ENVIRONMENTAL IMPACT STATEMENT

ENERGY TRANSPORTATION SYSTEMS, INC.
BUREAU OF LAND MANAGEMENT

FINAL
VOLUME 2

DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL IMPACT STATEMENT

ON THE

ENERGY TRANSPORTATION SYSTEMS INC.

COAL SLURRY PIPELINE

TRANSPORTATION PROJECT

PREPARED BY

BUREAU OF LAND MANAGEMENT (LEAD AGENCY)

AND WOODWARD-CLYDE CONSULTANTS

July 1981

DIRECTOR, BUREAU OF LAND MANAGEMENT

ERRATA SHEET

All references to Water and Power Resources Service (WPRS) should read Bureau of Reclamation. The name of this federal agency was changed too late to permit revision of the Final EIS text.

COAL .85I 7ES V.2 C.1

CONTENTS

Volume 2

TABLES

FIGURES

CHAPTER 6
CONSULTATION AND COORDINATION

The Bureau of Land Management (BLM) requested and received consultation from many organizations and individuals, public and private, in developing the draft and final environmental impact statement on the proposed coal slurry transportation project.

6.A SCOPING PROCESS

Regulations for implementing the National Environmental Policy Act (40 CFR, Part 1501.7) require an early and open scoping process. During this process, the scope of issues to be analyzed and significant issues related to the proposed action were identified. Information obtained during the scoping process was one of the sources used to determine significant impacts to be addressed in detail in the environmental impact statement (EIS).

Additional purposes of the scoping process were to inform affected federal, state, and local agencies and other interested persons about the proposal, and to identify existing environmental reports and information related to the proposal. Through the scoping process, better decision making is enhanced thorough emphasizing significant issues and reducing the magnitude of paperwork and the length of the statement.

The details of the nine public scoping meetings held during the initial phases of the environmental impact statement work are summarized in Appendix B-1.

6.B DRAFT EIS CONSULTATION AND COORDINATION

The Bureau of Land Management was assigned lead responsibility for preparing the environmental impact statement for the proposed coal slurry transportation project. The Bureau elicited the help of the following federal agencies in the areas indicated:

Geological Survey - consultation on ground and surface water concerns, including supply of hydrogeologic data

Fish and Wildlife Service - consultation on biological concerns, especially for threatened and endangered species

Forest Service - consultation on impacts to lands managed by the Forest Service and to forests and grasslands in general

Army Corps of Engineers - consultation on river crossing concerns and the permitting process for crossings

The first three agencies were considered to be cooperating agencies and, as such, had individuals assigned to the EIS team. Other team members included BLM personnel and personnel from its contractor, Woodward-Clyde Consultants. Persons from a wide variety of disciplines were assigned to the team to ensure an interdisciplinary approach to preparing the EIS. Their areas of expertise included hydrology, socioeconomics, biology, cultural resources, agriculture, air and water quality, visual resources, geology, wilderness resources. Information about EIS team members is included in the List of Preparers, which precedes the appendices in the Final EIS.

Between January and October 1980, three unpublished drafts of the EIS were distributed to a wide variety of federal agencies. The EIS was revised on the basis of their written review comments and published as the official Draft EIS. The Draft EIS was released for a 60-day public review on November 7, 1980.

Table 6-1 lists the federal and state agencies, local governments, organizations, legislators, and individuals that were sent copies of the Draft EIS and requested to complete a formal review of the document.

6.C PUBLIC REVIEW OF THE DRAFT EIS

The draft environmental impact statement (INT. DEIS-80-69) was filed with the Environmental Protection Agency on October 31, 1980, and announced in the Federal Register on November 7, 1980 (Vol. 45, No. 218, page 74074). In addition, three media releases were sent to radio and television stations and newspapers in the states that would be be affected by the proposed action. The releases announced the availability of the draft environmental impact statement (EIS) and locations of the public hearings, described the proposed action, identified key impacts, and requested public comment on the adequacy and accuracy of the statement. In all, a total of 1300 radio stations, television stations, and newspapers were contacted.

Approximately 3400 copies of the Draft EIS were distributed by mail to various individuals, organizations, and government agencies. Copies were also sent to 165 public libraries along the route, in addition to the designated federal depository libraries.

During the 60-day public comment period (November 7, 1980 to January 6, 1981), BLM conducted nine formal public hearings to solicit public comments on the Draft EIS. Table 6-2 shows locations and other details for each of the hearings. The public hearing testimony is discussed in more detail in Section 6.D.2.

The BLM also received letters addressing the Draft EIS during the public comment period. These letters are discussed in more detail in Section 6.D.3.

6.D PROCEDURES USED TO REVIEW PUBLIC COMMENTS ON THE DRAFT EIS

During the public review period for the Draft EIS, the BLM received 234 letters from citizens, federal and state agencies, local governments, businesses, and private organizations such as environmental and industrial groups. In addition, 161 individuals testified at the nine public hearings. The hearings proceedings were recorded verbatim by professional court recorders.

Copies of all letters and the hearing transcripts have been sent with the final environmental impact statement to the Secretaries of Interior and Agriculture. Copies of all letters from federal agencies; state agencies and legislators; local governments; organizations, groups, and businesses; and those from citizens with substantive comments (those that presented new data, questions of new issues bearing directly on the effects of the proposed action and its alternatives) are also included in Appendix I of this document. The hearing transcripts may be reviewed at the Office of Special Projects, Interior Building, Room 5070, Washington, D.C. and at the Office of Special Projects, 555 Zang Street, Third Floor East, Denver, CO 80228. Copies of all transcripts can be purchased for the cost of of photocopying from the Office of Special Projects in Denver at the above address.

TABLE 6-1

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS
REQUESTED TO REVIEW THE DRAFT EIS

Federal Government Agencies	National Environmental Groups	State Governments and Agencies	Local Governments
Department of the Interior *National Park Service *Geological Survey[a,b] *Water and Power Resources Service *Bureau of Indian Affairs *Fish and Wildlife Service[a] *Heritage Conservation and Recreation Service Denver Office of the Secretary Atlanta Office of the Secretary Department of Agriculture *Forest Service[a] *Soil Conservation Service Department of Energy Department of Transportation *Federal Highway Administration *Federal Railroad Adminstration Environmental Protection Agency *Washington Office *Region 6 *Region 8 *Interstate Commerce Commission Department of Defense *Corps of Engineers[a] (8 District Offices and 1 Division Office) *Department of the Air Force, Warren AFB Advisory Council on Historic Preservation	American Fisheries Society *Audubon Society Friends of the Earth Natural Resources Defense Council National Wildlife Federation *Sierra Club Wilderness Society	*Arkansas A-95 Clearinghouse *Colorado A-95 Clearinghouse Larimar Weld Regional Council of Governments Northeastern Colorado Council of Governments *Kansas A-95 Clearinghouse North Central Regional Planning Commission Northeast Kansas Planning and Development Commission Mid-State Regional Planning Commission Chikaskia Golden Belt and Indian Hill Regional Planning Commission Wichita-Sedgwich County Metropolitan Area Planning Commission *Louisiana A-95 Clearinghouse Central Regional Clearinghouse Capital Region Planning Commission Arcadiana Regional Clearinghouse Southwest Regional Clearinghouse Imperial Calsasieu Regional Planning Commission Northwest Regional Clearinghouse Ouachita Council of Governments Teche Regional Clearinghouse *Nebraska A-95 Clearinghouse *Oklahoma A-95 Clearinghouse *South Dakota A-95 Clearinghouse *Wyoming A-95 Clearinghouse *Indian Nations Council of Governments	Various commissioners, mayors, and departments[b]

TABLE 6-1 (Concluded)

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS
REQUESTED TO REVIEW THE DRAFT EIS

State Environmental and Industry Groups[b]		National Industry Groups[b]	Federal and State Congressional Representatives[b]		Individuals[b]	
Arkansas	(15)	(62)	Arkansas	(40)	Outside 8-State Area	(27)
Colorado	(20)		Colorado	(12)	Arkansas	(24)
Kansas	(15)		Kansas	(64)	Colorado	(20)
Louisiana	(17)		Louisiana	(28)	Kansas	(2)
Nebraska	(36)		Nebraska	(7)	Louisiana	(5)
Oklahoma	(9)		Oklahoma	(21)	Nebraska	(154)
South Dakota	(23)		South Dakota	(14)	Oklahoma	(26)
Wyoming	(11)		Wyoming	(4)	South Dakota	(11)
					Wyoming	(34)

a Cooperating agencies.

b Review comments used in preparing the Final EIS, but not reprinted in Chapter 6 or Appendix 1 of this document.

c Detailed list available upon request from Richard E. Traylor, ETSI EIS Project Leader, 555 Zang Street, 3rd floor East, Denver, Colorado 80228, phone: (303) 234-6737.

* Reviewed the Draft EIS and provided comments to BLM.

TABLE 6-2

DRAFT EIS PUBLIC HEARINGS

Hearing/Date	Adminstrator	Panel	Attendance	Speakers
Baton Rouge, LA 12/1/80	Rankin-BLM	Traylor-BLM Boyd-BLM	30	4
Little Rock, AR 12/3/80	Hildebeidel-BLM	Traylor-BLM Boyd-BLM	65	7
Tulsa, OK 12/4/80	Gurr-BLM	Traylor-BLM Boyd-BLM Short-FWS	60	7
Hays, KS 12/8/80	Gurr-BLM	Traylor-BLM Lytle-BLM	50	11
Sterling, CO 12/10/80	Gurr-BLM	Traylor-BLM Boyd-BLM	70	7
North Platte, NE 12/11/80	Noldan-BLM	Traylor-BLM Palmquist-BLM Dutcher-USGS	100	31
Rapid City, SD 12/15/80	Vail-BLM	Traylor-BLM Palmquist-BLM Dutcher-USGS	90	18
Edgemont, SD 12/16/80	Vail-BLM	Traylor-BLM Palmquist-BLM Dutcher-USGS Olsen-FS	315	44
Lusk, WY 12/17/80	Vail-BLM	Traylor-BLM Palmquist-BLM Dutcher-USGS Olsen-FS	200	32
		TOTAL	980	161

All letters and testimony were assigned a reference number and reviewed. Substantive comments were responded to. Where appropriate, Draft EIS sections were revised. All changes have been included in this final environmental impact statement.

6.D.1 LETTERS WITH SUBSTANTIVE COMMENTS

Letters that included substantive comments, as defined in the preceding section, are listed in Table 6-3. Responses to the comments included in these letters are found in Section 6.E. Letters that did not address the adequacy of the draft environmental impact statement were assigned a reference number but are not listed in the table.

6.D.2 PUBLIC HEARING TESTIMONY WITH SUBSTANTIVE COMMENTS

Individuals who presented testimony at a public hearing that included substantive comments, as defined in the Section 6.D introduction, at a public hearing are listed in Table 6-4. Responses to comments included in the hearing presentations are found in Section 6.E. The public hearing transcripts are not reprinted in this document, because they are already part of the public domain. The introduction to Section 6.D discusses where copies can be reviewed and how they can be obtained.

6.E RESPONSES TO COMMENTS ON THE DRAFT EIS

As discussed in Section 6.D, each letter received and each person who testified at a hearing was assigned a reference number. Individual substantive comments within each letter or testimony were then identified and responded to. In this section, these individual comments and responses have been grouped into the categories shown in Figure 6-1.

In the following sections, individual comments usually have been reprinted verbatim. Where many similar comments were received, only one representative comment has been reprinted, or a paraphrased comment that includes the points raised by all commenters has been printed. However, all commenters who made the same comment have been identified by reference number immediately following the comment. Table 6-3 and Table 6-4 list the names that correspond to the reference numbers. All reference numbers including only a number are found in Table 6-3. Those that include two letters and a number (for example, ED-1 or WY-5) are found in Table 6-4.

The comment responses either explain that the EIS text has been revised to incorporate the change recommended by the commenter or explain why a text change was not appropriate. Comments that were solely editorial in nature were incorporated in the text of the Final EIS but were not reprinted or responded to in this chapter.

6.E.1 WATER RESOURCES

Comments and responses related to water resources have been grouped into the following categories: WCC model, aquifer recharge, aquifer leakage, aquifer storage, drawdown, effects of Gillette pumping, ground-water quality, spring and stream flow impacts, shallow aquifer impacts, geothermal impacts, oil field impacts, monitoring, effects of pump station wells, effects on other users, regional water study, surface water quality, stream crossings, water legislation, and general water.

TABLE 6-3

LETTERS WITH SUBSTANTIVE COMMENTS

Reference Number	Source of Letter
4	Heritage Conservation and Recreation Service, Denver, CO (federal agency)
5	U.S. Army Corps of Engineers, Washington, D.C. (federal agency)
7	Tennessee Valley Authority, Norris, TN (federal agency)
8	South Dakota Resources Coalition, Brookings, SD (organization)
17	State of Arkansas, Little Rock, AR (state agencies)
28	H.E. Stuckenhoff, M.D., Casper, WY (citizen)
29	Cherie Daly, Douglas, WY (citizen)
32	Byron Radcliff, Chadron, NE (citizen)
33	Black Hills Alliance, Rapid City, SD (organization)
36	Kansas Fish and Game, Pratt, KS (state agency)
39	J.P. Gries, Rapid City, SD (citizen)
43	Water and Power Resources Service, Denver, CO (federal agency)
44	State of Nebraska, Lincoln, NE (state agencies)
45	State of Oklahoma, Oklahoma City, OK (state agencies)
46	Powder River Basin Resource Council, Douglas, WY (organization)
61	National Park Service, Denver, CO (federal agency)
72	State of Wyoming, Cheyenne, WY (state agencies)
74	Missouri Breaks Chapter, National Audubon Society, Pierre, SD (organization)

TABLE 6-3 (Continued)

LETTERS WITH SUBSTANTIVE COMMENTS

Reference Number	Source of Letter
78	Pulaski County Audubon Society, Little Rock, AR (organization)
83	Soil Conservation Service, Washington, D.C. (federal agency)
89	State of Colorado, Denver, CO (state agencies)
90	Dick Merklin, North Platte, NE (citizen)
97	Rex T. Coffee, Harrison, NE (citizen)
99	Marlene Simons, Beulah, WY (state legislator)
113	Oklahoma Department of Pollution Control, Oklahoma City, OK (state agency)
114	City of Fort Smith, Fort Smith, AR (local government)
122	Kansas City Southern Railway Company, Washington, D.C. (business)
129	Trout Haven Ranch, Buffalo Gap, SD (business)
136	Phillip L. Fitzwater, Tucson, AZ (citizen)
137	Union Pacific Railroad Company, Omaha, NE (business)
138	State of South Dakota, Pierre, SD (state agencies)
139	Energy Transportation Systems Inc., Casper, WY (business)
140	U.S. Fish and Wildlife Service, Denver, CO (federal agency)
141	Wyoming Chapter Sierra Club, Kaycee, WY (organization)
150	Oklahoma Department of Wildlife Conservation (state agency)

TABLE 6-3 (Continued)

LETTERS WITH SUBSTANTIVE COMMENTS

Reference Number	Source of Letter
151	Donald Pay, Mandan, ND (citizen)
153	John Gispert, Denver, CO (citizen)
156	John and Mary Lou Federle, Harrison, NE (citizens)
160	Joel Richenbach, Oelrichs, SD (citizen)
168	Kansas Department of Health and Environment (state agency)
169	Paul J. Templeton, Sterling, CO (citizen)
178	City of Gillette, Gillette, WY (local government)
179	Black Hills Energy Coalition, Rapid City, SD (organization)
193	Inyan Kara Ranches, Inc., Sundance, WY (business)
194	Missouri River Basin Commission, Omaha, NE (federal-state agency)
210	Indian Nations Council of Governments, Tulsa, OK (local government)
211	Department of Transportation, Washington, D.C. (federal agency)
213	Citizens for Responsible Use of Madison Water, Deadwood, SD (organization)
215	Arkansas Natural and Scenic Rivers Commission, Little Rock, AR (state agency)
216	Wyoming State Historic Preservation Office, Cheyenne, WY (state agency)

TABLE 6-3 (Concluded)

LETTERS WITH SUBSTANTIVE COMMENTS

Reference Number	Source of Letter
217	Interstate Commerce Commission, Washington, D.C. (federal agency)
218	Forest Service, Washington, D.C. (federal agency)
219	Weld County Department of Planning Services, Greeley, CO (local government)
220	United Transportation Union, Newton, KS (organization)
225	Bureau of Indian Affairs, Washington, D.C. (federal agency)
226	Environmental Protection Agency, Washington, D.C. (federal agency)
27	Arkansas Department of Local Services, Little Rock, AR (state agency)
9	Board of Sequoyah County Commissioners, Sallisaw, OK (local government)
	U.S. Army Corps of Engineers, Omaha, NE (federal agency)
	State of Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA (state agency)

TABLE 6-4

PUBLIC HEARING TESTIMONY WITH SUBSTANTIVE COMMENT

Reference Number	Speaker	Representing
CO-1	Fred Eiserman, Casper, WY	Energy Transportation Systems Inc.
CO-2	David Foy, Otis, CO	Washington County Commissioners
CO-3	Woody Huddleston, Sterling, CO	self
ED-1	John Krueger, Edgemont, NE	Fall River County Energy Coordinating Team
ED-2	Elizabeth Brechtel, Hot Springs, SD	self
ED-3	Perry Rahn, Rapid City, SD	self
ED-4	Keith Anderson, Edgemont, SD	Edgemont City Council
ED-5	Rex Miller, Edgemont, SD	Fall River County Commission
ED-6	Matt Brown, Edgemont, SD	self
ED-7	Charles Colgan, Hot Springs, SD	self
ED-8	Marvin Truhe, Rapid City, SD	Fall River County Commission
ED-9	Mike Strub, Rapid City, SD	Sixth District Council of Local Governments
ED-10	Irene Anderson, Edgemont, SD	Southern Hills Water Association
ED-11	Tom Landers, Hot Springs, SD	Fall River County Commission
ED-12	Mabel Moebeck, Edgemont, SD	Edgemont Chamber of Commerce
ED-13	Steven Kocer, Edgemont, SD	self
ED-14	Don DeVries, Hot Springs, SD	City of Hot Springs, Fall River Feedlots
ED-15	John Scheltens, Hot Springs, SD	City of Hot Springs
ED-16	Ken Dewell, Edgemont, SD	Fall River County
ED-17	Chuck Colgan, Hot Springs, SD	self
ED-18	Bill Greenwood, Alliance, NE	Burlington Northern, Alliance Division
ED-19	Steve Doerr, Edgemont, SD	Edgemont School District
ED-20	Matt Brown, Edgemont, SD	self
ED-21	Don Brown, Denver, CO	Save Nebraska Water
ED-22	Mark Friedrickson, Rapid City, SD	Black Hills Alliance

TABLE 6-4 (Continued)

PUBLIC HEARING TESTIMONY WITH SUBSTANTIVE COMMENT

Reference Number	Speaker	Representing
ED-23	John Williams, Chadron, NE	Upper Niobrara - White Natural Resource District
KS-1	John Ligon, Independence, KS	self
KS-2	Patrick Hubbell, Topeka, KS	Kansas Railroad Association
KS-3	John Pasley, Topeka, KS	Burgasin-Pasley Engineers
KS-4	Stephen Burr, Salina, KS	National Parks and Conservation Association
LA-1	Michael Tritico, Lake Charles, LA	RESTORE
LA-2	Virginia Partridge, Tulsa, OK	Energy Transportation Systems Inc.
NE-1	Myron Graybill, Grant, NE	self
NE-2	John Wilken, Alliance, NE	Alliance Area Chamber of Commerce
NE-3	Robert J. Olson, Grand Island, NE	Grand Island Utility Department
NE-4	Don Long, Holdrege, NE	Central Nebraska Public Power and Irrigation District
NE-5	Gary Toebben, North Platte, NE	North Platte Chamber of Commerce
NE-6	John Ditsch, Alliance, NE	Box Butte County Commission, Panhandle Resource Council
NE-7	Gary Patterson, North Platte, NE	self
NE-8	Alvina Collins, Ogallala, NE	Women Involved in Farm Economics
NE-9	Walter Carlyle, North Platte, NE	self
OK-1	Ed Dudley, Oklahoma City, OK	Oklahoma Railways Committee
RC-1	Frank Odasz, Casper, WY	Energy Transportation Systems Inc.
RC-2	Mike Strub, Rapid City, SD	Sixth District Council of Local Governments

TABLE 6-4 (Concluded)

PUBLIC HEARING TESTIMONY WITH SUBSTANTIVE COMMENT

Reference Number	Speaker	Representing
RC-3	Richard Howard, Pierre, SD	Bob Neufeld, Secretary of SD Department of Water and Natural Resources
RC-4	Lilias Jones, Rapid City, SD	Black Hills Alliance
RC-5	Steve Paulson, Rapid City, SD	Black Hills Energy Coalition
WY-1	Allan Boyce, St. Paul, MN	Burlington Northern, Inc.
WY-2	Jean Sears, Newcastle, WY	self
WY-3	Marlene Simons, Beulah, WY	State Representative, Crook County
WY-4	Paul Stuart, Gillette, WY	Powder River Basin Resources Council
WY-5	Frank Odasz, Casper, WY	Energy Transportation Systems Inc.
WY-6	Lorin Harper, Sundance, WY	self
WY-7	John DeGering, Lusk, WY	self
WY-8	Wayne Moore, Gillette, WY	self
WY-9	Russell Zimmer, Torrington, WY	self
WY-10	Mark Gordon, Kaycee, WY	Sierra Club
WY-12	Warren White, Cheyenne, WY	Wyoming Governor Herschler
WY-13	Terry Larson, Lusk, WY	Melvin ZumBrunnen, Niobrara County Farm Bureau
WY-14	Barry Peterson, Douglas, WY	Wyoming Department of Probation and Paroles
WY-15	Kenneth Freeman, Lusk, WY	Niobrara County Commission

FIGURE 6-1

PUBLIC COMMENT CATEGORIES

WCC Model

1. Comment: Many commenters were concerned about the reliability of the model used to predict the hydrologic impacts. They raised the following points:

   a. Predictions are based on very limited data for a large and complex geohydrologic system.

   b. Model does not accurately or adequately predict impacts.

   c. Methodologies are inadequate as they pertain to South Dakota.

   d. Predictions do not match observed declines.

   e. Model is based on erroneous geological input.

   f. Analysis does not address the entire range of possibly drawdowns.

   (Commenters 46, 72, 138, 139, 141, ED-4, ED-8, ED-17, ED-21.)

   Response: The input used to support the EIS conclusions is based on existing data, especially USGS publications and data bases. These data and other published reports are assumed to be reliable sources of information (see Chapter 1 of the Well Field Hydrology Technical Report [WCC 1980b]). The model that was developed best explains the hydraulic dynamics of the Madison aquifer flow system in light of the latest existing and available data. Data may exist in inaccessible or confidential locations such as oil company files. However, the value of this information cannot be ascertained at this time, and may never be known.

   A degree of uncertainty is present in predicting the response of any hydrologic system. The degree of uncertainty in predicting the future response of the Madison aquifer system to groundwater withdrawals was handled by using a statistically acceptable technique called a Monte Carlo simulation. The uncertainty the predictions were discussed in Chapter 7 (Reliability of Impact Predictions) of the Well Field Hydrology Technical Report (WCC 1980b).

   The results of this technique were discussed in Section 4.A.1 of the Final EIS; this section dealt with the impact of each of the possible well field plans. The Well Field Hydrology Technical Report (WCC 1980b) stated on page 7-10, "The probability distributions of drawdowns in the Madison aquifer from Monte Carlo simulations of ETSI's proposed withdrawals show that the drawdowns calculated are greater than the values having a 50 percent exceedence probability. This suggests that the values computed are conservative in the sense that they have a smaller probability of being exceeded rather than not being exceeded."

   The model used to calculate drawdowns did not differentiate between Wyoming and South Dakota. All aquifer parameters were specified as being continuous across state lines.

The model was developed to predict the worst-case impacts (see response to WCC Model Comment 3). Because of the uncertainties and complexities involved, it was felt that development of a range of drawdowns from least probable to most probable would not be a useful decision-making tool. Therefore, only the worst-case analysis was presented in the Draft EIS. This was also done in the Final EIS, with one exception. A most probable as well as a worst-case analysis was developed for the combined well field alternative.

2. Comment: Many commenters raised the issue as to why the USGS model and data gathered for the USGS Madison Formation study was not used in the EIS. (Commenters 7, 72, 179, ED-6, ED-16, ED-21, ED-23, and RC-3.)

Response: The USGS, acting as a cooperating agency, assisted BLM in preparing the Draft EIS as well as the Final EIS. All available information that could be released by USGS was used in the development of the model used in the EIS. All of the work performed for the EIS was reviewed by USGS. The USGS has stated that in its estimation and based on available data, the impact analysis presented in the EIS represents a worst-case analysis.

The USGS Madison Formation Study is being issued as several individual reports. The main report, which will contain the model, is not scheduled for release until late 1981 or early 1982.

The conclusions of the geology and tectonic analysis of the USGS Madison study are not available and, therefore, could not be considered by Woodward-Clyde Consultants in their Madison aquifer model.

The analysis conducted for the ETSI EIS consisted of a review of available and pertinent literature and contacts with experts in their respective fields (see Chapter 1 of the Well Field Hydrology Report [WCC 1980b]). These studies included a review of other people's earlier attempts at assessing potential impacts caused by pumping from the Niobrara County well field site.

The methodology used in the EIS was not directly a methodology utilized by the USGS. The USGS preliminary model was not used in this study to calculate impacts, because the data set was released only as a preliminary version, because the model was designed to simulate a very large region, and because the drawdowns calculated using the model were unrealistic. The numerical computer code (Trescott and Larson 1976) used to calculate the mathematical equations for the steady-state and transient hydraulic response of the aquifer system is a code developed by the USGS. The application of this numerical code to the simulated hydrodynamics of the Madison aquifer system is unique. The Madison aquifer model developed by Woodward-Clyde Consultants was independently and specifically designed for this study and does not exactly reproduce anything previously developed by the USGS.

A conceptual model was developed from these studies which explains the hydraulic behavior of the Madison aquifer system. Based upon the conceptual model, a state-of-the-art numerical model was used to calculate future declines in water levels, changes in water quality, and reduction in spring flow and stream flow caused by withdrawals of ground water by present and planned Madison aquifer users, as well as by ETSI. A monitoring program was then designed which would monitor potential impacts on the ground-water and surface-water resources.

Refinement at this time is not possible, since additional data has not become available. It is felt that since the model does represent a worst-case analysis (see response to WCC Model Comment 3) refinement with new data would only tend to reduce the predicted impacts, not increase them.

3. Comment: Numerous commenters questioned the Draft EIS statement that the hydrologic impact analysis presented was a worst-case analysis. They felt it was not a worst-case analysis. The general basis for this concern appeared to be the fact that the model used in this EIS did not predict the same magnitude of impact that had been predicted by earlier studies such as South Dakota School of Mines and Technology, University of Wyoming, Dr. Perry Rahn, and Huntoon and Womack. (Commenters 7, 8, 33, 46, 72, 74, 138, 179, ED-3, ED-6 ED-8, ED-9, ED-15, RC-2.)

Response: The calculated drawdowns shown in the Draft EIS have less than a 50% chance of being exceeded if the ETSI withdrawals occur (see response to WCC Model Comment 1). Therefore, these impacts represent a worst-case analysis.

The model used to calculate these drawdowns and spring flow reductions was a biased estimation of most probable impacts; the model overestimated the impacts that are most likely to occur. The degree of overestimation cannot be quantified, but as discussed below, the overestimation of most probable impacts may be large.

Most systems models are biased. That is, the models have a tendency to overpredict or underpredict system responses to stress. Frequently, as is the case with this model, the model biases cannot be quantified. The cause of bias in the model of the Madison aquifer system which have been recognized and which are probably the major causes of bias are a result of: 1) parameter uncertainty; 2) the uniform parameter distributions; 3) boundary condition specifications; and 4) the technique used to calculate spring and streamflow reduction.

The parameters used in the model were fully discussed in Section 4 of the Well Field Hydrology Technical Report (WCC 1980b). (This presentation has been clarified and expanded in the final Well Field Hydrology Technical Report). The reliability of the predictions was discussed in Section 7 of the same report.

Because of the unknowns, the worst-case approach was used instead of developing least likely or most probable scenarios. This was to ensure that the worst case of secondary impacts associated with the drawdowns would also be analyzed.

All previously published hydrologic studies on the Madison aquifer were reviewed in the process of preparing the EIS. Chapter 2 of the Well Field Hydrology Technical Report (WCC 1980b) discussed these studies and the reasons why some previous estimates of drawdowns were considered to be inappropriate for the purposes of the EIS. The reasons why these other studies were inappropriate are summarized below.

(1) A more complete data base was available and was incorporated in this study.

(2) Some of the earlier studies were empirical and limited in scope and complexity. These studies did not address or incompletely addressed boundary conditions, the effect of pumping by other users, water quality changes, the hydraulic connection with adjacent formations, aquifer geometry, and contained very simplified assumptions.

(3) The analyses were too regional in character and were not specifically designed for assessing impacts of a more local scale.

(4) The analyses could not be appropriately used for assessing impacts caused by pumping from other well fields such as the Crook well field.

(5) The pumping rates and length of pumping used in the other studies were different from those required by this study.

These previous studies (Rahn 1975, 1979a; Halepaska 1975; Huntoon and Womack 1975) were based on data available in the mid-1970s. Additional data collected since that time have considerably increased the understanding of the hydraulic behavior of the Madison aquifer along the western flanks of the Black Hills. The additional data and resulting interpretations have led to the recognition of some important factors that need to be considered in assessing the long-term effects of development from the Madison aquifer (refer to Chapter 2, page 2-1, of the Well Field Hydrology Technical Report [WCC 1980b]). These factors were not included in the earlier studies, and therefore, the results of the earlier studies do not represent the most realistic predictions of drawdowns that can be made now.

The studies of Rahn (1975), Halepaska (1975), and Huntoon and Womack (1975) over-estimated drawdowns for several reasons. The most important reasons are:

(1) Estimates of transmissivity of the Madison were too low. Rahn (1975) used 0.01 ft^2/sec; Huntoon and Womack (1975) used 0.003 ft^2/sec; and Halepaska used 0.006 ft^2/sec. Recent data on the Madison aquifer suggest that the transmissivity in the vicinity of the Niobrara site is most likely about to Section 4.C.1 of the Well Field Hydrology Technical Report).

(2) Leakage from overlying strata was assumed to not occur in the earlier models. Leakage is now known to occur when the system is stressed.

The absolute worst case, of course, is the drying up of all wells, springs and streams. This is not a realistic approach to the analytical problem. In the absence of any data, this might have been the appropriate approach. However, as stated, a certain level of data does exist and was used. With the level of data available, then, the worst-case analysis was developed.

4. <u>Comment</u>: "We believe that it is difficult to assess the accuracy of the steady-state model calibration with only a comparison of observed and computed potentiometric levels at selected locations as given in Table 4-2 of the "Well Field Hydrology Technical Report." Since the credibility of the predictive analyses rests on the accuracy of the numerical model, illustrations showing a comparison of computed and observed potentiometric contours over the modeled region would be more meaningful. We suggest that this information be included in the final EIS." (Commenter 7.)

<u>Response</u>: Only a few data points were used by Miller and Strausz (1980) in constructing the potentiometric map of the Madison aquifer in the vicinity of the Black Hills. Most of these data points are listed in Table 4-2 of the Well Field Hydrology Technical Report (WCC 1980b), which lists the observed and the calculated potentiometric heads at these points. The comparison is believed to be more meaningful than a comparison of the computed surface with the surface constructed by Miller and Strausz (1980), because many possible surfaces can be contoured that fit the observed data. The calculated potentiometric surface, though, does closely coincide with the surface contoured by Miller and Strausz (1980).

5. <u>Comment</u>: "In the same area, the DEIS notes that pumping, especially at the Niobrara field, would take place at a point where the recharge waters to the Madison aquifer are beginning to move horizontally (p. 3-10). The effects of pumping water from that particular point in the hydrological system might be particularly significant and should be looked into more closely." (Commenter 33.)

Response: The effects of pumping water from the Niobrara well field were examined in detail. The methods of analysis were explained in detail in the Well Field Hydrology Technical Report (WCC 1980b) (see Chapter 4). The effects caused by pumping from the Madison aquifer were assumed using state-of-the-art technology and up-to-date information. The hydrology studies conducted for the impact assessment were comprehensive, incorporating information from a large number of contacts and numerous publications (see Sections 1.C and 1.D of the same Well Field Hydrology Technical Report).

6. Comment: WCC's transient numerical model used to predict 50-year drawdowns in the Powder River Basin is based on faulty assumptions and is incapable of representing realistic impacts on water resources in the western Black Hills. First, the spacial distribution of Madison transmissivities as determined by the calibration of a steady state model fitted to Swenson's potentiometric map is not justified by the physical system. An example of the arbitrary nature of the transmissivity fitting is in the area of Newcastle, Wyoming. This area was designated a low transmissivity area with a transmissivity of only 0.01 of the average basin value of 0.03 ft^2/sec. Flow tests of Newcastle's four municipal Madison wells conducted by Anderson and Kelly Consultants in 1978 yielded transmissisivity values of 0.02 ft^2/sec, two orders of magnitude higher than that predicted by the steady state model calibration. This points up the fact that WCC's assignment of low transmissivity areas along the Black Hills monocline was arbitrary and is not representative of the physical system. Replacing the model's transmissivity value of 0.0003 ft^2/sec with the flow test's 0.02 ft^2/sec would allow the sphere of influence from ETSI pumping to propagate quickly through the Newcastle area and would stress the springs and rivers near the Black Hills recharge area to a much greater extent than predicted in the report.

Nowhere does the analysis indicate that the actual observed field results of the State Engineer-ETSI pump testing data were reproduced utilizing the methodology employed in preparing the EIS. (Commenter 136, 72.)

Response: The hydrogeological analyses are not based on theoretical conjecture. Hydrologic properties of the Madison aquifer system used in this study are based on studies of available geologic and hydrologic data, including lithology, geologic structure, stratigraphy, water chemistry, short- and long-term aquifer response to pumping, recharge-discharge relationships, and accepted hydraulic principles. The assumptions used in the model are realistic based on available information. A zone of relatively low transmissivity along the Black Hills monocline best explains the observed potentiometric surface. Close agreement was obtained between the observed and the computer potentiometric surface (see Table 4-2 in Section 4.C.2 of the Well Field Hydrology Technical Report [WCC 1980b]). A transmissivity of 0.03 ft^2/sec, was specified for the Madison aquifer in the vicinity of the Newcastle wells.

The selection of the transmissivities used in the Madison aquifer model was not based on arbitrary values, but rather on calculations using available data and the relationships between hydrogeologic parameters. Data from aquifer tests, as well as other hydrogeological characteristics, were used to develop the conceptual model. The conceptual model is consistent with the geology and water quality characteristics in the aquifer, and explains the wide range of reported transmissivities.

The ETSI Niobrara County well field Madison pump tests, as well as Madison aquifer tests at the Gillette (Moorcroft), Newcastle, and USGS Test Well No. 1, were reviewed and analyzed (see Appendix H of the Well Field Hydrology Technical Report [WCC 1980b]). A review of other peoples' analyses of these pump tests was also conducted. The conclusion reached as a result of these reviews is that these short-term Madison aquifer tests are not useful for assessing aquifer behavior on a regional scale. However, the hydraulic behavior of the Madison aquifer system can be explained using the numerical techniques and conceptual model developed for the ETSI EIS. The techniques used and the model developed are consistent with known physical and hydrogeologic properties of the Madison aquifer system.

The regional transmissivity of the Madison aquifer is a function of zones of high and low transmissivity. The high transmissivity zones are not assumed to be present everywhere, but are hydraulically continuous. The numerical model does not explicitly represent each of these high transmissivity zones on an individual basis, but rather the regional hydraulic character of the Madison aquifer. The regional hydraulic character is an integration of both high and low transmissivity zones. Drawdowns measured during a short-term pumping test will be only a function of the local transmissivity in the area of the pump test, not the regional transmissivity. The numerical model was designed to simulate the Madison aquifer system on a regional scale.

7. Comment: Some commenters raised the concern that the Final EIS should identify that the model is only a model, the impacts are estimated, and the impacts and the methods used to determine the aquifer characteristics should be summarized. (Commenters ED-3, 72.)

   Response: The Draft EIS as well as the Well Field Hydrology Technical Report (WCC 1980b) state many times that a numerical model was used to predict the impacts. The numerical methods and parameter estimates, along with supporting evidence, was discussed in Chapter 4 of the Technical Report. A summary of these estimates can be found on Table 4-1 of the same report.

8. Comment: "The second faulty assumption was the use of a constant head boundary condition along Black Hills recharge area. This boundary condition is only valid for use under steady state conditions. It is not acceptable for a transient model used to predict pumping impact in the Black Hills area. Using a constant head boundary in the Black Hills essentially assumes infinite recharge in that area and restricts the model from representing consequences of ETSI pumping on Black Hills' streams and springs. Assuming infinite recharge and at the same time predicting minimal impact in recharge areas is an inescapable circular argument, particularly, if certain small springs and streams are made to disappear by the pumping. The constant head boundary condition becomes critical when the imposed zones of low transmissivity, as at Newcastle, are removed and pumping impact is allowed to propagate to recharge areas. Springs and streams in these areas must then respond with lower discharges. Use of a constant head boundary here excludes prediction of this impact and should be replaced by a prescribed flux boundary condition to realize a realistic impact prediction.

...I recommend amending the transient ground-water flow model by correcting the misplaced zones of low transmissivity and replacing the constant head boundary in the Black Hills with a prescribed flux boundary in order to predict the extent of ETSI pumping impact on the water resources of the western Black Hills." (Commenter 136.)

Response: No-flow boundaries, not constant-head boundaries, were specified in the Black Hills in the transient models. The outcrop areas of the Madison and Minnelusa aquifers were modeled in the Black Hills region for the transient simulations with no-flow boundaries specified along the edge of the outcrops and an unconfined storage coefficient specified for the outcrop areas. Constant-head boundaries were used in the Black Hills region for the steady-state simulations. It is agreed that constant head boundaries will cause impacts to be underestimated if they are used in transient simulations. However, all boundary conditions used in the transient simulations were no-flow conditions.

Constant-flux boundary conditions could have been used instead of no-flow boundary conditions to represent the outcrop areas. In fact, constant-flux conditions would better simulate actual conditions, but since drawdowns in the outcrop areas are small (generally less than 10 feet), both techniques produce nearly identical drawdowns in confined portions of the aquifers. No-flow boundary conditions were used, because they are computationally much simpler to specify.

One drawback of using no-flow boundary conditions rather than constant-flux conditions is that rates of recovery are underpredicted. As prediction of recovery was not a major issue in the EIS analysis, the modelers were not concerned that recovery rates were underpredicted.

The zones of low transmissivity were not misplaced (see response to WCC Model Comment 6).

9. Comment: (in reference to the Well Field Hydrology Technical Report): Page 4-14-Paragraph 4 states, "The model assumes regional transmissivity of the Madison aquifer is a function of well-developed zones of secondary porosity and permeability in the Madison aquifer. These zones are assumed to be randomly distributed." Page 4-2 states, "Transmissivities in both the Red River and Madison aquifers were specified as being 16 times greater in a northeast-southwest direction than in the northwest-southeast direction." The basis for these assumptions are not adequately justified in the report. (Commenters 138, ED-3, ED-8.)

Response: The model makes two basic assumptions on the transmissivity of the Madison: (1) transmissivity of the Madison is a function of well-developed zones of secondary porosity and permeability; and (2) these zones are randomly distributed.

The simplest way to explain the transmissivity of the Madison aquifer is to assume that: (1) transmissivity is a function of intercrystalline porosity and permeability; and (2) the transmissivity distribution is uniform. These assumptions are contrary to the observed data. The transmissivity of the Madison, where it is due to intercrystalline porosity and permeability, is about 0.004 ft^2/sec. Transmissivities of the Madison aquifer calculated from pump test data range between 0.0015 and 0.46 ft^2/day. Results from Madison aquifer tests, especially the tests run at the Gillette and Niobrara well fields, as well as recorded bit drops, led to the development of a conceptual model of the Madison transmissivity that assumes the regional transmissivity of the Madison aquifer is a function of well-developed zones of secondary porosity that are randomly distributed and already continuous from a hydraulic viewpoint. This conceptual model explains in a simple manner the wide range of reported transmissivity for the Madison aquifer and the apparently high range of transmissivities estimated for the Madison aquifer from steady-state models (0.0225 to 0.035 ft^2/sec). These zones of high transmissivity could be either randomly or nonrandomly distributed and explain these observed phenomenon.

The observed potentiometric data and the pump test results can be adequately explained by a model that assumes a random distribution. Therefore, since a random model is simpler than a nonrandom model, a random transmissivity distribution was specified in the aquifer models.

The 16:1 transmissivities were specified by the USGS in the preliminary data set of the USGS Madison aquifer model. No documentation was supplied with the data set as to why the 16:1 ratio was used. In a meeting with the USGS, BLM, and WCC (June 26, 1980), the USGS said that there was no physical basis for using the 16:1 ratio. According to the USGS, the reason that ratio was given was because it provided a best fit with the Madison potentiometric data. The USGS also said at the same meeting that this ratio will not be used in a subsequent, updated version of their Madison aquifer model.

10. Comment: Several commenters raised the issue concerning the assumption of the existence of a fault where large vertical displacement has occurred, with resulting low transmissivity across the area next to the Niobrara well field. The use of this feature has a profound effect on the modeling results and would reduce the size of the affected area and the magnitude of predicted water level declines. (Commenters 39 and 72.)

    Response: The available evidence, particularly the piezometric surface maps, strongly suggests that a zone of low transmissivity exists parallel to the Black Hills and Fanny Peak Monoclines (refer to p. 4-17 of the Well Field Hydrology Technical Report [WCC 1980b]). The Well Field Hydrology Technical Report states: "Changes in structural relief of 6000 feet within a few miles along the monoclines and possible faulting of the Madison Group along these monoclines are the cause of these transmissivity reductions."

    The existence of a fault is not a prerequisite for the low transmissivity zone along the monocline. In the study it is implicitly assumed, as expressed in the above stated quote, that drape folding, not faulting, of the Madison Group is the predominate structural feature in the Madison Group along the monoclines.

    The reasons why the monoclines act as zones of low transmissivity are unknown. Apparently, the well-developed zones of secondary porosity and permeability which effectively determine the transmissivity of the Madison aquifer elsewhere do not occur along the monoclines. As a result, the transmissivity of the Madison along the monoclines is equal to or less than the estimated transmissivity of the Madison aquifer due to intercrystalline porosity and permeability.

    The tensional fracturing would be parallel to, not transverse to the monoclines. Therefore, higher transmissivity would parallel the monoclines. This high transmissivity is incorporated in the model, and was specified to be 100 times greater along the monoclines than across the linear features.

    If a zone of low transmissivity was not specified along the monocline, calculated impacts from pumping from the Niobrara well field would be less, but calculated impacts from pumping from the Crook Well Field would be little changed.

11. Comment: "A second area of concern with the Woodward-Clyde model is that little consideration has been given to fracture permeability. In my opinion, fracture related porosity and

permeability in the carbonate reservoir rocks of the area has a significantly greater influence on the movement of water than intercrystalline matrix porosity and permeability. From personal communication with many oil companies working in the Williston and Power River Basins, it is apparent that they are arriving at the same conclusions. Two examples of recently discovered oil fields in which the Madison Limestone is treated as a fractured reservoir are the Stanley field in North Dakota and the Mondak field in Montana and North Dakota." (Commenter ED-21.)

Response: Analysis of the results of the many pump tests that have been seen in the Black Hills region, especially the tests conducted at the Gillette and Niobrara well fields, have led to the conclusion that well-developed zones of secondary permeability and porosity, not intercrystalline matrix porosity and permeability, determine regional aquifer transmissivity. The transmissivity of the Madison aquifer due to intercrystalline matrix porosity and permeability was estimated to be about 0.004 ft^2/day, but the regional transmissivity used in the transient models was 0.03 ft^2/day. The transmissivity value of 0.03 ft^2/day was used for the Madison aquifer, because the regional transmissivity of the Madison is hypothesized to be a function of hydraulically interconnected zones with well-developed secondary permeability and porosity. The origin of these zones are not discussed in the Draft EIS or in the Well Field Hydrology Technical Report, but the zones likely may be developed along fractures or solution cavities in the Madison.

The data available to support the hypothesis of transmissivity presented in the EIS were limited primarily to data on water wells located near the Black Hills. The EIS hypothesis is apparently supported by the data which the commenter has developed working with oil companies in the Williston and Powder River basins.

12. Comment: "The above mentioned lineament fracture directions are currently being used in a model being prepared by Joe Downey of the USGS for the Madison Limestone Project. Flow directions in that model tend to show stronger alignment along the northeasterly lineaments than along northwesterly lineaments. This may indicate the northeasterly lineaments or faults or fractures may tend to be conduits to fluids, rather than barriers to flow. Local conditions may change these relations, of course, but the anisotropy is different than that shown in the Woodward-Clyde models." (Commenter ED-21.)

Response: The previous works by Donald Brown (1978) and others that discussed regional fracture patterns (refer to the section titled Features Influencing the Development of Stratigraphic and Structural Conditions in Appendix B of the Well Field Hydrology Technical Report WCC 1980b) were reviewed. Undoubtedly regional fracture patterns exist. Whether these fracture patterns result in preferred directions of ground-water flow is not at all clear. Analysis of the regional potentiometric data and pump test data led to the conclusion that the major structural features (the Black Hills monocline and Fanny Peak lineament), create anisotropies in the system. These features were modeled as linear zones of relatively low transmissivity. The potentiometric data and the pump test data did not indicate that regional transmissivity anisotropy exists in the Madison aquifer in the remainder of the area. Therefore, the transmissivity distribution was specified as being non-anisotropic. An isotropic transmissivity distribution is most commonly used in numerical modeling, because it is the simplest distribution. Non-isotropic transmissivity distributions are typically not used unless strong evidence exists which warrants its use.

The fractures may create locally well-developed zones of secondary porosity and permeability. These zones were considered in modeling the aquifer system (refer to WCC Model Comment 11). From a hydraulic viewpoint, these zones were assumed to be randomly distributed. Data were not available to support the hypothesis of nonrandomly distributed zones of high transmissivity.

13. Comment: "The crucial aspect of this statement is that the geology, based on wrench-fault tectonic analysis, is predictable rather than a random system as suggested in the Woodward-Clyde report...because the structural style of deformation is that of a wrench-fault tectonics, the fracture directions are predictable, rather than random, as stated by Woodward-Clyde." (Commenter ED-21.)

Response: Fracture patterns in the Madison aquifer system are acknowledged to be predictable. Regardless of the predictability of fracture patterns, the regional transmissivity of the Madison can be best explained with a conceptual model that assumes that randomly distributed high transmissivity zones exist in the Madison aquifer. Predictable geologic patterns do not necessarily lead to direct correlations of hydraulic properties.

14. Comment: "Why were sensitivity analyses not utilized to determine the effects on predicted results assuming different values for transmissivity, storage, leakage, recharge and other factors to provide a basis for assessing the accuracy of the model results? There are concerns about the range of errors which are inherent when trying to model such a complex aquifer with a karst topography. Why were the most optimistic values for recharge, transmissivity and storage utilized in the model?" (Commenter 138.)

Response: The effects of parameter uncertainty on the predicted drawdowns were examined in detail in Chapter 7 of the Well Field Hydrology Technical Report (WCC 1980b). Sensitivity analyses were also made to determine model response to changes in model parameters. The results of these analyses were not presented, because the results of the Monte Carlo simulations better portray model response to changes in model parameters. The drawdowns shown in Chapter 5 of the Well Field Hydrology Technical Report were calculated using the best estimates for the aquifer parameter values available at the time. These estimates may be the most optimistic values to some people, but as discussed in Chapter 7 of the Well Field Hydrology Technical Report, these parameter estimates overpredict the most probable impacts. See also the response to WCC Model Comment 3.

15. Comment: "Page 4-19. Minnelusa section - No mention is made of the lower Minnelusa member although hydraulic conductivity and transmissivity of the upper member is covered thoroughly. The part of the conceptual model was referred to on pp. 4-5 and Fig. 4-3 as the 'Minnelusa Confining Unit.' Would like to see some discussion inserted in text." (Commenter 138.)

Response: The lower Minnelusa member, which is defined as part of the Minnelusa confining unit, was not discussed in this section, because the transmissivity of the Minnelusa confining unit is considered to be negligible (ratio less than 1/100) relative to the transmissivity of the upper Minnelusa unit. Data on the transmissivity of the Minnelusa confining unit are nonexistent. Based on lithologic considerations, the transmissivity of the Minnelusa confining unit was estimated to be less than 1/100 of that in the upper Minnelusa unit.

The important hydraulic property in determining model responses of the Minnelusa confining unit is the leakage coefficient of the unit. The derivation of this parameter was discussed in Section 4.C.1 of the Well Field Hydrology Technical Report (WCC 1980b).

16. Comment: (in reference to the Well Field Hydrology Technical Report): "On Page 3 - 8 - Paragraph 2 it states 'Water movement in the Madison aquifer system is influenced by the geologic structure in the Black Hills and eastern Powder River Basin region.' These structural features are complex, and the model does not include the most recent structural geology data obtained in the USGS Madison Formation Regional Analysis. (Reference: verbal comments presented by Donald L. Brown, formerly in charge of geologic investigations involved in the Madison Project, at the Public Hearing in Edgemont on December 16, 1980.)" (Commenter 138; also, ED-21.)

Response: Please refer to the response to WCC Model Comment 2. The aquifer parameters specified in the models of the Madison aquifer system incorporated all available geologic information. The commenters did not present any data to suggest that the conceptual model and corresponding aquifer parameters should be changed. The data referred to in the comments was requested from Mr. Brown; however, it was not supplied. The USGS geologic report referred to in the comments is currently undergoing an intra-agency review; and because of problems with the report, it is not expected to be released until late 1981.

17. Comment: "Although geological reports of the various well field sites are presented, it is not apparent to me that the structure and tectonic effects were taken into account in the model." (Commenter ED-21.)

Response: The structure and tectonics of the Black Hills region were taken into account in three ways in the model:

1) The major structural features, the Black Hills monocline and the Fanny Peak lineament, were modeled as zones of relatively low transmissivity. The effect of this representation was to introduce a northwest-southeast anisotropy into the model.

2) The trend of the Lake Basin fault zone was used as a line north of which transmissivity in the Madison was specified as being reduced by 0.1.

3) The conceptual model of Madison transmissivity assumed that the regional transmissivity of the Madison aquifer was a function of hydraulically interconnected zones of well-developed secondary permeability and porosity. The origins of these zones were not discussed, but they may be oriented along fracture patterns.

18. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-18-Paragraph 2. For comments on this paragraph perhaps we should quote Tullis and Gries, Black Hills Engineer, South Dakota State School of Mines, December 1938, p. 245. 'As noted by Newton (1880) the caverns in the Pahasapa limestone commonly occur in the upper half of the formation, an observation confirmed by the writers with two exceptions, one of them Crystal Cave which is in the middle of the formation (Johnson, 1919, p. 2) and the other, Rushmore Cave which appears to be in the lower part of the formation.' (Pahasapa Limestone = Madison Limestone).

Is it justifiable in suggesting on page 4-16 that just because the bit dropped when they encountered the top of the Madison, therefore caves do not exist at the base of the Madison, and therefore the transmissivities of the upper part of the Madison may be an order of magnitude 300 times larger on the top of the Madison than near the base of the formation?" (Commenter 138.)

Response: It is acknowledged that zones of high transmissivity may occur throughout the Madison section. These zones appear to be most common in the upper part of the Madison section. The upper part of the Madison section has been the most extensively drilled and therefore, it is agreed that conclusions based on drilled holes will bias conclusions toward the upper part. Zones of high transmissivity have been encountered at the Gillette well field 400 to 600 feet below the top of the Madison section. Transmissivities of over 1 million gpd/ft have been reported for Madison wells in the Gillette well field.

The conceptual model of Madison transmissivity developed in the Well Field Hydrology Technical Report is valid regardless of where the zones of high transmissivity occur in the Madison section. The zones, though, must be randomly distributed and areally continuous from a hydraulic viewpoint.

19. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-8 - Paragraph 4. Why does the author use water quality to indicate hydraulic connection between the Madison and the Bell Sand and ignore water quality and assume that Rahn's and Gries's estimate of spring discharge is correct when water quality shows that their estimate is wrong. The author also suggests communication between Upper Minnelusa and Madison through the Minnelusa confining unit (page 4-7) even though it has bad quality water (p. 3-38 and Table 3-6). How does this fit into the conceptual model?" (Commenter 138.)

Response: The hydraulic connection between the Madison and Bell Sand is valid, because the direct communication between the two aquifers is supported on the basis of water quality and lithologic information.

Water emerging from Minnelusa and Madison springs may differ in water quality because of different ground-water flow paths and the varying rates of dissolution and amounts of minerals along the different ground-water flow paths. However, both these types of springs can originate from water in the Madison aquifer (common origin, different flow path, and different point of discharge). Madison water emitting from a Madison spring would have Madison water quality characteristics. Madison water flowing through the Minnelusa and emitted as a Minnelusa spring would obtain Minnelusa characteristics; Madison water characteristics would be lost or obscurred. Also see responses to Aquifer Recharge Comment 22 and WCC Model Comment 21.

The authors believe that in most cases the water is produced by upward leakage from the confined and unconfined parts of the Madison Formation to the Minnelusa Formation. Even though the water may leak upward from the Madison Formation, it may dissolve large concentrations of calcium and sulfate, and thus give the discharging waters high concentrations of total dissolved solids.

The reasons for the differences and similarities described above are accomodated in the conceptual model. Ground water flows out of the Madison aquifer as Madison water. Ground water flowing in the ground through the Madison, up through the lower and middle Minnelusa, and then out of the Minnelusa will have water quality characteristics more similar to the Minnelusa than to the Madison. Ground water can originate from a common source, but discharge with different characteristics because of different flow paths and different discharge points.

20. Comment (in reference to the Well Field Hydrology Technical Report): "Further evidence that relates to possible pumping impacts on the Black Hills water resources comes from analyses of water quality and tritium content of ground water from the Madison aquifer in Weston County. Chloride concentrations do not increase significantly from shallow wells near recharge to wells in Fiddler Creek oil field about 35 miles west. This implies continuous water movement from recharge down through the aquifer. Tritium analyses for the same area indicate water is traveling from recharge to depths of greater than 8000 ft. through the Madison in less than 70 years. Both the insignificant increases in chloride concentrations and the tritium concentrations exceeding 1.5 T.U. in the Fiddler Creek oil field at depths greater than 8000 ft. indicate rapid westward movement of water from recharge down through the Madison flowing actively past the Black Hills monocline. This almost pipelike connection of Madison ground water to recharge areas will accentuate impact from ETSI pumping on the springs and streams of the western Black Hills." (Commenter 136.)

Response: Rapid water movement (high transmissivity zones) does occur in the Madison aquifer, as noted in the comment and as evidenced at various other locations (for example, the Gillette well field and the Niobrara County well field. See also Appendix H of the Well Field Hydrology Technical Report [WCC 1980b]). This supports the study hypothesis contention that these high transmissivity zones are hydraulically continuous. However, there is no known areal distribution of these high transmissivity zones; therefore, these zones are assumed to be randomly distributed, albeit hydraulically continuous.

The data in the comment show that the Fiddler Creek area is a part of one of these high transmissivity zones which crosses the Black Hills monocline. However, data are not available to universally show that high transmissivity zones transverse to the monocline exist along the entire lengths of the Black Hills and Fanny Peak monoclines (i.e. the monoclines are high transmissivity zones). Data which support the hypothesis of a zone of low transmissivity along the monoclinal structures (as used in the EIS) are:

1) Sharp changes in potentiometric gradients west of Newcastle and Osage (Figure 3-4 of the Well Field Hydrology Technical Report).

2) Relatively flat potentiometric gradients west of the Black Hills monocline.

3) Sharp changes in Minnelusa water quality along the Black Hills monocline (Figure 3-10 of Well Field Hydrology Report).

There are data, such as the commenter's geochemical data and Head and others (1979) temperature data, which suggests that a low transmissivity zone may not exist along these monoclines. However, the evidence in support of a relatively low transmissivity zone along these monoclinal structures is, in the authors' opinion, much stronger than the evidence that is used to refute the existence of a low transmissivity zone. A low transmissivity zone along these monoclinal structures does not mean that Madison ground water does not flow into the central part of the Powder River Basin; neither does this mean that a high transmissivity zone does not exist parallel to these structures.

21. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-17-Paragraph 2 Here they use water quality to differentiate units where in other cases they ignore water quality." (Commenter 138.)

Response: The available data from the Madison aquifer system were used to develop the conceptual model. The water quality data are discussed in detail in Section 3.B.4 of the Well Field Hydrology Technical Report. The most important instances where ground-water quality data were used to support the conceptual model are listed below:

(1) Ground water in the upper part of the Madison aquifer at the Gillette well field and at Newcastle are of a better water quality than ground water in the rest of the Madison section. This suggests a non-uniform ground-water velocity distribution exists in the Madison, with higher velocities in the upper part.

(2) Ground water in the Red River Formation is of a better quality than water in the Madison Group at USGS Madison Test Well No. 1 near Hulett, Wyoming. The Well Field Hydrology Technical Report (WCC 1980b, page 3-35) states, "the differences in water quality are probably a result of faster ground-water flow velocities and lower matrix concentrations of gypsum, anhydrite, and halite in the ... Red River Formation.

(3) Ground water in the Bell Sand member of the Minnelusa Formation has a water quality similar to that in the Madison Group, but dissimilar from that in the rest of the Minnelusa Formation. These data were used to suggest that the Bell Sand was hydraulically closely connected with the Madison Formation.

(4) Abrupt changes in water quality in the Madison Group along the trend of the Lake Basin fault zone were used to support the hypothesis that transmissivities in the Madision aquifer were lower north of this zone.

(5) Abrupt water quality changes in the Minnelusa Formation across the Black Hills monocline were used to support the contention that transmissivity in the Madison Group and Minnelusa Formation were relatively low along the monocline.

Aquifer Recharge

22. Comment: Page 3-15, First Para., Left Column. This paragraph discusses the method of determining the recharge rate to the Madison aquifer involving the determination of discharge from known point sources. The conclusion reached using this approach is that recharge is 'in the range of 140,000 to 400,000 acre-feet per year.'

There is no information in the DEIS or in the Technical Report on Well Field Hydrology to indicate whether the 139,000 acre-feet per year figure cited as being the annual discharge from all springs and seeps in the Black Hills region is based on measurements conducted over more than one year nor how many measurements were involved and how many estimates. It is impossible to determine whether or not this figure is reliable, although the Technical Report indicates that the figure is probably on the low side.

(In reference to Page 3-18, Paragraph 3, of the Well Field Hydrology Technical Report) Spring discharge from the Madison measured by Rahn and Gries is used as the lower limit for the recharge rate. An analysis of springs issuing from the Madison indicate actual recharge from the Madison may be less than 87 cfs (62,875 acre-feet per year). This estimate is based on water quality, but it is somewhat more scientific than merely looking at a spring and declaring it issues from the Madison. If the previous estimate were used the lower limit for recharge would equal not 139,000 acre-feet/year but 62,875 acre-feet/year. In other words, Rahn's and Gries' work did not under estimate Madison recharge but over estimated the lower limit of recharge by 100 percent. (Commenters 138, 139.)

Response: The amount of water that recharges the Madison and Minnelusa aquifers in the Black Hills region is unknown. Recharge generally cannot be measured directly, but in all aquifer systems at steady-state, recharge equals discharge, and discharge can sometimes be measured directly. Discharge from the Madison and Minnelusa aquifers occurs at springs and seeps in the Black Hills region, occurs as upward leakage to the Dakota Sandstone along the Missouri River Valley, and may occur as upward leakage to overlying strata south, west, and north of the Black Hills. The quantities of discharge that occur as upward leakage cannot be measured directly and are unknown.

The discharge that occurs as springs and seeps can be measured directly. The larger springs or series of springs in the Black Hills region are monitored continuously by the USGS (Sand Creek, Stockade Beaver Creek, Fall River, Beaver Creek, Spearfish Creek, Cold Springs Creek);

and between 1966 and 1971, Rahn and Gries made monthly stream gagings on most large streams and springs in the Black Hills of South Dakota and Wyoming. Rahn and Gries (1973) concluded that almost all of the water discharging at the springs and seeps came from the Madison and Minnelusa aquifers. Therefore, since the amount of water that discharges by upward leakage is known to be greater than zero (Konikow 1976, Swenson 1968), a lower bound on the recharge rate is the measured discharge.

The upper bound on recharge could be calculated in two ways: 1) estimate the maximum amount of water that may discharge to overlying strata; or 2) estimate potentional recharge from precipi tation and evapotranspiration data. The latter method was chosen, because it is the simpler and a more straight-forward approach. Estimating upward leakage is a very complicated task because of the large area covered by the Madison aquifer, and because the hydraulic characteristics of overlying strata are unknown. Potential recharge was estimated by calculating total outcrop area and multiplying area by total precipitation minus evapotranspiration. The largest unknown in this computation is evapotranspiration. An evapotranspiration of 14 inches per year was used in calculating potential recharge of 400,000 acre-feet per year.

The low and high bounds calculated for recharge imply that between 0 and 260,000 acre-feet per year (400,000 ac-ft/yr potential recharge - 140,000 ac-ft/yr known to discharge to springs and seeps) discharge from the Madison and Minnelusa aquifers by upward leakage to overlying strata. The steady-state model developed by the Madison aquifer system calculated that approximately 40,000 acre-feet per year discharges by upward leakage from the Madison and Minnelusa aquifers. This suggests either that 1) not all of the outcrop area of the Madison and Minnelusa aquifers contribute recharge to the aquifer systems, or 2) evapotranspiration was underestimated. Data are not available to suggest that either is the case.

Note: The recharge rates refer to the combined Madison and Minnelusa aquifers, not just to the Madison aquifer. Refer to the Well Field Hydrology Technical Report (WCC 1980b), Section 3.B.2, for explanation.

23. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-16 - Paragraph 3. Based on water quality calculations, a reasonable aquifer recharge rate would have a lower estimate of 62,875 acre-feet--not 150,000 acre-feet.

On the basis of water quality calculations, transmissivity should range between 0.0075 to 0.030 square feet per second to produce reasonable aquifer recharge rates (73,000 to 300,000 acre-feet/year in the Black Hills). The author used the highest possible maximum figure of 0.03 square feet per second for an assumed uniform transmissivity value. Again, how does this fit into the conceptual model in terms of quality water?" (Commenter 138.)

Response: See WCC Model Comment 5 for a discussion of transmissivity values. The commenter did not provide an explanation as to how water quality was used to calculate recharge. The derivation of the aquifer recharge values used in the model is explained in Aquifer Recharge Comment 22.

24. Comment: "The EIS says that recharge to the Madison Aquifer may come in part from infiltration of water from the Arikaree Formation in the Hartville uplift. This would probably not occur since the head (pressure) in the Madison is greater than that of the Arikaree Formation. (Chapter 3, P.15)" (Commenter 72.)

Response: It is acknowledged that infiltration to the Madison aquifer from the Arikaree Formation will not occur in areas where the potentiometric head in the Madison is greater than it is in the Arikaree. In and near the Madison outcrop area in the Hartville uplift, the potentiometric head in the Arikaree area is probably greater than it is in the Madison, meaning that groundwater movement is downward, toward the Madison. However, the area in which the Arikaree directly overlies the Madison is very small (see Figure B-12 in Well Field Hydrology Technical Report WCC 1980b). Recharge to the Madison in this area has been accounted for (see Well Field Hydrology Report [WCC 1980b], Section 3.B.2., entitled Recharge to the Madison Aquifer, Hartville Uplift).

25. Comment: "The EIS estimates annual recharge to the Madison to be 140,000 to 400,000 acre-feet per year. However, the EIS does not adequately address what happens to this recharge under existing conditions. The available evidence does not indicate that long-term water storage in the Madison is increasing - therefore discharge from the Madison must equal or exceed recharge. The EIS should address the use currently being made of this discharge. I believe careful investigation will show that this discharge is presently being beneficially used by agriculture, industry, and municipalities. If the EIS cannot show that significant volumes of discharge are presently unused, the conclusion presented in table 5-4, that little or no use is presently being made of the groundwater resources, cannot be substantiated." (Commenter ED-4.)

Response: Table 5-4 has been deleted from the Final EIS. The discussion of the impact of stream and spring flow reduction has been revised in the Final EIS.

26. Comment: "The draft EIS identifies the long-term impacts versus short term gains of the proposed project (Chapter 5). Under that section the alternative well drawdowns for the Madison Formation were discussed. There was no comparable discussion found for rate of recharge of the Madison Formation within Chapter 5. Does that in effect mean that the time frame for recharge of the aquifers is so

long-term as to nullify any ability to reuse the aquifers in the future?" (Commenter 219; also, 74, 138.)

Response: The rate of recharge to the Madison aquifer is not calculated to be decreased because of ETSI's ground-water withdrawals. The impact on ground-water levels caused by ETSI's pumping is more directly related to the effect on aquifer storage than on recharge rate. Therefore, the effect of recharge in relation to ETSI's withdrawals is more long term than short term. ETSI's withdrawals would not preclude (nullify) the use of this aquifer in the future.

Water would still remain in the aquifer after 50 years of ETSI's pumping. The aquifer would still be useful for obtaining ground-water supplies. The water that would be pumped by ETSI would mainly come from water in aquifer storage, not from recharge at the Black Hills. Not until at least the latter part of ETSI's pumping would the effect of the pumping be felt at the Black Hills outcrop area. If ETSI's pumping would be felt in the outcrop area, the amount of water that could recharge the ground-water system would likely increase, because extra void space would be made available in the outcrop area of the aquifer for precipitation and runoff to enter the ground-water system.

27. Comment: "Fourth, there is dangerous distortion in the DEIS, in regard to recharge into the Madison. We quote from pages 3-15:

Based on the work by Rahn and Gries and uncalculated potential recharge (WCC 1980b), recharge to the Madison aquifer in the Black Hills can be stated to be in the range of 140,000 to 400,000 acre-feet per year.

BLM's terms, 'can be stated to be' constitute a flagrant disregard for the rules of scientific language. There is a vast difference between the use and abuse of scientific language." (Commenter 213.)

Response: The sentence has been corrected and improved in Section 3.A.1 of the Final EIS.

28. Comment: The E.I.S. states recharge to the Madison Limestone in the Black Hills to be 140,000 to 400,000 acre-feet per year. This must be the entire Black Hills area. Also, if the Madison Aquifer as defined by Woodward-Clyde Consultants is utilized, recharge would be much greater. If the recharge is as stated, 140,000 to 400,000 acre-feet per year, it is difficult to see how the withdrawal of an additional 15,000 acre-feet of water per year would produce the effects on ground water levels shown in the E.I.S. The projected use consumes part of the recharge.

Page 4-24-Paragraph 1 Recharge rate of 230 cfs = 456 ac-ft/day = approximately 166,512 ac-ft/yr. Although ETSI's use of 20,000 ac/ft is approximately 12 percent of recharge over the entire model area it should be emphasized that it will probably be concentrated in some areas and may exceed local recharge rates. (Commenters 72, 138.)

Response: The range of recharge rates calculated to occur in the Black Hills is for the entire Black Hills. Recharge could not be greater, given existing meteorological conditions, because the upper bound on recharge is limited by the amount of precipitation that falls on the outcrop area. Four hundred thousand acre-feet per year is the upper bound calculated for recharge in the Black Hills using present-day meteorological characteristics.

The water that is pumped from a well first comes from storage within the aquifer. In an unconfined (water-table) aquifer, storage is the same as the specific yield (water that can be drained from the pore spaces in the rock) of the material unwatered during pumping. In a confined aquifer, water in storage is derived not by the dewatering of the aquifer, but rather by the compression of the aquifer and the expansion of the water. It generally takes a long period of time for water to move from the outcrop area to the point of discharge, such as a well. Therefore, the effects caused by pumping from a well are not immediately felt in the outcrop area, but rather only in the vicinity of the well where water is being taken out of aquifer storage. Eventually, the area where water has been taken out of storage is replenished with water from other parts of the aquifer, including recharge areas.

Aquifer Leakage

29. Comment (in reference to the Well Field Hydrology Technical Report): "Page 3-38-Paragraph 2. If each of these lithologic units function as a separate hydrologic unit why is it maintained that there is rather unrestricted communication between the upper Minnelusa and the Madison. Wouldn't this have to occur through the middle Minnelusa which acts as a hydrologic entity? Page 3-44 shows that water produced from the same location has TDS of 2020 from the Upper Minnelusa and TDS of 300 from the Madison. The water from the Upper Minnelusa compares very favorably with water from LAK Springs with TDS 2110 and does not appear to be derived from the Madison. Does this illustrate communication?" (Commenter 138.)

Response: The values specified for the leakage coefficients imply that communication between the Madison and upper Minnelusa is restricted, not unrestricted, in the natural system.

The water quality reported for LAK Springs does not imply that the water did not originate as leakage from the Madison aquifer. The high total dissolved solids concentrations reported for this water merely suggest that dissolution took place when ground water passed through the Minnelusa Formation.

30. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-22 Leakage coefficient between the Red River-

Madison and the Madison-Upper Minnelusa should be reviewed. Aren't they saying that upward leakage is greater than downward leakage?" (Commenter 138.)

Response: The leakage coefficients do not contain information on the direction of water movement. The leakage coefficient is a measure of the capacity of a unit to transmit water. The direction of water movement is determined by the potentiometric (head) gradient. If heads in the Madison aquifer are greater than in the Red River aquifer, water will flow from the Red River aquifer to the Madison aquifer. If heads are greater in the Red River aquifer, flow will be from the Red River aquifer to the Madison aquifer.

31. Comment (in reference to the Well Field Hydrology Technical Report): Page 4-23-Paragraph 3 The vertical hydraulic conductivity of 5×10^{-8} ft/sec for the Minnelsua confining unit, which was used to compute the leakage coefficient of 10^{-10} sec^{-1}, is reasonable for clastic rich carbonates (Freeze and Cherry, 1979). . . . Thick evaporite beds generally exist in the lower part of the upper member. Is this leakage coefficient reasonable for evaporite beds also?" (Commenter 138.)

Response: A leakage coefficient of 10^{-11} was specified for the Minnelusa confining unit where the upper Minnelusa Formation consists of greater than 50 percent evaporites. This value is based upon the steady-state model and on lithologic considerations.

32. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-25, Table 4-2 'Calculated Potentiometric Heads in the Madison Aquifer using the Steady State Model.' This tabulation shows that Niobrara and Weston Counties locations are extremely sensitive to both leakage and the simulated effect of geologic structural features.

However, Crook County locations are relatively insensitive to both parameters. Consequently, if leakage values increased on the basin side of the Black Hills Monocline due to the depth of burial, the calculated effects of the Crook County well field could be different than predicted because of possible contributions from that area." (Commenter 139.)

Response: If leakage values were increased (so that more leakage occurred) on the western side of the Black Hills monocline, the calculated effects of the Crook County well field would be different. Drawdowns would be less in the Madison aquifer, but would be greater in the shallower aquifer units. Hydrogeologically, it is not likely that the leakage coefficient would be greater (see Table 7-1 of Well Field Hydrology Technical Report), because the depth to the Madison is measurably greater west of the Black Hills monocline.

33. Comment (in reference to the Well Field Hydrology Technical Report): "Data is very inconclusive in major areas that are of concern in determining the amount of drawdown expected in South

Dakota. There is difficulty in determining leakage down through overlying units as the Madison is being pumped. How were the leakage values used in the model determined? Were any calculations made indicating the amount of water vertically leaking between individual formations? Could the head loss values generated by the model be duplicated using values for leakage which are not realistic? A second difficulty is determining the degree of hydrologic connection at the fault line of the Old Woman anticline. Another major problem is the large range of transmissivities reported. These range from 3,000 gpd/ft. up to 200,000 gpd/ft. The lower the transmissivity value the greater the drawdown and picking accurate transmissivity values is very subjective. If leakage is small from the overlying rock units, then the potentiometric surface drawdown will be on the higher end of estimates made, possibly 1,000 feet at Edgemont. If the Old Woman Fault creates an impermeable barrier, it may cause very steep drawdowns next to the fault. This in turn will mean that more water will come from the opposite direction (towards the Black Hills) and create greater drawdowns in that direction compared to drawdowns if the fault transmitted water freely. The highest drawdown will be expected if the fault creates a barrier and the overlying aquifers do not leak readily to the Madison.

Response: The methods used to estimate the leakage coefficients were discussed in detail in Section 4.C.1 of the Well Field Hydrology Technical Report (WCC 1980b). These calculations shown in Table 6-5 were made to indicate the amount of water leaking between aquifers.

The potentiometric surface calculated in the steady-state model could not be reproduced when unreasonable leakage coefficients were used as explained in Table 4-2 of the Well Field Hydrology Technical Report (WCC 1980b).

If all leakage coefficients were specified as zero, the drawdown at Edgemont is calculated to not exceed 600 feet.

34. Comment: "Pump tests of the E.T.S.I. test wells were conducted during May and June, 1974. The tests and data collected were monitored by a representative of this office. The data was analyzed and it soon became apparent that the Madison Limestone in the general vicinity of the proposed E.T.S.I. well field was not homogeneous and isotropic. Because of this, standard type mathematical analysis of the aquifer parameters was not feasible. The application of "leaky aquifer" theory was necessary and dictated by the data generated during the pumping tests. The "leaky aquifer" theory, very simply stated, says that when water is removed from an aquifer, slow drainage of water stored in overlying or underlying formations into the pumped aquifer will occur. In the case of the Madison Limestone, leakage from the basal portion of the overlying Minnelusa Formation occurs. It is important to note, however, that the vertical leakage from the Minnelusa Formation to the Madison is confined to the basal portion of the Minnelusa Forma-

TABLE 6-5

CALCULATED LEAKAGE RATES AFTER 50 YEARS OF PUMPING

	Minnelusa to Madison (cfs)	Upper Confining Unit to Minnelusa (cfs)	Red River to Madison (cfs)
Plan 1	21.5	5.7	-
Plan 2	21.3	5.2	.3
Plan 3	18.2	7.1	1.9
Plan 4	18.9	6.2	1.7

tion by the thick layers of impermeable evaporite materials located in the middle portion of the Minnelusa Formation. The slow leakage will provide huge quantities of water over time without producing the widespread effects predicted by the Woodward Clyde model." (Commenter 72.)

Response: Interpretation of the Niobrara pump tests was discussed in detail in Appendix H of the Well Field Hydrology Technical Report (WCC 1980b).

Leakage from the basal portion of the Minnelusa Formation is implicitly included in the model (see Chapter 4.C of Well Field Hydrology Technical Report). The inclusion of this leakage produces the drawdowns shown in the environmental impact statement. Large volumes of water are produced by leakage from the Minnelusa Formation (see response to Aquifer Leakage Comment 33).

35. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-15, Para. 3, Line 7 --- 'a leakage coefficient of approximately 5 x 10^{-4}.' It is probable this value should be changed to '5 x 10^{-9}.'" (Commenter 139).

Response: The correct value is 5 x 10^{-9}. The Final EIS has been corrected.

Aquifer Storage

36. Comment (in reference to the Well Field Hydrology Technical Report): "(Page 5-1, Chapter 5.) In summary, it appears that the top of the Upper Confining Unit was not modeled to have a constant head layer (or boundary) at its upper surface in those areas where it is exposed at ground surface. Yet, because most observers would contend a general zone of saturation exists near ground surface (water table), it would appear that such a layer should exist in the conceptual model also. It is acknowledged that propagation of effects through 1,000+ feet of low vertical permeability material will be slow. However, in close proximity to the well field (say 10 miles), conventional techniques of leakance considerations indicate the effect will occur within 50 years. Obviously, the model makes the same predictions with respect to stream flow. Why did the model not predict some of this effect on drawdowns?" (Commenter 139.)

Response: The specification of a storage coefficient of 10^{-4} everywhere in the Upper Confining unit resulted in a large overprediction of drawdowns in the Upper Confining unit where it is unconfined, and a slight overprediction of drawdowns in the Madison aquifer unit. The storage coefficients specified where the Upper Confining unit outcrops (where the aquifer is unconfined) have been changed from 10^{-4} to 10^{-1} for the Final EIS. The characteristics of these shallow water-table aquifers in the Upper Confining unit are poorly known in the Black Hills region. Most of the available data on these aquifers is published in USGS Water Supply papers (see Whitcomb and Morris 1964; Whitcomb 1965).

Previous numerical models of the Madison aquifer by the USGS have specified the upper boundary condition for a unit corresponding to the Upper Confining unit in this study as a constant head boundary (Konikow 1976, Downey and Weiss 1980). This specification was made implicitly by Konikow (1976) and explicity by Downey and Weiss (1980).

Three types of boundary conditions were considered for accurately modeling the upper surface of the aquifer unit in the Draft EIS:

1) Constant head boundary condition with storage in upper unit not specified
2) No flow boundary condition with confined conditions specified in the upper unit
3) No flow boundary condition with unconfined conditions specified in upper unit where it outcrops, and confined conditions specified elsewhere

The model of the Madison aquifer system presented in the Draft EIS was designed primarily to examine drawdowns in the Madison aquifer. The Minnelusa aquifer unit and the Upper Confining unit were defined in the model primarily so that leakage into the Madison from the overlying units would be explicity treated. In deciding upon the type of boundary condition to be used for the Upper Confining unit, the major concern was that the boundary condition not bias the model toward an underprediction of drawdowns in the Madison.

Specifying the upper boundary as a constant head boundary, or as a no-flow boundary with unconfined conditions where the unit outcrops were thought to have the effect of causing a bias toward underprediction of drawdown in the Madison. A constant head boundary can result in the creation of flow, as the physical meaning of a constant head is a lake (constant source) on the top of the aquifer. A no-flow boundary with unconfined conditions represented in outcrop areas was not used, because even in the outcrop areas, part of this unit is confined. Therefore modeling the aquifer in this manner could cause a bias toward underprediction of drawdowns in the Madison. Instead, the upper boundary was modeled as a no-flow boundary and confined conditions were specified everywhere in the Upper Confining unit. This technique has a bias toward overpredicting drawdowns in the Madison and in the Upper Confining unit. (Later analyses show that calculated drawdowns in the Madison would have changed by less than 10% from those calculated if either of the other two types of boundary condition had been used.)

During the comment period, much thought has gone into trying to improve the conceptualization of the aquifer system. Many comments were raised concerning possible drawdowns in aquifers lumped in the Upper Confining unit. As stated in the Draft EIS, page 4-11, drawdowns in this unit were not explicitly calculated in the original analyses, but they could be as great as 90% of those in the Madison aquifer.

The reason drawdowns could be as great as 90% was because of the way the upper aquifer unit was modeled--an emphasis on not underpredicting drawdowns in the Madison aquifer, not on predicting accurate drawdowns in the Upper Confining unit. The model was modified for the Final EIS as a result of the public's comments on the Draft EIS so that drawdowns could be explicity calculated for the upper aquifer. The change made in the model was the splitting of the Upper Confining unit into two units. The uppermost of those units was specified as being unconfined wherever strata between Minnelusa Formation and lower Cretaceous shales outcrop (where the aquifer is unconfined). The other unit was specified as being confined everywhere. With this representation of the aquifer system, meaningful drawdowns in the upper aquifers could be calculated, and they are shown in the Final EIS. The effect of this change on the Madison aquifer drawdowns was to reduce them by less than 1% in most areas.

37. Comment (in reference to the Well Field Hydrology Technical Report): PAGE 4-21 - Paragraph 5. First, there is the rather arbitrary assumption of 3.3 x 10^{-7} storage coefficient. Secondly, this assumption was stretched to cover the entire Minnelusa Formation. Third, a uniform thickness of 1000 feet was used for calculating the storage coefficient of the upper Confining unit. If this coefficient is correct how can there be a 'Minnelusa Confining Unit?'" (Commenter 138.)

Response: The storage coefficient estimates for the Upper Confining unit were based on Lohman's (1972) estimates of storage coefficients for a typical confined aquifer. The Well Field Hydrology Technical Report (WCC 1980b) explained on page 4-20 how the coefficient was derived.

In response to the comment's second point, the storage coefficient covers the entire Minnelusa Formation.

A uniform thickness of 1000 feet was used for calculating the storage coefficient of the Upper Confining unit. This limits the amount of water that can be derived from this unit, and biases drawdown toward overprediction of impacts (i.e., conservative).

All confining units have storage coefficients. This coefficient is a reasonable value for this hydrogeologic unit.

38. Comment (in reference to the Well Field Hydrology Technical Report): Page 4-21, Para. 1 "The aquifer matrix compressibility is unknown, but the average compressibility of solid rock is 1.1 x 10^{-11} pascals (Pa) (Freeze and Cherry, 1979). The storage coefficient per foot of aquifer thickness computed with a porosity of 10 percent and a matrix compressibility of 1.1 x 10^{-11} Pa is 3.3 x 10^{-7}. A storage coefficient of 3.3 x 10^{-7} per foot is lower than the typical storage coefficient of a confined aquifer, which is approximately 1 x 10^{-6} per foot of aquifer thickness (Lohman, 1972)."

This is an extremely important aspect of the entire analysis of the Madison aquifer and directly affects the predicted impacts (drawdowns). References are made and coefficients are presented without supporting calculations in order to demonstrate the dramatic differences that would accrue using these coefficients...

The importance of the specific storage can be shown on the attached modifications of Figure 5-7 of the Technical Report. The following explanation will be as brief as possible because the authors are familar with the criteria used.

The first example uses the specific storage used in the computer simulation for Crook County (3.3×10^{-7}) for the total thickness of all units (2500 feet) for a derived storage coefficient of 8.25×10^{-4}. This shows that a non-equilibrium solution differs only slightly from the computer simulation. This is principally because the various boundaries used in the model cannot be considered in the simplistic approach. This example is presented only for the purpose of comparison with the next example. It uses Lohmans' average figure of 1×10^{-6}, which also falls within the range calculated above, for the entire thickness that results in a storage coefficient of 2.5×10^{-3}.

Comparison of the two examples shows that the change in specific storage greatly affects the magnitude and extent of predicted drawdowns. It would appear reasonable to assume comparable changes would result if the higher specific storage value were used in South Dakota (Figure 5-2 and Table 5-1) might show predicted drawdowns of less than 25 feet in another model simulation. If that were the case, the impacts there would <u>not</u> be considered significant. (Commenter 139.)

<u>Response</u>: The paragraph cited in the comment contained several inaccuracies. It has been revised in the final Well Field Hydrology Technical Report (WCC 1981b).

The computed drawdowns are sensitive to the storage coefficients used. The storage coefficients used for the Madison aquifer, though, are similar to those derived from the pump tests at the Niobrara and Gillette well fields.

<u>Drawdown</u>

39. <u>Comment</u>: <u>Page 4-4, Para. 6</u> 'Several existing Madison and Minnelusa water users would likely have increased pumping lift as a result of the declines in the potentiometric surface (Table 4-2). Only at the Madison wells located near Edgemont, South Dakota, would drawdowns in the potentiometric surface exceed 25 feet.'

Add after (Table 4-2), in para. 6, fourth line: 'The effect of ETSI pumping on Minnelusa water users is insignificant. In comparing Plan I (Niobrara well field only) with current users and ETSI plus current users, only in the Madison wells located near Edgemont, South Dakota would drawdowns in the potentiometric surface exceed 25 feet.' Drawdowns of the Minnelusa at Hulett, Wyoming are zero." (Commenter 139.)

Response: Section 4.A.1 of the Final EIS has been rewritten to better describe those wells impacted with greater than 25 feet of drawdown. No description of users not significantly affected (less than 25 feet of water-level decline) was included, because there are numerous users who are not calculated to be affected.

40. Comment: "The DEIS gives us much more information about the potential impacts on water resources. Page 2-8, Table 2-4 presents the 50-year groundwater drawdown that would occur at Devils Tower National Monument, Wyoming. Since page 3-2, Table 3 5 estimates the existing drawdown at Devils Tower to be 10 feet, and Table 2-4 includes existing drawdown, does the proposed action from the Niobrara supply mean there would be an additional drawdown of 10 feet? The much greater additional drawdown for the Crook County alternative is obvious." (Commenter 61.)

Response: No additional drawdowns beyond the existing 10 feet of drawdown is calculated to occur at Devils Tower as a result of pumping from the Niobrara well field. Table 2-4 figures of the Draft EIS represent the drawdown due to 50 years of pumping by ETSI and all existing users. Table 3-5 figures of the Draft EIS represent drawdown due to pumping by existing users only; ETSI pumping is not included.

41. Comment: "Wind Cave National Park, South Dakota, also gets its water from the Minnelusa Formation. We have not been able to determine whether the Madison Formation extends that far, but we believe there may be a good chance that the water level and thus, cave hydrology within the park, may be affected. Jewel Cave National Monument lies somewhat closer to the Madison Formation than Wind Cave and thus could also be affected. The National Park Service therefore urges that the final EIS evaluate these potential consequences." (Commenter 61; also, 138.)

Response: The proposed withdrawals are not predicted to measurably affect cave hydrology in Wind and Jewel Caves, because they are many miles outside of the areas of any calculated drawdown.

42. Comment: "In order that no one will be dissuaded by the argument that the drawdowns are predicted on a fifty year basis, it is important to point out that once ETSI starts pumping from a well field, the drawdown effect will be virtually instantaneous.

"Far more critical to evaluating the impacts of the ETSI project is the determination of the decline and pressure of the artesian aquifer, which is an almost instantaneous response to pumping from an aquifer . . . Artesian aquifers with very low coefficients of storage are highly susceptible to drawdown from ground-water withdrawals (Walton 1970).' (Rahn, supra, at 104)." (Commenter ED-8.)

Response: The change in drawdown with time in the vicinity of the well fields was analyzed in the time-drawdown diagrams in Chapter 4 of the Draft EIS (Figures 4-1, 4-4, 4-6, 5-1, 5-2, 5-3, 5-4) and in the Well Field Hydrology Technical Report. These figures show the rate and amount of drawdown which would occur in the Madison through time. These diagrams reflect the effect of drawdown in the Madison under confined (artesian) aquifer conditions.

43. Comment (in reference to the Well Field Hydrology Technical Report): "Figure 5-1 following Page 5-2 shows the drawdowns in the Madison potentiometric surface in the Black Hills region in 1980 caused by pumping by present Madison Group water users, e.g., Edgemont - 25', Newcastle - 100', Osage - 200'.

Figures 5-12, 5-14, 5-16, and 5-18 which show drawdowns after years of pumping by ETSI and present users under various plans do not include the 1980 drawdowns from present users shown in Figure 5-1. This is very misleading. Figures should be provided in the report which are cumulative to show the total drawdown to be expected at the end of the 50 year period." (Commenter 138.)

Response: Maps labelled "cumulative case" show calculated changes in the potentiometric surface that occur after 1985, the year ETSI pumping is proposed to begin, Department of the Interior procedures specify that project impacts be measured from baseline conditions (the conditions that exist or are calculated to exist when project actions are projected to begin).

44. Comment: "The fact is that no one knows what the drawdown will be until the pumps are turned on. I think, therefore, that it's misleading for BLM to present predictions in this EIS to three significant figures. Example: 666 feet drawdown at Niobrara well field." (Commenter ED-3; also, ED-8.)

Response: Appropriate revisions have been made in the Final EIS.

45. Comment: "Page 3-22, Para. 4 'Historic changes in the Madison potentiometric surface could not be accurately determined from existing information because of a limited data base'. Continuing to the next paragraph- 'Calculated changes (emphasis added) in the potentiometric surface of the Madison aquifer--are shown on Map 3-8. Drawdowns greater than 25 feet occur only in the vicinity of Edgemont, Osage, Newcastle and Bell Creek (Table 3-5, Map 3-9)'. Map 3-8 and Table 3-6 should be adequately labeled to indicate the drawdowns are calculated." (Commenter 139.)

Response: The Final EIS has been appropriately clarified.

46. Comment (in reference to the Well Field Hydrology Technical Report): "The Newcastle area, as discussed on p. 3-57, contains

similar anomalies between reported individual well data. The oldest well, City No. 1, is reported in Table 3-10 to have declined from 200 psi to 171 psi from 1949 to 1978. This is 67 feet not the 'almost 100 feet' reported on p. 3-57.

Furthermore, the shut-in pressure data from well No. 4 'was high than that calculated from initial shut-in pressures at wells drilled in the early 1960s'. Again, the calculated decline, as shown on Map 3-8 and Table 3-5 at 132 feet, is nearly double that shown by the historical data." (Commenter 139.)

Response: The decline of 29 psi at Newcastle Well No. 1 is equivalent to 67 feet. This change has been made in Chapter 3 of the Final Well Field Hydrology Technical Report (WCC 1981b). See also the responses to Shallow Aquifer Comment 75 and WCC Model Comment 1.

47. Comment: "I find it hard to believe that the influence on the potentiometric head in the Minnelusa Formation will be nearly as great as in the Madison. Admittedly, the Minnelusa is not everywhere separated from the Madison by the conspicuous paleosol at the base of the Minnelusa, but it is present over most of the area under consideration, and should prove a fairly effective seal over the geologically short period of time represented by the life of the pipeline. My own work with the stratigraphic trap fields in the Leo sands makes me doubt that pumping the Madison would have any appreciable effect upon the hydrology of these apparently sealed local systems. The Red Marker shale which separates the lower and upper Minnelusa is so persistent as to make the hydrologic systems in the lower and upper Minnelusa distinct in the area around the Black Hills where I am most familar with them." (Commenter 39.)

Response: The Leo Sands and Red Marker Shale were included in the Minnelusa confining unit of the Madison aquifer model (see Section 4.C.1, pp. 4-22, 4-23 of Well Field Hydrology Technical Report [WCC 1980b]). This confining unit was assigned a very low transmissivity value (less than 1/100 of that of the upper Minnelusa unit). The vertical hydraulic conductivity of 5×10^{-8} ft/sec was used to compute the leakage coefficient of 10^{-10} sec^{-1} for the Minnelusa confining unit (see Well Field Hydrology Technical Report [WCC 1980b], page 4-23, in Section 4.C.1). These are relatively low values and are believed to be appropriate for the types of sediment in the lower and middle parts of the Minnelusa Formation. Variations in sediment type or geologic structure may further limit the amount of hydraulic connection with the Madison aquifer on a local scale.

The upper part of the Minnelusa has been explicitly separated from the other parts of the Minnelusa, as stated in the comment. These two divisions were represented by the upper Minnelusa unit, and the Minnelusa confining unit (see Figure 4-3 on p. 4-7 of the Well Field Hydrology Technical Report [WCC 1980b]).

48. Comment: "Page 4-94 and 4-97 Near the bottom of page 4-94 of the EIS, a discussion of the predicted effects on existing users begins. Increased pumping lifts and declines in pressures of both the Madison and Minnelusa formations are postulated and it is stated that, 'This would result in a substantial flow reduction in many of the irrigation wells'.

This conclusion is not substantiated by explanation or data in the Technical Report in Section 5. However, data from the files of the USGS District office in Huron show water levels have

fluctuated during the past 20 years more than the models prediction of 40 feet of decline in that area.

The record of these two Minnelusa wells shows that preirrigation season measurements from one year to the next may vary as much as about 30 feet. The difference between levels within a year (one before and one during the irrigation season) may vary by about 20 feet. The limited data on flow rates from irrigation wells in the Spearfish area indicate the expected change in flow with change in pressure. However, based on these data and other experience with flowing wells, the reduction of flow rate due to a decline of pressure of 40 feet (as predicted by the model simulation) can be expected to be only about 10 percent because of discharge vs drawdown relationships in rock aquifers (Kelly & Others, 1980). This is in sharp contrast to 'a substantial flow reduction'. It also should be added that some of the present irrigation users apparently are not greatly concerned about conservation of water (and/or the pressure levels) as evidenced by the practice of flowing to waste at some wells during the non-irrigation season." (Commenter 139.)

Response: It is recognized that water levels in a well may fluctuate on a seasonal, daily, or hourly basis. The drawdowns predicted and presented in the EIS are water-level declines which would be superimposed on the normal seasonal, daily, or hourly fluctations in water levels. Distinguishing between natural and man-made water-level fluctuations can be difficult from a practical standpoint, but should not detract from predicting the amount of drawdown caused by ETSI's groundwater withdrawals.

49. Comment (in reference to the Well Field Hydrology Technical Report): "Page 4-1 - Paragraph 1 - last line. '...to model the aquifer system and simulate system response to pumping.' This report considers rocks ranging in age from Precambrian to lower Cretaceous in age. Does this mean that figures showing drawdown in the Madison actually show drawdown in Mississippian, Pennsylvanian, Permian, Triassic, Jurassic, and Lower Cretaceous rocks?" (Commenter 138.)

Response: The figures in the Draft EIS showing drawdown in the Madison aquifer depict drawdown only for wells open to the Madison. Drawdowns in the other aquifers are calculated to be less than (up to 90 percent of) those shown for the Madison. These shallow aquifer drawdowns have been added to the Final EIS in Chapter 5. The Inyan Kara (of lower Cretaceous age) has been explicitly treated in Chapter 5 of the Final EIS to show calculated water-level declines in this aquifer. Table 5-4 of the Final EIS shows in a general fashion how much drawdown can be expected in each geologic unit mentioned in the comment.

50. Comment (in reference to the Well Field Hydrology Technical Report): "The Osage Area (46N63E), as reported on p. 3-55, has one well that had the same shutin pressure in 1951 and 1978. The oldest well, flowing since drilled in 1941, is described as having flow rate changes (both a decrease and an increase) but 'nothing conclusive can be stated about changes in the potentiometric surface'. However, the calculated change shown on Map 3-8 and Table 3-5 of the EIS is 70 feet.

The Osage Area (46N-64W and 65W) also is discussed in the Tech Report on p. 3-55. It is reported that the water level in one well declined 120 feet and had declined 147 feet in another after only two hours of recovery.

However, it is stated that 'Smaller water-level declines were reported at the four other wells in the area'. This is in sharp contrast with the calculated decline of more than 200 feet shown on Map 3-8 of the EIS.

...Although the conceptual model is probably the best and most reasonable to date, the fact remains that use of the 'effective average of the properties' (page H-32, No. 1) cannot reproduce field results on a local scale." (Commenter 139.)

Response: The Final Well Field Hydrology Technical Report (WCC 1981b) has been revised (see Section 5.A.1) to explain the relationship of calculated drawdowns to observed changes in this area.

51. Comment: "For the Niobrara pumping site, the Draft Environmental Impact Statement omits consideration of the intensified effects pumping would have because of the particular place in the hydrological system that the wells would be. The statement notes that the wells would be in an area where underground water turns a corner from the Black Hills to run east, but doesn't consider what that means for the water drawdown." (Commenter ED-22.)

Response: Ground water moving east would not measurably affect drawdowns.

52. Comment: "Page 2-6, sec. 2.B.2, and p. 4-3, sec. 4.A.1 The complications of ground-water drawdown should be discussed more fully." (Commenter 231.)

Response: The meaning of "complications" is unclear, as stated in the comment. The drawdowns were fully discussed and analyzed in Section 5 of the Well Field Hydrology Technical Report (WCC 1980b); they were summarized in the Water Resources sections of Chapter 4 in the Draft EIS. The hydrology study was conducted using state-of-the-art techniques and up-to-date information.

53. Comment: Concern was expressed about the presentation of the predicted hydrologic impacts in the text and maps. It was suggested that BLM should move away from technical jargon, like drawdown, and clarify the natural misinterpretation by some other means such as, for example:

- o Include a cross section showing Madison and shallow wells.
- o Substitute the concept of bottom hole pressure for drawdown.
- o Use percentage change in hydraulic lift instead of drawdown.
- o Use BLM ingenuity to explain to these frightened and irrate landowners exactly what impacts they face.
- o Show drawdowns by time periods, such as 5, 10, 25 years (Commenters 139, WY-3, WY-5).

Response: Drawdown does not appear to be technical jargon, because the Webster dictionary defines it as "a lowering of a water level." Revisions have been made in Chapters 4 and 5 of the Final EIS and in the Final Well Field Hydrology Technical Report (WCC 1981b) to clarify the presentation of the predicted hydrologic impacts.

54. Comment: "There are several areas in the United States and in the world where use of underground water has resulted in significant impact on the aquifers and substantial lowering of water tables. The geological and water system specifics of these existing cases, the effects on water tables, and the impacts of the lowering of these water tables should be more fully evaluated and used and applied as appropriate in the environmental impact analyses and statements relative to this proposed slurry pipeline operation." (Commenter 193.)

Response: Each aquifer has unique hydrologic characteristics. No meaningful information would be conveyed by noting that large drawdowns have occurred in some aquifers as a result of extensive pumping. The model and impact predictions are tailored to the specific area of the Powder River Basin.

Effects of Gillette Pumping

55. Comment: "Page 4-14, Para. 6 of the DEIS. 'Many existing Madison and Minnelusa water users would have increased pumping lifts as a result of the declines in the potentiometric surface around the Gillette well field (Table 4-4).' Table 4-4 assumes that all the water extracted at the Gillette well field is for ETSI's benefit. This is not true. The drawdown effect of only ETSI's allotment should be reflected in the column marked, 'ETSI only' of Plan 2 in the table - not the combined total of Gillette's allotment and ETSI's allotment. This correction will greatly reduce the number of water users that are calculated to be affected."(Commenter 139.)

Response: The comment refers to Figure 4-4 (page 4-16), not Table 4-4 of the Draft EIS. The drawdowns shown for Plan 2 and Plan 4 were calculated assuming that no water was being pumped from the Gillette well field for municipal uses. This is shown in Figure 4-4 by the leveling off and eventual rise in ground-water levels at the Gillette well field after about 1997. In Plan 2, the pumping rate at Crook County increases, while the pumping rate at Gillette decreases, because ETSI would be receiving less water from the Gillette well field with time (see Table 4-1, page 4-5 of the Draft EIS).

56. Comment: The Technical Report accompanying the EIS states that the City of Gillette would pump at a rate of 3,000 gallons per minute from its Madison well field, when actually the city proposes to pump at 7,000 gallons per minute with Pacific Power and Light pumping an additional 1,000 gallons per minute. Water demands have been understated, and so have the effects." (Commenter WY-12; also 72.)

Response: The city of Gillette - Pacific Power and Light agreement was signed after publication of the Draft EIS. However, the amount of water involved in this agreement was considered in the hydrology studies reported in the Draft EIS and Well Field Hydrology Technical Report, because they considered the cumulative impact of pumping the Gillette well field at its design capacity of 11,200 gallons per minute (18,065 ac-ft/yr) (even though Gillette's pipeline capacity is only 7000 gallons per minute). The drawdowns for this case with either the Niobrara or Crook County well fields were shown on Maps 5-3 and 5-5 of the Draft EIS. Therefore, the water demands and potential use from the Gillette well field were not understated.

57. Comment: "Two of the pumping scenarios that the DES evaluates include the use of water from Gillette well field. The amount of water available to ETSI from the Gillette well field was calculated as the difference between the maximum amount of water that the well field could produce and the amount Gillette needs to meet user demands. This calculation, however, does not accurately reflect the availability of water from the Gillette well field. The City of Gillette signed an agreement with Pacific Power and Light Company (PP&L) on April 28, 1980. This agreement gives PP&L the "right and option to purchase any water which may be surplus to the needs of the City for its municipal customers." Therefore, unless PP&L relinquishes their right or the Gillette well field is shown to have the capacity to serve the needs of Gillette, PP&L and ETSI, it should not be considered as an alternative source of water." (Commenter 72.)

Response: ETSI has a signed Memorandum of Understanding with the City of Gillette (see Appendix C-5 of the Draft EIS). This indicates the desire on the part of the City of Gillette to negotiate a contract with ETSI for delivery of a minimum of 4,000 acre-feet of water. PP&L does have an agreement with the City of Gillette for the uninterrupted supply of 1,000 gallons per minute (1,613 acre-feet per year). However, there is sufficient water to supply both uses. Table 5-3 on page 5-4 of the Draft EIS shows that a total of 11,292 acre-feet per year is available from the well field. At a maximum projected use by the City of Gillette of 5,402 acre-feet, a surplus of 5,890 acre-feet would be available. Of the 5,890 acre-feet PP&L would utilize 1,613 acre-feet, still leaving a surplus of 4,277 acre-feet for ETSI, which is above the minimum they would require.

58. Comment: "The Environmental Impact Statement on the Energy Transportation System proposed for Wyoming is not an adequate statement as it does not adequately address the impact on the Northeast Corner of Wyoming and the Northwest Corner of South Dakota, as to what will happen to the water tables in the immediate future. My understanding is that the Gillette water system can not be used for the pipeline because of an agreement with the State Farm Loan Board and the Crook County Commissioners. This permit for deep water was granted for municipal use only." (Commenter 99.)

Response: The purpose of State Farm Loan Board funding to Gillette is to improve and expand the Gillette municipal water supply system. Because the terms and conditions of the funding included no specific exclusions as to use, it is fair to assume the water can be used for normal municipal uses - primarily domestic, but also commercial and industrial. The intent of the city is to sell surplus water to ETSI. The proceeds from this sale will permit the city to operate the system efficiently at its designed capacity and lower the overall costs of water to consumers and significantly reduce the costs of capital and debt service. In addition, an agreement is already in place which sells some water to Pacific Power and Light, an industrial user.

Ground-Water Quality

59. Comment: "We are also concerned that the assumptions used in the model regarding the assigned aquifer parameters (such as low permeability zone) may have biased the model so that water quality changes were minimized. For instance, the numerical model used in the geo-hydrological analysis of the groundwater assumes restrictive boundary conditions for the Madison aquifer and predicts very little impact on water levels west of the Niobrara wellfield. One of our reasons for concern is that there is some scientific controversy regarding the permeability of the Fanny Hill Mountain Monocline. If this supposed "impervious" structure does have leakage through it, and water moves from the west of the wellfield where water quality is extremely poor, water quality impacts could be severe. Because of this uncertainty, additional modeling using different permeability and boundary assumptions should be undertaken to present a better picture of the potential for water quality impact in the Final EIS." (Commenter 226.)

Response: The model was not biased to minimize water quality changes. The Fanny Peak monocline ("Fanny Hill Mountain monocline" in the comment) was considered in the analysis On a regional scale, water quality (total dissolved solids, sulfates, sodium chloride) on either side (east-west) of the Black Hills - Fanny Peak monocline is different. These data, along with other hydrogeologic data, suggest that ground-water flow across this structured feature is small. Figure 3-10 of the Well Field Hydrology Technical Report (WCC 1980b) graphically showed these water quality differences.

As shown in the sample calculation on Figure 6-2, ground-water movement is slow and anything moving at the same rate as the ground water would not migrate far (less than 4 miles over the 50 years of pumping).

60. Comment: "Page 3-21. 'Sulfate and TDS concentrations in the Madison increase with distance from the outcrop areas.' A comparison of total dissolved solids (TDS) of (1) springs a short distance from the Black Hills, versus (2) wells withdrawing water from the Madison a greater distance from the Black Hills, suggests water quality improves with distance from the Black Hills.

(1) (TDS values ppm)

LAK Springs (TDS 2110)
Spearfish Springs (TDS 1250+)
Cascade Springs (TDS 2530)
Evans Plunge (TDS 1553)

(2) (TDS values ppm)

Newcastle City (TDS 350)
Spearfish City (TDS 260)
Belle Fourche (TDS 237)
Edgemont City (TDS 1151)
Igloo (TDS 1280)
Hot Springs (TDS 436 & 878)
Niobrara Well Field (TDS 400-500)

From the above it appears that the general statement of TDS increasing with distance from the Black Hills is incorrect. This inconsistency has not been addressed in the EIS." (Commenter 138.)

Response: LAK Springs (Stockade-Beaver Creek), Cascade Springs, and Hot Springs (Evans Plunge) are not Madison Springs. Comparisions of Madison ground water with these non-Madison Springs for the purposes of this comment cannot be made. Spearfish Springs may be a Madison (Pahasapa) spring, but likely contains minerals dissolved from other formations through which the ground water has previously traveled. Therefore, the information supplied by this comment is not adequate for supporting a change in the EIS statement that sulfate and TDS concentrations in the Madison increase with distance from the outcrop area.

61. Comment: "The discussion of radioactivity in the aquifer formations should be more complete, and it should include a discussion of the characteristics of the strata surrounding them. Mention should be made of any tell-tale sign for radioactive

FIGURE 6-2

CALCULATION OF DISTANCE TRAVELED BY GROUND WATER

Ground-water movement can be calculated using the following assumptions:

Transmissitity (T) = 0.03 ft^2/sec
Thickness (b) = 250 ft
Porosity (n) = 0.1

$$\text{Ground-water gradient } (i) = \frac{350 \text{ ft}}{6 \text{ miles}} = .011$$

(Gradient calculated at the steepest part of the potentiometric surface, west of the Niobrara County well field, after 50 years of pumping at the Niobrara County well field.)

Then,

$$\text{Hydraulic conductivity } (k) = T/b = \frac{0.03 \text{ ft}^2/\text{sec}}{250 \text{ ft}} = 1.2 \times 10^{-4} \text{ ft/sec}$$

$$\text{Ground-water velocity } (v) = \frac{ki}{n} = \frac{(1.2 \times 10^{-4} \text{ft/sec})(0.011)}{0.1} = 1.32 \times 10^{-5} \text{ft/sec}$$

$$= 7.88 \times 10^{-2} \text{mi/year}$$

Distance traveled in fifty years = 7.88×10^{-2} mi/year x 50 years = 3.94 miles elements such as the existence of carbonacious materials in the cuttings. There should be some discussion included in the Final Impact Statement about how the ETSI projects might affect the migration of those 'likely high concentrations of radioactivity.'" (Commenter 141.)

Response: The only known published data on radioactivity in the study area consists of a report by Gott, Wolcott, and Bowles (1974) and scattered water quality analyses. No additional conclusions can be made beyond those discussed in the Water Quality section of the Well Field Hydrology Technical Report.

Radiochemistry has been considered in the monitoring program. Gross alpha and gross beta are specified as parameters which should be analyzed (see the Well Field Hydrology Technical Report, Madison Aquifer System Monitoring Network).

62. Comment: "Nothing more is said in either the DEIS or the technical report about the existence of radioactive minerals. Nothing is really specifically stated why this information is not important enough to include in any further discussion, or how its existence in Madison slurry water might affect fish and wildlife, or drinking water in the event of a spill, or methods of treatment at the dewatering plants. The statement remains unexplained." (Commenter 141.)

Response: High concentrations of radioactive elements have been identified only on a local basis in the western Black Hills - Eastern Powder River Basin area. Not only could the Minnelusa or Madison be a source for radioactivity, but Precambrian-age rock could likely be the originating source. Data are not sufficient to form conclusive evidence that a high radioactivity hazard exists. The Madison aquifer system monitoring program has been designed to monitor for potential problems such as this and provide for early warning of impending impacts such that remedial measures can be taken.

63. Comment: Several commenters raised concerns about the possible changes in water quality that may result from the use of Madison Formation water:

1) Additional modeling should be developed to further define potential water quality impacts.

2) What methodology was used to determine water quality impacts?

3) What specific water quality changes are expected to occur besides changes in TDS? (Commenters 138, 141, 226)

Response: The greatest amount of change in water quality that can be expected to occur as a result of ETSI's ground-water withdrawals would occur at the well field where pumping would occur. Stress would be greatest in the well field and lesser at greater distances from the well field. At the Niobrara County and Crook County well fields, water quality (total dissolved solids concentrations-TDS) is calculated to change from about 500 mg/l to 560 mg/l and from 900 mg/l to 910 mg/l, respectively (Well Field Hydrology Technical Report, Chapter 5.) At all other Madison wells, TDS concentrations are calculated to change less than 1 percent as a result of ETSI's pumping.

There is less than a 50 percent probability that drawdowns (and hence pumping stress) would be as large as those presented in the Draft EIS (see Chapter 7 of Well Field Hydrology Technical Report). Consequently, drawdowns (and water quality changes caused by drawdown) are generally expected to be less than that predicted. If drawdowns were less or if the amount of leakage from adjacent formations were smaller, water quality changes would be less that that presented in the Draft EIS.

The purpose of the Draft EIS is to present a worst-case analysis of the development. Therefore, the amount of water quality change that is calculated to occur as a result of ETSI's pumping (and as presented in the report) is probably larger than what actually would occur. As discussed earlier, the amount of water quality change that is calculated to occur as a result of ETSI's pumping is relatively small and is not expected to measurably impact ground-water users other than ETSI.

The method used to calculate water quality changes was described in the Well Field Hydrology Technical Report (WCC 1980b) section entitled "Numerical Methods" (p. 4-11). This method of calculating water quality changes (TDS) is based on conservative assumptions. As stated in the Well Field Hydrology Technical Report (p. 4-11), "The mixing model assumes that TDS concentrations are conservative (mass is preserved), that convection is the only transport process for chemical species, and that chemical concentrations are uniform within each grid cell block." This allows maximum travel distance and greater concentration. Since changes in TDS concentrations were calculated to be small (see Chapter 5), changes in other water quality parameters are also expected to be small. Ground water would not move far in 50 years (less than 4 miles), so the potential for migration of poor quality ground water into the ETSI well field is very small (see response to Ground-Water Quality Comment 59).

Spring and Stream Flow Impacts

64. Comment: "The Madison aquifer, which supplies the upper aquifers has not been addressed in the EIS, but it has been proven by Rahn, Gries, Gott and Swenson that the Madison is the aquifer that recharges all the upper aquifers." (Commenter ED-6.)

Response: The Madison aquifer is assumed to be the source of most of the springs and seeps that discharge from the Minnelusa, Spearfish, and Sundance Formations in the vicinity of the Black Hills. These springs were discussed in Chapter 3 (page 3-22) of the Well Field Hydrology Technical Report (WCC 1980b).

65. Comment: Many commenters were concerned that the draft EIS failed to identify all of the streams and springs that would be affected by reduced flow or would be totally eliminated. Some com-

menters asked if specific streams or springs would be affected. (Commenter 28, 43, 72, 74, 97, 138, 140, ED-4.)

Response: Surface springs are not predicted to be eliminated by the proposed project. The list of streams and springs located in Table 3-1 of the Draft EIS is only an inventory and not meant to be used to describe impacts. All springs and streams calculated to be affected by one or more cfs reduction as a result of the operation of the proposed project were shown in Table 4-3 of the Draft EIS. This table lists total flow reductions at an individual location or area. Any stream or spring not listed in Table 4-3 is not calculated to be affected by the proposed withdrawal of water. Those streams and springs specifically mentioned by the commenters are not predicted to be affected except as already shown in the Draft EIS.

66. Comment: "Page 4-7, Table 4-3 illustrates changes in groundwater discharge rates to streams and springs. From this information we recommend selection of Plan 1; Niobrara Well Field only. If any other plan is selected, additional detailed analysis should be conducted and presented. Potential dewatering effects of the other plans are inadequately assessed and mitigated in the EIS." (Commenter 72.)

Response: The comment does not identify where or what type of additional analysis is needed. The same level of analysis was used for all four well field alternatives (see Chapter 5 of the Well Field Hydrology Technical Report). In addition to the four well field pumping plans, a treated wastewater alternative and a combined water source alternative have been considered in the Final EIS in Sections 4.I and 4.G, respectively.

67. Comment: Several commenters questioned the validity of the impact significance criteria used for drawdown and stream and spring flow reductions. In the EIS, impacts on the hydrology of the Madison aquifer system were considered potentially significant if stream flow was reduced by more than 0.5 cfs, or if measurable water quality changes occurred as a result of ETSI's ground-water withdrawals. (Commenters 72, 139, ED-2.)

Response: Standards on what is a significant drawdown will vary from person to person. For this reason, it was necessary to define what level was considered significant in the Draft EIS so that each reader could see the standard used. There are no state or federal standards established on allowable drawdown levels that could have been used as significance criteria. The 25-foot level was chosen, because it was felt that for most wells values less than this would not create problems of lowering pumps, deepening wells, etc., while values exceeding this amount might cause more of these impacts. A reduction of 0.5 cfs in stream and spring flow was considered potentially significant due to the possible legal implications to allocated water rights as well as the possible importance to fisheries, even though such a value is difficult to measure in some streams.

The base flows of most of the springs and streams that would be affected by the proposed project are less than 20 cfs. The criteria of 0.5 cfs was used, because this limit defines the smallest predictable change.

None of the commenters presented a rationale to support a change in either of these criteria.

68. Comment: Several commenters questioned the validity of the analysis of the reduction of spring and stream flow, particularly the concept that the streams contain a Madison aquifer base flow and that because of complex geology impacts cannot be accurately predicted without individual, on-site analysis. (Commenters 7, 72, 138, 139, RC-3.)

Response: A field investigation was conducted by Rahn and Gries when they inventoried the springs in the Black Hills in 1973. Data from their report (Rahn and Gries 1973) was used in the studies conducted for this EIS (see Table 3-2 of Well Field Hydrology Technical Report [WCC 1980b]).

The magnitude of the calculated stream flow reductions are a result of the hydraulic parameters specified for The Madison aquifer model (Section 4.C.1 in the Well Field Hydrology Technical Report) which includes the Madison aquifer unit, the Minnelusa confining unit, the Minnelusa aquifer unit, and the Upper Cretaceous confining unit. Only streams which cross Lower Cretaceous and older strata are stated to contain a Madison baseflow component. No Madison baseflow component is calculated to occur to those parts of the streams in the Powder River Basin which cross strata that are younger than Lower Cretaceous in age.

The final Well Field Hydrology Technical Report has been revised to include a discussion of the techniques used to calculate the spring and stream flow reductions (see Section 4.B).

69. Comment: "Although Trout Haven Ranch sent a letter to the Bureau of Land Management concerning the effects of Madison Water Drawdown to our business, there was not a word mentioned in the Draft EIS.

Our hatchery uses the water of Beaver Creek. The spring to this creek is nine miles northeast of Hot Springs, South Dakota. This is also the location of our trout hatchery. If ETSI causes a temperature increase of two (2) degrees Fahrenheit or flow reduction of only 10% to our spring, we will be forced out of business because of economical reasons." (Commenter 129.)

Response: Beaver Creek near Buffalo Gap, South Dakota, is not calculated to be significantly affected by ETSI's pumping. This means that stream/spring flow reduction in this creek is calculated to be less than 0.5 cfs (see page 4-1 of the Draft EIS for definition of a significant impact). This reduction is not expected to cause any measurable change in temperature. Therefore, these impacts were not significant and not mentioned specifically in the EIS.

70. Comment: "Page 4-17. para. 2. Estimates of stream flow or spring flow reductions are presented. However, the base flows or flow durations are not given in the text. Without these data, adequate evaluation of the impact of these reductions is impossible." (Commenter 231.)

Response: Flow-duration data were located in Appendix I of the Well Field Hydrology Technical Report (WCC 1980b).

71. Comment: Page 4-14, para. 2; Page 4-17, para. 3; Page 4-97, para. 4; Reference a time frame figure to this paragraph. Important for reader clarification changes in base flows of the Cheyenne River, Cascade Springs, and of springs in the Hot Springs area, as well as flows of Sand Creek, Spearfish Creek, Belle Fourche River, and Crow Creek Springs, could be depicted in the same way as was done in Figure 4-1 on page 4-9 of the DEIS for the Edgemont and Provo wells. Time frames should also be added for this type of data in the Well Field Hydrology Technical Report. (Commenter 139.)

Response: Time frames have been added to Chapter 5 of the Final EIS and to the Final Well Field Hydrology Technical Report (WCC 1981b).

72. Comment: "The EIS does not address the physical or socioeconomic impacts of a reduction of 2 cfs of the Fall River and Hot Springs. This represents about a 8 to 10 percent reduction in flow. The EIS is not clear in this spring flow reduction. It appears that it's taken for the total flow of Fall River, and that all the springs that feed it are lumped together. This is not clear. In reality the total perennial flow of Fall River is the composite flow of several Madison free flowing springs. They are located over about a two mile geographic area. Each spring has its own discharge and inorganic chemical characteristics, which are not considered in the impact statement." (Commenter ED-15.)

Response: Stream flow in the Hot Springs area is mainly from Hot Brook and Evans Plunge springs. Hot Brook springs is located about two miles northwest of Hot Springs and, when last measured (Rahn and Gries 1973), had a fairly consistent flow of 2 cubic feet per second (cfs) or 900 gallons per minute (gpm) and a temperature of 75°F. Hot Brook spring flow joins with Cold Brook Creek (an ephemeral stream) to form the Fall River which flows down to and through Hot Springs. Flow from the Evans Plunge spring area (a relatively small area where springs occur) joins the Fall River in Hot Springs. The Evans Plunge Spring area adds about 14 cfs or 6300 gpm to the Fall River minus the flow into the Black Hills Power and Light inlet (Rahn 1979b, 1980).

A few users take out fairly significant quantities of water from the Hot Brook and Evans Plunge springs. The city of Hot Springs used the equivalent of 0.89 cfs (400 gpm) from Hot Brook and 0.38 cfs (170 gpm) from Evans Plunge in 1980 (Shelton 1981). The Federal Veterans Administration facility used the equivalent of 0.35 cfs (160 gpm) from Evans Plunge in 1980 (anon. 1981). The Evans Plunge Resort uses approximately 6.7 cfs (300 gpm) to flush its large swimming pool (Muller 1981). No other significant users of springs in the area were identified through discussions with the parties referenced above.

The predicted effects of the ETSI well field on the springs in the Hot Springs area are relatively small compared to the flow of the springs and actual water use from the springs. Minimal impact on the flow and water quality (including temperature) of Hot Springs Brook is predicted. Impacts on water quality, including temperature, of the Evans Plunge springs is predicted to be minimal. Therefore, there are no predicted economic impacts from the change in flow.

73. Comment: "Statistical analyses should have been incorporated in the DEIS to more accurately evaluate the probability of such an event (severe drought), because drought conditions, combined with a reduction in base flows would cause serious impacts to fisheries and other aquatic resources, instream beneficial uses, and other established water uses and rights, and may cause violations of the South Dakota Surface Water Quality Standards (ARSD 34:04)." (Commenter 138.)

Response: The probability that a stream at a specified location will flow for a given time at a given rate, given past conditions, is shown in Appendix I of the Well Field Hydrology Technical Report. These probabilities are given in the form of flow-duration curves. The amount of flow reduction which is calculated to be caused by ETSI, and the resulting probability of stream flow can be calculated by taking the calculated flow reduction caused by ETSI's pumping (see Chapter 5 of the technical report) and subtracting this amount from the flow-duration data.

Calculations for water-level declines and reductions in spring and stream flow are based on available historic data and recent climate conditions. Climatic change has not been factored into any of the analyses.

For a discussion of the relationship of flow reductions to beneficial users and South Dakota water quality standards, see the response to General Water Comment 129.

74. Comment: "Withdrawal of the 20,000 acre-feet per year from the Madison in the Niobrara County well field would reduce base stream flows in South Dakota by 7 cfs.

We would ask, how will this impact existing water rights and water uses in South Dakota? How will it impact waste water treatment needs of discharges, an example is Hot Springs, and who will pay for the more stringent treatment if it is needed?" (Commenter RC-3.)

Response: The text has been revised. See Final Surface Water Quality Report (WCC 1981c), Chapter 4, and Final EIS, Section 4.A.1.

Shallow Aquifer Impacts

75. Comment: Many commenters raised the issue that the impact on the shallower aquifers (e.g., Spearfish Formation, Inyan Kara Group) was not adequately analyzed in the Draft EIS. They felt that the statement that the impact would be 90% of that predicted for the Madison Formation was too broad and additional detail was needed. (Commenters 7, 32, 46, 138, ED-3, ED-4, ED-6, ED-8, ED-11, ED-14, RC-3, WY-4, WY-12.)

Response: The conceptual model of the Madison aquifer system presented in the Draft EIS was designed primarily to evaluate the impacts of the proposed ETSI withdrawals on other users of the Madison aquifer, and, to a lesser extent, on users of water from the Minnelusa and Red River Formations. These impacts were presented and described in Chapters 4 and 5 of the Draft EIS. Analysis of these predicted impacts suggested that ETSI withdrawals may also have an effect on the permeable units of the shallower Inyan Kara Group. Therefore, changes in Chapter 4 and 5 of the Final EIS were made to better define the impact on the shallower aquifer units. Drawdowns have been presented in tables and on maps in the Final EIS and Well Field Hydrology Technical Report.

76. Comment: "The EIS states (Page 3-9) that a series of shale beds isolates the Madison aquifer from important aquifers nearer the surface. The EIS has not addressed the fact that fracturing and faulting within the shale beds could be sufficient to blend the aquifers. If this is the case, important aquifers utilized by the agricultural industry could be adversely affected by any drawdown in the Madison aquifer. Further study is needed to determine if a hydrologic relationship exists between the Madison aquifer and aquifers above it. Additionally, the BLM has failed to adequately document the drawn-down and recovery levels of the Madison aquifer." (Commenter 72.)

Response: There is no evidence to show that folding and faulting in the Cretaceous shales is significant on a regional scale to hydraulically blend the waters in different aquifers.

Regarding the hydrologic relationship between the Madison aquifer and shallower aquifers, see the response to Shallow Aquifer Comment 75.

The drawdown and recovery levels of the Madison aquifer were documented in Section 5 of the Well Field Hydrology Technical Report and in Chapters 4 and 5 of the Draft EIS. Additional maps have been included in the Final EIS which also illustrate this point.

77. Comment: "Finally, since the State of Nebraska will also be directly affected by the decline in water tables, it should be pointed out that there is a hy-

draulic connection between the Madison aquifer and the overlying Arikaree Formation (EIS 3-15). This is an aquifer of great importance to western Nebraska which will also suffer the impacts from the projected water withdrawals. These impacts were not adequately addressed in the EIS." (Commenter ED-8.)

Response: As explained on pages 3-7 and 3-8 of the Well Field Hydrology Technical Report (WCC 1980b), the Arikaree Formation is separated from the Madison in Nebraska by a thick sequence of Cretaceous shales which hydraulically isolates the two aquifers. No significant impacts (greater than 25 feet of drawdown) would occur to wells in the Arikaree Formation in Nebraska.

Geothermal Impacts

78. Comment: The impact of ETSI's pumping on the geothermal heat potential of the Madison aquifer should be addressed in the EIS. Will the increased groundwater velocity in the Madison caused by ETSI's pumping cause significant cooling of the water in Edgemont? Will leakage from overlying, cooler formations cause significant cooling? Will the increased pumping costs associated with the loss of artesian head make geothermal heating economically unattractive? Who will mitigate the adverse impacts? What will the increased socioeconomic cost be to those institutions currently using geothermal water? (Commenters 74, 138, ED-1, ED-4, ED-8, ED-15, ED-19, RC-3.)

    Response: The proposed ETSI withdrawal is not calculated to measurably affect ground-water temperatures in the Madison aquifer. Similarily, the proposed withdrawal is not calculated to measurably affect the temperatures of Madison water in South Dakota. Vertical and horizontal ground-water movement would be too slow to alter the geothermal gradient. The only predicted impact of ETSI on the use of the Madison as a geothermal resource is that a small part of extreme western South Dakota may experience water-level declines. These declines would result in loss of artesian head in the Madison aquifer. Additional costs would be incurred as a result of a lowered artesian head, because flow would be reduced in free-flowing wells and greater pumping lifts would be required for nonflowing wells.

    Refer to Section 6.E.16, Economic Cost Comment 478 for a discussion of economic costs and EIS analyses. Refer to Section 6.E.14, Mitigation Comment 443, for a response to the mitigation question.

Oil Field Impacts

79. Comment: Concern was expressed by several commenters as to what the impact would be on oil fields (e.g., reduction in recovery rates, need for increased water flooding, costs, mitigation, responsibility, etc.) (Commenters 138, ED-1, ED-4, RC-3.)

    Response: The possible impact on oil fields has been clarified in the Final EIS. Based on the available data, the most that can be predicted is that oil field reservoir pressures have the potential to decrease as a result of change in water levels in the

Madison and Inyan Kara aquifers. The complexity of the geology associated with the oil fields prohibits making any detailed impact assessment. The Final EIS as well as the Draft EIS recognize this potential impact and explain that data do not allow a refinement of the impact analysis.

80. Comment: "Page 4-11, Para. 2 of the DEIS. 'Several small oil fields that produce from stratigraphic traps in the upper part of the Minnelusa Formation exist within the region in which declines in the potentiometric surface of the upper Minnelusa are greater than 25 feet. Reservoir pressures would decrease in these fields as a result of the pumping at the Niobrara County well field.' Suggest that this reference be deleted, to end of paragraph, as this is a qualitative statement and the complexities of the geology of the region do not allow that statement to be made with certainty. It is speculative. As indicated by the statement that 'the geology is complex and further refinements concerning impacts other than these qualitiative expressions cannot be made at this time.' (Page 4-11, Para. 2.)

Oil stratagraphics are on west side of Old Woman fault. Hydrology basis for the computer program is that there is insignificant communication between east and west sides of the fault. Therefore, if the assumptions behind the hydrology are correct, the pressure change on oil traps is insignificant." (Commenter 139.)

Response: The potential impact on oil fields has been clarified in Section 4.A.1 of the Final EIS.

81. Comment: "Finally, I don't believe enough consideration has been given to vertical communication along fracture zones. If leakage and vertical communication is greater than anticipated so that depletion of heads in the overlying Pennsylvania and lower Cretaceous sediments occurs from Madison pumping, then an interesting situation may arise that has not been considered. It has been suggested that some of the oil fields along the eastern flank of the Powder River Basin are hydrodynamically trapped. If this is true and the heads in the Minnelusa and lower Cretaceous are lowered, what effects will this have on the trapping conditions in fields like the Recluse and Bell Creek?" (Commenter ED-21.)

Response: Present data does not suggest that vertical communication along fracture zones is important on a regional scale. On a regional scale, ETSI's pumping may be expected to reduce reservoir pressures in oil fields within the zone of influence of ETSI's pumping wells.

82. Comment (in reference to the Well Field Hydrology Technical Report): "Even using the terminology of this report, the unit that produces oil in southwestern South Dakota is Pennsylvanian in age; therefore, using this terminology, production is from the lower Minnelusa." (Commenter 138.)

Response: Oil and gas production in the study region can be from the upper and lower parts of the Minnelusa Formation. In southwestern South Dakota, oil production is from the lower Minnelusa.

A statement has been added to the Final EIS that oil and gas is produced from the Minnelusa in Wyoming and South Dakota.

Monitoring

83. Comment: "The recommended monitoring program is already covered under the existing permit, legislative and third party agreement conditions. (Chapter 4, p. 121-123)" (Commenter 72).

Response: The monitoring program is in addition to that required by law. The monitoring program developed by the Wyoming State Engineer's Office is designed to only measure impacts in the Madison Limestone in the vicinity of the Niobrara well field. For the EIS, a monitoring program needed to be developed on the basis of predicting impacts for several different well field development plans, for monitoring drawdown in the Minnelusa Formation, for monitoring stream flow, and for monitoring water quality change.

84. Comment: "Lastly, the construction of monitoring wells is mentioned in Chapter 6 of the Technical Report, but the details of the operation and significance are not addressed." (Commenter ED-3.)

Response: The details of the operation of the monitoring system were discussed in the Madison Aquifer System Monitoring Network section (Chapter 6, pages 6-8 to 6-11) of the Well Field Hydrology Technical Report (WCC 1980b).

85. Comment: "Your proposal to only monitor the drawdown levels of the Gillette well field does not go far enough. There needs to be a specific measure on assessing the drawdown impact on the Gillette well fields, and a mitigation proposal tied to this measurable index so that the water supply can be adjusted to off-set for the drawdown impact." (Commenter 178.)

Response: The Gillette wells are recommended to be monitored in the same manner as other Madison wells in the Madison aquifer system monitoring network (see Monitoring section in Chapter 4 of the Final EIS). The discharge rates from the Gillette well and the amount of water that could be supplied by Gillette to ETSI would then be a known quantity. Since overall impacts that would be caused by ETSI and Gillette pumping in the area surrounding the Gillette well field are being monitored by the Madison aquifer system monitoring network, the proportion of the impacts caused by ETSI and the proportion of impacts caused by Gillette could be separated by examining the amount of water withdrawn at the Gillette well field by Gillette, and then subtracting this amount from the total impact caused by the ground water withdrawals at Gillette. The balance of the impact could be attributed to ETSI if no other water users were involved in using the Gillette water supply system. The basis for determining the amount of drawdown caused by the Gillette well field would be by using appropriate hydraulic equations that define the relationship between drawdown and discharge. (See also Section 6.E.14, Comment 443 for a response to the mitigation concern.)

86. Comment: "Another planning device I feel has been rather overlooked is the best case/worst case method of making decisions. What will happen if the worst possible event occurs as a result of this project? Since the EIS basically addresses only a numerical model which may not have a very practical application, we would hope that some type of monitoring and testing can be done prior to actual operation, and we would also hope that the worst case is presented and some type of mitigation is planned." (Commenter ED-1.)

Response: Extensive testing and monitoring has been done, both in the Niobrara and Crook well fields areas. See Appendix H of the Well Field Hydrology Technical Report (WCC 1980b) which summarizes the testing. The monitoring program ETSI plans to follow during operation should the project be approved is outlined in the Monitoring section of Chapter 4 of the Final EIS.

Refer to response to WCC Model Comment 3, which discusses presentation of a worst-case analysis.

Protection measures for Wyoming groundwater users were identified in Appendices C-2 and C-3 of the Draft EIS. Similar measures that ETSI has offered to the City of Edgemont, South Dakota, and the state of South Dakota are included in Appendices C-7 and C-8 of the Final EIS.

87. Comment: "One monitoring well in the Madison in South Dakota, OW-6, is not enough. What about monitoring the overlying aquifers for which 90 percent drawdown is forecasted?" (Commenter ED-3; also ED-4, RC-3.)

Response: The Madison aquifer monitoring program located in Chapter 4 of the Final EIS states that monitoring wells specifically located for ETSI's well field development and existing Madison wells will be continuously monitored for the effects ETSI may have on the Madison aquifer system. This network of wells includes existing wells in South Dakota, as well as in Wyoming, where ETSI's influence on Madison ground water may be felt. Both water levels and water quality are to be monitored in these wells. Minnelusa wells will also be monitored. Since ground water impacts should occur to the Minnelusa Formation before impacts occur in rock units above the Minnelusa Formation, no monitoring program is required at this time for the shallower aquifers. Should ETSI begin pumping and it appear likely that other areas in the aquifer units could be impacted by ETSI's pumping, additional measures could be taken to monitor for these effects. It would be premature to develop an all-encompassing monitoring program until the actual physical impacts can be better quantified.

The monitoring program included in the Final EIS is in addition to the present USGS stream gaging and water quality sampling program. These programs would be useful in monitoring for surface water impacts as well as in supplementing ETSI's ground-water monitoring program.

88. Comment: "The EIS presents recommendations regarding monitoring wells for the proposed pumping areas and the affected community well areas. The location of the wells poses a problem. For example, in the case of the Niobrara County wellfield all of the monitoring wells will be upgradient of the wellfield. The model does show depressions in the piezometric surface downdip after ETSI pumping. Since the downdip directions are primarily toward the west they also would be drawing from potentially the worst quality water. For this reason we recommended that monitoring wells be installed to the west of the proposed wellfields as well."(Commenter 226.)

Response: Only a small part of the drawdown is calculated to occur west of the Niobrara well field. Calculations show that water quality changes are expected to be relatively small. No existing or proposed Madison water users exist near the western side of the Niobrara well field.

There is no evidence to show that water quality in the Madison is worse west of the Niobrara County well field. Even if Madison water quality is worse west of the well field, the only entity that would be harmed by pumping the poorer quality water would be ETSI. Therefore, monitoring wells were not recommended west of the Niobrara County well field.

Effects of Pump Station Wells

89. Comment: "The Department of Agriculture is concerned about the loss of ground-water at two pumping stations proposed in Wyoming. The annual consumption of 60 acre-feet of water will be in direct conflict with existing or potential ground-water needs in the vicinity of the pumping stations. A pumping station proposed near Carpenter, Wyoming would be drawing ground-water from an area already designated as a critical ground-water area. The State Engineer has placed a moratorium on the drilling of water wells in this area. ETSI's proposed plans to drill a water well in this area is in direct conflict with a decision made by the Office of the State Engineer." (Commenter 72.)

Response: No proposed pump station would be located near Carpenter, Wyoming (see Map A-44 of the Draft EIS Map Volume, Appendix A). All the proposed pump stations in Wyoming would be located in Niobrara County. The proposed pump stations in Wyoming that would require approximately 30 acre-feet per year of ground water (28 gpm) each are shown in Table 6-6.

The use of ground water at these pump stations should not physically conflict with any existing users. Adequate yields are generally obtainable from the shallow aquifers in the area with minimal drawdown impacts.

The use of ground water at these locations would require a permit from the states of Wyoming or Colorado. Each state is responsible for protecting existing ground-water users from future ground-water impacts.

90. Comment: "A complete investigation of water availability should be conducted and impacts cited concerning the 90 acre-feet of supplemental water required for the pipeline alternative in Colorado." (Commenter 89.)

Response: The two pump stations located in Colorado on the Colorado alternative would require wells capable of producing approximately 30 gpm. The availability of ground water at the two pump stations is discussed below.

Pump Station C-4 is located approximately 11 miles south of the Nebraska border in Weld County, Colorado, and south of the Pawnee Buttes. The White River Group is the source of water to domestic and stock wells in the vicinity of the proposed pump station (Wiest 1964). A well at the pump station would likely be able to produce at least 30 gpm from the White River Group. Drawdowns in existing wells as the result of this pumpage would be minimal.

Pump Station C-5 would be located southeast of Wray, Colorado, in Yuma County. The pump station would be located where a thin veneer of the Ogallala Formation overlies the Pierre Shale. The Ogallala Formation in the location of the proposed pump station is reported to be unsaturated (Wiest 1964). A deep well yielding sufficient quantities of water could be completed in the sandy zones of the Pierre Shale or in the underlying lower Cretaceous sandstones. The impact of this withdrawal on existing users would be small.

The use of ground water at these pump stations would require a permit from the state of Colorado. The state would be responsible for protecting existing ground-water users from future ground-water impacts.

Effects on Other Users

91. Comment: "EPA believes that the impacts on local communities from drawdowns of the Madison aquifer need to be examined in greater detail. The proposed project anticipates extracting some one million acre-feet of water from the Madison aquifer over the life of the project. A number of small communities draw water from this aquifer and will be adversely affected by this project. EPA is concerned with both the physical depletion and

TABLE 6-6

WYOMING PUMP STATION LOCATIONS AND WATER SOURCES

Station Name	Location [a]	Probable Source of Ground Water
	Proposed Action	
P-2	18 miles NE of Lusk	Lance Formation
P-3	7 miles E of Lusk	Arikaree Formation
	Colorado Alternative	
C-1	9 miles NW of Lusk	White River Group
C-3	6 miles SW of Lusk	Arikaree Formation

[a] Pump station locations shown on Appendix A maps.

potential for water quality degradation of this aquifer, and the related impact on those communities which depend on this aquifer for their water supply." (Commenter 226.)

Response: The community water supplies of Edgemont, South Dakota, and Newcastle, Osage, Upton, Sundance, and Hulett, Wyoming, were estimated to be affected by the proposed ETSI withdrawals. The amount of drawdown estimated to occur at each of these community water wells is listed in Table 4-3 and Tables 5-5 through 5-10 of the Final EIS. The estimated drawdowns will increase pumping lifts at Sundance and Upton, will necessitate the installation of pumps at Edgemont, and will slightly decrease well flow rates at Osage and Newcastle. Water quality impacts were not estimated to occur in the Madison aquifer in the vicinity of any of the community water supply wells.

92. Comment (in reference to the Well Field Hydrology Technical Report): "Even though they are stating that their pumpage will affect flows in the Powder River, etc., they do not consider the effects of proposed pumpage from the western part of the basin." (Commenter 72.)

Response: The proposed withdrawals are not stated to have an effect on the flow of the Powder River.

The water withdrawals in the midwest Wyoming area are assumed to have no effect on water levels in the central and eastern part of the Powder River Basin. The basis for this assumption is an hypothesized zone of low transmissivity along the eastern flanks of the Big Horn Mountains. The areal extent of the cone of depression around the Midwest (Salt Creek) oil field can be shown to be restricted to only the southwestern corner of the Powder River Basin. Map 3-4 of the Well Field Hydrology Technical Report (WCC 1980b) and Map 3-4 of the Draft EIS showed these drawdowns in northeastern Natrona County and southeastern Johnson County, Wyoming.

93. Comment: "How will the water use affect development of uranium mining and milling?" (Commenters 138, ED-1.)

Response: The use of Madison water by ETSI would not affect development of uranium mining and milling.

Regional Water Study

94. Comment: "Page 3-4, Para. 1, Left Column. 'In the area of interest, the Black Hills region of South Dakota and Wyoming and the eastern part of the Powder River Basin of Wyoming and Montana, the Madison group has not been fully developed...'

This is a significant statement that could be expanded and given more emphasis. If the Madison aquifer has not been fully developed, the draft EIS should spell out the extent of its underdevelopment. In a general sense, the documents indicate there is room for further development of the Madison aquifer, but there is little specific information to indicate the degree of underdevelopment.

For example, the October 10, 1977 report (Project No. C-108, SAI-1-064-03-029) prepared for the Office of Technology Assessment by Science Applications, Inc. summarizes the potential of the Madison Formation as follows: 'Ground water supplies from the Madison Formation could possibly be increased by about 50,000 acre feet per year without exceeding present recharge.'" (Commenter 139.)

Response: Discussing the possible development of the Madison Formation is beyond the scope of the EIS. The purpose of the EIS is to assess the impact of the proposed coal slurry transportation system and reasonable alternatives. Numerous other studies have assessed water development in this region. The most recent one by the Water Resources Council was published in the Federal Register on Wednesday, October 29, 1980.

95. Comment: It would seem feasible as well to require a study of all the energy mining, and agriculture projects proposed for this semi-arid region which will require the use of the region's underground or surface waters, so that some clear picture of the total depletion that would occur from these projects can be given to the public. The necessary studies to determine baseline data should accompany this regional environmental impact statement. (Commenters 46, 72, 122, 151, 179, OK-1, RC-4.)

Response: The purpose of the EIS was to analyze the impact of the ETSI proposal. A regional water study analysis of need, costs, and impacts is beyond the scope of this EIS. Numerous studies of this nature have already been conducted. The EIS took into consideration all known, probable users of Madison water and considered these effects in the cumulative impact section (Chapter 5). A list of some of the other major water studies that have been conducted follows:

- Water for Energy: Mississippi River Reservoirs, Pick-Sloan Missouri Basin Program: Use of Missouri River Reservoir Water for Energy-Related Industrial Development. Department of the Interior, Bureau of Reclamation. Washington, D.C. Department of the Interior. December 1, 1977.
- Energy Resources Development in Wyoming's Powder River Basin: An Assessment of Potential Social and Economic Impacts: Roger A. Matson, Jeanette B. Studer, U.S. Department of Agriculture, Economic Research Service: Wyoming University, Water Resources Research Institute: Northern Great Plains Resources Program. 1974.
- Water Demands for Energy Development. Meese, Allen V.; Brown, F. Lee, University of New Mexico, Natural Resources Lawyer. 1975.

Surface-Water Quality

96. Comment: "Page 4-17, paragraph three, column two, describes hydrostatic testing. Extreme impacts could result from haphazard hydrostatic testing. All hydrostatic testing should be done in

such a manner that no introduction of pollutants in excess of Wyoming water quality standards or stream channel degradation occurs." (Commenter 72.)

Response: The effects of hydrostatic test water discharge were summarized in Section 4.A.1, page 4-17 of the Draft EIS. The effects were more fully discussed in Chapter 3, Hydrostatic Test Water Discharge, of the Surface Water Quality Technical Report. The state of Wyoming Department of Environmental Quality would issue the permit authorizing discharge of the test water and could ensure that stream channel degradation would not occur.

97. Comment: "Page 4-17, col. 2, par. 1-3. No consideration has been given to slower controlled hydrostatic test releases. Erosion and degradation to the receiving drainage could be greatly reduced by slowing the releases which would allow for mixing and recovery within the receiving waterway." (Commenter 231.)

Response: Discharge of hydrostatic test water would require a permit under the National Pollutant Discharge Elimination System (NPDES). As discussed in Section 3.A of the Surface Water Quality Technical Report (WCC 1980c), regulatory stipulations by the states of Wyoming, Colorado, Kansas, Nebraska, Oklahoma, Arkansas, and Louisiana and EPA Region 6 could include erosion control, detention ponds, and other measures. Mitigation of potential impacts was included in the Mitigation section of Chapter 4 of the Draft EIS.

98. Comment: "The risk associated with discharge resulting from ruptures during hydrostatic testing is understood and appreciated. However, every effort should be made to control any discharge not resulting from a rupture. No hydrostatic test water should be allowed to be discharged unless it can be controlled and will not violate any established water quality standards or cause any environmental damage. In addition, any waters taken from within a State should be accompanied by proper water use permits and receive adequate treatment after use to meet acceptable water standards before final discharge.

Additional information on test sites, water use per site, discharge site and quantity, and necessary treatment to meet discharge site standards should be included in the EIS." (Commenter 113.)

Response: Please refer to the response to Surface Water Quality Comment 97. Additional information on test sites, water use per site, and necessary treatment is not available at this time. This information would be developed as part of detailed construction plans and would be available for public review through the National Pollutant Discharge Elimination System permit process.

99. Comment: "The draft EIS has identified that the proposed coal slurry system will require hydrostatic testing prior to being used for coal transportation. EPA Region VI in Dallas considers hydrostatic testing discharge water as innocuous and is cur-

rently in the process of developing general permits for this type of activity. However, a possible limitation in association with coal slurry pipelines might relate to workover hydrostatic testing where pipeline residual materials could cause contamination of hydrostatic test water. If residuals are to be a significant problem, the EIS should discuss and identify methods of effective technology to remove this potential impact." (Commenter 226.)

Response: No unique residual materials are expected to be present in the hydrostatic test water. Table 3-1 of the Surface Water Quality Technical Report (WCC 1980c) indicated the types of constituents expected to be present. The principal constituents are expected to be suspended solids and iron, and possibly oil and grease, as discussed in Section 3.B of the same technical report.

The types of controls that could be required include controlled or timed release, detention or retention basins, evaporation pits, and straw or hay bale filters.

100. Comment: "Page 4-17, Para. 5 of the DEIS. 'Surface Water,' refers to effects of hydrostatic testing indicating possible adverse effects. Change this section to reflect impact of mitigating measures. In the ETSI project, only a small amount of water will be discharged at locations approved by EPA and/or State authorities, and using approved methods to prevent any adverse pollution." (Commenter 139.)

Response: Section 4.A.1, Surface Water, of the Final EIS has been revised.

101. Comment: "Page 4-55, Paragraph 2 'It is anticipated that general construction activity associated with the proposed dewatering facilities would contribute considerably to the suspended solids concentrations of the water bodies identified in Section 3.A.5.' Change the paragraph to reflect that no quantifiable information is available and that in all cases construction techniques will be used to contain sediment contributions during rainstorms as specified on pages C-1 and C-2, Appendix C, under "General Construction, Operation, and Reclamation Procedures." (Commenter 139.)

Response: Section 4.A.6, Dewatering Plants, of the Final EIS has been changed to include the information included in the comment.

Stream Crossings

102. Comment: "Contours. The EIS makes an incorrect statement that no changes would occur in bottom contours as a result of the laying of the pipeline. Experience indicates that unless considerable care is exercised, erosion - particularly in flood situations does occur." (Commenter OK-1.)

Response: As explained in the General Construction, Operation, and Reclamation Procedures included in Appendix C-1 (fourth point under Right-of-Way and Site Clearing), streambanks would be stabilized to prevent erosion. Erosion of the streambed around or near the pipeline would not be a problem, because the pipe would be buried below the scour depth, as required by U.S. Army Corps of Engineers regulations (33 CFR 320).

103. Comment: "The DEIS does not address the physical impacts of the stream crossing activities on stream regime. Trench and fill operations at stream crossings could result in stream channel instabilities, resulting in a variety of adverse impacts. Examples include increased bank erosion, degradation and possible headcutting in upstream directions, deposition and increased flooding downstream, transient bed form disturbances and damages to bridges and other similar structures." (Commenter 231.)

Response: In the Draft EIS, stream regime is discussed in Appendix C-1, General Construction, Operation, and Reclamation Procedures. The Right-of-way and Site Clearing section states that the banks would be stabilized and that original contours would be reestablished. Furthermore, existing federal regulations (49 CFR 192) state that a minimum cover must be maintained over the pipe. This implies a stable bottom would be established. Therefore, it was predicted that impacts of this nature would not be significant, and no EIS revision was necessary.

104. Comment: "It would appear that no on-site evaluations were made. Particularly lacking are inspections at major stream crossings which would allow values and benefits of these locations to be assessed." (Commenter 231.)

Response: An on-site evaluation of stream crossing sites was thought to be of questionable value, because the EIS did not analyze a staked pipeline route, but rather considered a route that could vary within a one-mile wide corridor. If the project is approved, the stream crossing sites would be precisely determined when actual route surveys are completed. During this phase of design, there would be considerable latitude to determine the best place to cross a given stream. As indicated in Section 1.F.4 of the Draft EIS, these crossings would require Corps of Engineers permits and would have to meet certain requirements.

105. Comment: "The data presented in the draft EIS does not include any information on the bed material for Oklahoma." (Commenter 113.)6

Response: Bed materials change within given physiographic regions rather than at state boundaries; therefore, bed materials discussed in Arkansas and Kansas would be similar to those in Oklahoma.

106. Comment (in reference to the Surface Water Quality Technical Report): "Page 29, par. 2. B. Construction methods include the diversion of perennial streams. Fill material used to divert the flow of streams may be subject to regulation pursuant to Section

404 of the Clean Water Act. More detailed information is needed to make this determination." (Commenter 231.)

Response: The river and stream crossings that require U.S. Army Corps of Engineers permits under provisions of Section 20 of the River and Harbor Act of 1899 and/or Section 404 of the Clean Water Act of 1977, were identified in Appendix D-6 of the Draft EIS. Should the project be approved, ETSI would finalize its system design and stream crossing locations and construction methods, and would then provide the Corps of Engineers with any additional detailed information as needed pursuant to Section 404 of the Clean Water Act.

107. Comment (in reference to the Surface Water Quality Technical Report): "Page 32, Para. 1' (e.g., burial 4 feet or 20 percent of scour depth, beneath the maximum scour depth elevation, or whichever is greater.)' As stated, it is not clear whether 20% indicates only 20% of the scour depth or the scour depth plus 20%." (Commenter 139.)

Response: Section 2.B of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised to clarify the meaning of this sentence.

108. Comment (in reference to the Surface Water Quality Technical Report): "Page 11, Para. 2 'Up to an estimated maximum of 16 million gallons could be generated per construction spread.' It is unclear what 'spread' represents in this discussion." (Commenter 139.)

Response: The Summary of the Surface Water Quality Technical Report (WCC 1981c) has been revised.

109. Comment (in reference to the Surface Water Technical Report): "Page 64, Para. 2 'Water would be obtained...of water required per spread... Colorado alternative.' (Meaning of 'spread' unclear.)... Same comment for page ii, paragraph 2." (Commenter 139.)

Response: Section 3.B of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised.

110. Comment: "In addition, water quality impact data for wetlands and waterway crossings during pipeline construction are virtually nonexistent. More emphasis and detailed information should be developed. In accordance with Executive Order (EO) 11990, and for 404(b) evaluation for permits, wetlands should be delineated. Impacts should be described." (Commenter 231.)

Response: Water quality impact analysis for wetland stream crossing construction effects was presented in the Surface Water Quality Technical Report (WCC 1980c) in Chapter 2 and in the Draft EIS in Sections 4.A.1 and 4.A.4. Delineation of wetlands was presented in the Terrestrial Biology Technical Report (WCC 1980e) in Appendices A and B.

Water Legislation

111. Comment: "The ETSI DEIS is predicted on that assumption that 20,200 acre-feet of water will be

available annually for slurrying coal to points south and east of the Powder River Basin. The Legislature of Wyoming only authorized 20,000 acre-feet subject to terms and conditions of the Wyoming State Engineer. An Agreement between ETSI and the State Engineer of Wyoming dated September 24, 1974, (Appendix C-3), allows ETSI the use of 300,000 acre-feet over a 20 year period, or an annual average of 15,000 acre-feet, not the 20,200 acre-feet as stated in the DEIS." (Commenter 72; also, 122, 141, ED-6.)

Response: The analysis of water withdrawals from the Madison aquifer considered the removal of 20,200 acre-feet per year for 50 years (20,000 acre-feet to be used as slurry make-up water for coal transport and 200 acre-feet for non-slurry uses at preparation plants). This information was provided by ETSI in their System Description and presented in Chapter 1 of the Draft EIS (1.F.2 Project Components and 1.A Introduction).

The basis for using 20,000 acre-feet is based on interpretations of provisions in the permit granted by the state of Wyoming which allow "no more than 20,000 acre-feet of water per year." The additional 200 acre-feet per year usage was provided by ETSI in their System Description as was the 50-year economic project life. The use of 20,200 acre-feet per year for 50 years provides for a worst-case analysis of project use of Madison aquifer water.

112. Comment: "There are several significant differences between the provisions of the Forty-Second Legislature of the State of Wyoming which authorized ETSI to appropriate underground water subject to the approval of the State Engineer, and certain codicils of the third party agreement between the Office of the State Engineer and ETSI which was finalized subsequent to the authorizing legislation and dated September 24, 1974. The most significant of these differences is the twenty-four month compliance time granted to ETSI, once they have been ordered by the State Engineer to cease and desist pumping. The legislation has specific provisions for protecting Wyoming's water resources and the administrative steps to be followed in accomplishing these requirements and provisions. However, the third party agreement goes beyond the legislative authorization by allowing ETSI to continue pumping for two years after their pumping has been determined to be detrimental. The implications of this for agriculture are severe: two years is a very long time when your well has gone dry and your cattle are thirsty. This matter should be investigated in greater detail, and the discrepancies cleared up." (Commenter 46; also, 72.)

Response: This is not an issue to be addressed in the EIS. This is the responsibility of the State Engineer. Any differences between what the law states and what the State Engineer authorized is a matter for the State Legislature and/or the Wyoming Governor to resolve.

113. Comment: "Since the statute authorizing ETSI to use Wyoming underground water specifically instructs the State Engineer to issue the use permits only on the condition that, again I quote, 'Such use will not interfere with the domestic, municipal, stock watering or irrigation uses or any other existing beneficial uses within Wyoming.' The EIS should address these conditions directly." (Commenter WY-6.)

Response: The issuance of the well permits has already occurred. Assurance of compliance with these conditions is the responsibility of the State Engineer's Office and beyond the scope of the EIS. The impacts of the proposal have been addressed by the EIS.

114. Comment: "Another authorization of the third part agreement would allow ETSI, with the concurrence of the State Engineer, to appropriate wastewater of any preferred user and either spread or inject said wastewater into the underground in order to satisfy ETSI's substitute water supply requirements in whole or in part. By definition, preferred water users are the cities of Newcastle, Upton, Moorcroft, Osage, Gillette, Sundance, and one 'New City.' It seems there should be a clear definition of what this wastewater should be, prior to being injected into the ground. One would hope that it would not be raw sewage. Could this wastewater be used in the slurry line?" (Commenter 46.)

Response: The use of wastewater as a means to meet the agreement with the State Engineer and its impact is the responsibility of the State Engineer. Based on contacts made to determine the feasibility of using treated wastewater as a water source, wastewater in the amounts needed is not available in Wyoming. The treated wastewater altenative analysis has been expanded in the Final EIS. (Sections 1.N, 3.I, 4.I).

115. Comment: "The state notes here that there is a discontinuity in the agreement as printed in the DEIS between C-15 and C-16. Apparently some material was inadvertently omitted." (Commenter 138; also, 139.)

Response: One page that should have appeared between pages C-15 and C-16 was inadvertently omitted from the Draft EIS. It has been included in Appendix C-3 in Final EIS.

116. Comment: "The DEIS completely ignores the potential effects that enforcement of Indian water rights would have on any of the pipeline alternatives. As the Hearing Board requested more information on this issue, we are attaching an explanation of the Winters doctrine (Attachment 1), a newspaper article on Indian water issues (Att. 2), a copy of the 1868 Fort Laramie Treaty (Att. 3), and a newspaper article on the current status of that Treaty (Att. 4)."(Commenter 33.)

Response: Effects of pumping water from the Madison Formation are not predicted to extend to any existing Indian lands.

Results of pending or future litigation or congressional or presidential action would resolve any water rights conflict that could develop on lands not now included in Indian reservations or waters not now assigned to a Tribe.

The position of the Water and Power Resources Service (WPRS 1981) on the Oahe alternative is:

> The analysis of water availability indicates there is in excess of 20 million acre-feet of annual yield available from the Missouri River in normal years. The Water and Power Resources Service's industrial water marketing program covers up to 1 million acre-feet per year which has been determined to be surplus to contemporary agricultural needs and can be used to satisfy interim industrial uses. Of this amount, only 36,000 acre-feet annually has currently been contracted for energy development.
>
> The Indian tribes are currently using very little water from the Missouri River. The 1 million acre-feet considered in the marketing program should have no impact on future Indian water utilization or claim to water. Steps have been taken to ensure that the existing and proposed water service contracts cannot affect or impinge on the reserved rights of the Indians under the Winters Doctrine. These contracts have and will specifically recognize that pre-existing Indian water rights take priority over utilization of water by the industrial contractors.

The Bureau of Indian Affairs' position (BIA 1981) on the Oahe alternative is that "a share of the water within Oahe Reservoir and other available storage facilities is owned by various Indian Tribes, and that a sale of water by WPRS would preclude the Tribes an opportunity to market their water."

<u>General Water</u>

117. <u>Comment</u>: "We submit that attention must be given to the present and future water needs of both of these reservations (Crow and Northern Cheyenne Reservations in Montana). Proposals that may now or in the future affect the use of Indian waters and the development of Indian resources should not be considered until impacts can be accurately described and the Tribes are made aware of the ramifications involved." (Commenter 225.)

<u>Response</u>: No impacts on water resources on these reservations are predicted.

118. <u>Comment</u>: "We agree with the DES that there are uncertainties and complexities involved in predicting future use of the Madison. However, for the benefit of the public, the FES should include a determination of when the Madison would fully recover from the ETSI pumping if there were no other Madison users." (Commenter 72.)

<u>Response</u>: The general nature of water-level recovery was shown by the recovery curves in the Draft EIS, Figure 4-1, page 4-9. An analysis of final water-level recovery would not be useful in a

practical sense. Meaningful, accurate, and quantitative information is not available that would allow one to know what variables ables would be introduced into such a prediction. The amount of possible error in such a prediction would be very large. Unknowns include:

(1) The number of users that would be pumping and those that would be planning to pump 50 to 200 years (2035 to 2235) or more beyond the time ETSI proposes to stop pumping.

(2) The amount and distribution of the use described in item 1, above.

(3) Climatic conditions during 2035 to 2235 and beyond.

119. Comment: "Page 4-41, Figure 4-6 Finite Difference Grid Used in Simulating Pumping from the Crook County and Gillette Well Fields. The location of the Crook County Well Field is shown Row 9, Columns 9 and 10. This appears to be the location of the Devils Tower and Hullet data points, as shown on Figure 5-2. The actual location of the Crook County well field should be in Row 10, Columns 9 and 10, according to the second paragraph on page 4-39. The location of the Gillette Well Field is shown in Row 8, Column 8. The actual location should be in Row 7, Column 8." (Commenter 139.)

Response: The locations of the Crook County and Gillette well fields were incorrectly shown on page 4-41. The Final Well Field Hydrology Technical Report has been revised accordingly.

120. Comment (in reference to the Well Field Hydrology Technical Report): "Page 3-1 - Paragraph 1. It is doubted that the Madison Aquifer system includes units from the Precambrian basement rocks to the Cretaceous shales except in south-central South Dakota where the Madison recharges the basal Cretaceous sands....The Madison aquifer does discharge water to the Dakota Artesian System in the eastern part of south-central South Dakota. Beyond that point neither the Madison nor the 'Madison aquifer system' exist. Only when the water from the Madison reaches the top of the Dakota Sandstone does the water contact Cretaceous Shales. If BLM is going to include the Dakota System in the 'Madison Aquifer System' perhaps they should compute the long-term drawdown of the Dakota in South Dakota." (Commenter 138; also, 72.)

Response: The Madison aquifer system is defined for purposes of the EIS as the strata from the Precambrian basement rocks to the Cretaceous shales. The Madison aquifer system was defined after a careful review of available information on the geologic and hydrologic characteristics of the strata in the study area. Rock units were grouped according to similar hydrogeologic characteristics. The Precambrian basement rocks and Cretaceous shales constitute the lower and upper stratigraphic bounds, because they are thick, regional, and have very low hydraulic conductivities. Between these two units are regionally significant aquifers. The system was defined to include all strata in which measurable potentiometric declines potentially could occur as a result of a large-scale, long-term pumping from the Madison Group. The only known, planned large-scale withdrawal to occur from the Inyan Kara (Dakota) aquifer is the uranium mine development near Burdock, South Dakota, by the Tennessee Valley Authority. This has been addressed in Chapter 5 of the Final EIS. The effect of ground-water withdrawals from the Inyan Kara aquifer by existing users in the western Black Hills region is unknown, but the impact on the ground-water resource is likely small and should not measurably affect predictions presented in the Final EIS.

121. Comment: The proposed Niobrara County well field would affect large portions of Custer and Fall River counties. The proposed Crook County well field would affect a large portion of Butte and portions of Lawrence and Harding counties. The report states that existing Madison and Minnelusa water users would have increased pumping lifts and that substantial flow reduction would occur in many of the flowing wells. Other affected aquifers are also used in this area.

1. How many individuals in South Dakota will be impacted?

2. What will be the economic, physical and environmental magnitude of the impacts?

3. How will the adverse impacts be mitigated?

4. Who will mitigate the impacts?

5. Will loss of ground water affect present or future water rights and appropriations? (Commenter 138; also ED-7, ED-23, RC-3.)

Response: Questions 1 and 2 are answered in the response to Shallow Aquifer Comment 75. Questions 3 and 4 are answered in the response to Comment 443 of Section 6.E.14.

There would be no "loss" of ground water, because aquifer recharge would exceed ETSI's removal of ground water.

Existing ground-water rights may be affected. However, the law is not clear on this topic, because no clear-cut decisions have been made regarding South Dakota and Wyoming (interstate) ground-water law.

Water rights and appropriations are a complex issue often requiring court rulings to determine or interpret. ETSI has obtained permits from the Wyoming State Engineer to withdraw ground water, but any legal ramifications on present or future water rights and appropriations is unknown. However, in general, perfected water rights preceding ETSI's would have precedence; water rights succeeding ETSI's would be inferior. An EIS on a specific project is not the place to discuss the need for a law. The lack of a law does not affect the impacts of the proposal which has been analyzed in this EIS.

122\. Comment: Will subsidence or sink holes occur as a result of the water withdrawal? (Commenters 29, 138, 220.)

Response: Subsidence due to fluid withdrawal from geologic formations has been reported in oil and gas fields and areas of ground-water extraction. The subsidence occurs as a result of compaction of the geologic units following withdrawals of fluids. As the fluids are withdrawn, additional loads from overburden are imposed upon rock structure causing consolidation and compaction. Materials that have abundant voids and that are weakly cemented such as sands and silts or other alluvial materials have a higher potential for compaction and resulting settlement. The Madison aquifer is primarily a pervious limestone that is believed to have relatively good strength characteristics which would not typically be subject to compaction. Limestone is composed of fine crystalline calcite in an interlocking dense structure. Considering the characteristics of the Madison Limestone, it appears that there is a very low potential for subsidence due to ground-water withdrawal from this unit.

123\. Comment: "With the withdrawal of this much Madison water in this area, what potential lies ahead for deep wells drilled in the past and in the future for this area? Could the Arikaree water be sucked in as was the 13,000 acre surface Lake Teigneur in southern Louisiana? Also, what potential is there for infiltration through fractured formations? Could the same type of leak occur as occurred at the Teton Dam in Idaho? Both of these examples supposedly were well engineered, including hydrological studies." (Commenter WY-13.)

Response: The EIS addresses potential impacts on all known existing and realistically planned (future) water users. Impacts on water developments of a speculative or possible nature were not considered (see Section 1.F.5 of the Draft EIS).

The hydrogeologic setting in the Black Hills region is not the same as occurs in southern Louisiana. This postulated analogy is not meaningful.

There is very little potential, on a regional basis, for infiltration through fractured formations, especially away from outcrop areas.

Ground water in the Madison aquifer system would not experience leakage as occurred at Teton Dam.

124\. Comment: "We have a ready made computer set-up between Edgemont and Igloo which was offered to prove Rahn's theory. This is nine miles apart from Edgemont and Igloo wells. Two thousand gallons per minute could have been withdrawn from the Igloo wells, which would have been one-sixth of ETSI requirements. At the end of the year of pumping, an accurate answer would have been forthcoming. Total cost would have been the installation of two pumps, plus the electricity. Why was this not addressed by the BLM, the U.S. Geological Survey and ETSI? It's apparent in the EIS that no one from any of the groups preparing the EIS ever set foot in the old Army Depot at Igloo, because every time these wells are mentioned, except by Rahn, they show the well location at Provo, South Dakota." (Commenter ED-20.)

Response: Ground water has been pumped from scores of Madison wells in the Black Hills region for many years. The drawdowns observed in the vicinity of these wells were analyzed in the EIS study. A long-term pump test at the Igloo wells is not likely to produce a large amount of additional hydrogeologic information beyond that obtainable from historic data at other existing Madison wells (see Appendix H of the Well Field Hydrology Technical Report [WCC 1980b] for a detailed explanation as to why data obtained for Madison aquifer tests must be used with caution and that estimates of some Madison aquifer system properties that may be important factors in long-term regional hydrologic impact assessment cannot be obtained from the analysis of short-term pumping tests).

125. Comment: "Good quality ground water in arid western South Dakota is an extremely valuable resource. A substantial portion of the recharge to the Madison Formation for the proposed project would originate in South Dakota, and, likewise, a substantial portion of the recharge of the entire Black Hills area will be used by the proposed project. We would ask, what future beneficial uses of groundwater in western South Dakota will be foreclosed by the development of this project? What are the impacts of the sacrificied use on the quality of life in South Dakota?" (Commenter RC-3; also 138.)

Response: Ground water will not be depleted in western South Dakota according to the results of the hydrology studies discussed in Chapter 4 of the Draft EIS. Drawdowns would occur in some areas (refer to the Hydrology sections of Chapter 4 and 5 of the Final EIS) so that future users of ground water (Madison and upper aquifers) may need deeper wells. Because water from these aquifers will still be available to future users, no significant impacts on the quality of life in South Dakota anticipated.

126. Comment (in reference to the Well Field Hydrology Technical Report): PAGE 3-7 - Paragraph 2. States that 'the Fall River Formation of the Inyan Kara Group is an important aquifer in Niobrara and Crook Counties;...' It is also an important aquifer in Fall River and Custer Counties in South Dakota. (Commenter 138.)

Response: The Final Well Field Hydrology Technical Report has been revised to include Fall River and Custer counties.

127. Comment: "The desirability/-advisability of exporting such large quantities of water from a semi-arid region with questionably sufficient rainfall to recharge the aquifer should be discussed more thoroughly." (Commenter 231; also, 213, ED-6, ED-23.)

Response: The determination of desirability/advisability of a proposed action is not an EIS role. The role of an EIS is to analyze potential impacts. Based on these impacts, it then becomes the responsibility of the decision maker to decide the desirability of allowing the project to occur.

128. Comment: Page GL-1 'Base flow - that part of a stream derived from groundwater.' In the DEIS, base flow figures are derived from specific modeling of the Madison Formation and pertain to groundwater originating from the Madison Formation (question to Charles Andrews, Hydrology meeting, Denver 12/18/80, on this subject; answer in the affirmative). Suggest expanding the definition to read: 'That part of a stream flow derived from Madison Formation groundwater." (Commenter 139.)

Response: The general definition of base flow is correct as stated in the Draft EIS on page GL-1. The ground water could be from any aquifer; therefore, the definition was not revised.

129. Comment: "There is no indication in the draft EIS of how the reduction in stream flow would affect the ability of Black Hills streams to support the classified beneficial uses nor what minimum flows would be retained such that the suitability of each respective stream to support its beneficial uses will not be impaired. Before the impacts of a Madison aquifer drawdown may be adequately assessed, it will be necessary to determine instream flows required for support of each beneficial use." (Commenter 138; also RC-3.)

Response: Instream beneficial uses have been established in South Dakota and Wyoming for the streams that may be affected by flow reductions. Little data is available on which to analyze impacts. The two most important areas of impact for which data was available is downstream wastewater discharges and fisheries. Additional impact analysis on these topics has been added to the Final EIS.

In Wyoming, numerical minimum flows have not been established to protect beneficial uses. In South Dakota, minimum flows to protect fisheries have been established for some streams. The relationship of the potential stream flow reductions to these minimum flows is discussed in Section 6.E.5, Aquatic Biology Comment 237. No minimum flows have been established in South Dakota for beneficial uses besides fisheries.

130. Comment: "First, and perhaps most significant, is the inadequate scope of the DEIS. Water is the singular issue of the Great Plains region, especially in the semi-arid site selected by ETSI for their proposed well field. This information is directly relevant to the DEIS because it not only points to a badly-flawed DEIS but implies the reason for that flaw as well." (Commenter 213.)

Response: The comment is unclear as to what the specific inadequate scope problem is. The hydrologic impact of the proposed action was identified as the most significant issue and was treated as the major issue of the EIS. A detailed technical document was prepared on the hydrologic subject to support the data contained in the EIS. Both the EIS hydrologic sections and the technical report have been revised for the Final EIS.

131. Comment: "Table 3-4 shows Town of Osage water use doubling by 1996. This seems unrealistic and could affect the model simulation. (Chapter 3, P. 25.)" (Commenter 72.)

Response: The increased water use at Osage is not based on a large increase in consumptive use by people in Osage, but on the proposed expansion of water use by Black Hills Power and Light (BHP&L). BHP&L plans to withdraw an additional 1450 acre-feet of Madison ground water per year in the 1990's.

132. Comment (in reference to the Well Field Hydrology Technical Report): "Page 3-48 - Paragraph 4 (last sentence): 'No published inventory of Inyan Kara Group wells is known to exist.' Ground Water Reconnaissance Study of the State of Wyoming. Wyoming Natural Resources Board, 1962 by George F. (Pete) Dana, which is an inventory of all known wells in Wyoming and numbers 10,782 wells and lists producing units is available. Also available is Groundwater Resources of the Western Half of Fall River County, South Dakota. Report of Investigations No. 109, Jack R. Keene, South Dakota State Geological Survey, 1973." (Commenter 138.)

Response: The text of the final technical report (WCC 1981b) has been revised.

133. Comment: "On Page 5-1 of the EIS we find reference to Madison water as irrecoverable, but in the glossary we find no definition of the mining. We have no guarantee mining will not occur as a result of the ETSI drawdown, and no mention is made of future demands on the Madison which are sure to follow, by ETSI and others if this project is permitted to go ahead." (Commenter ED-ED-7.)

Response: Mining of ground water was not discussed in the Draft EIS. Ground-water mining always occurs when ground-water withdrawals are made. Ground-water mining is the artificial discharge of water from the ground-water system which results in a reduction of the ground water in storage in the aquifer. All known existing and planned Madison water uses within the defined area of impact are addressed in the Draft EIS in Section 3.C.

134. Comment: "Page 5-15, Sec. 5.C.2. par. 1. Acre-feet should be shown in the more familar measurement of gallons, considering that what is being withdrawn amounts to 334,047,500,000 gallons over the projects expressed 50-year life at 6,680,950,000 gal./year or 18,303,972 gal./day." (Commenter 231.)

Response: Acre-feet is the most commonly used term in hydrologic studies. The numbers used in the report are sometimes large; using a small number makes descriptions more readable, comprehensible, and editorially manageable (for example, 1 million

(1,000,000) acre-feet per year is a more manageable number than three hundred twenty six billion gallons (326,000,000,000) per year. For the convenience of the reader, one acre-foot equals 325,851 gallons.

135. Comment: "Page 5-15, Second Para., 5.c.1, Benefits. 'Groundwater Hydrology. Project operation would provide extensive new scientific information on the Madison aquifer.'

Another significant benefit connected with this project is that it would also develop and utilize a presently unused resource. This is particularly significant in view of the fact that this is a renewable resource currently providing only limited benefit to mankind." (Commenter 139.)

Response: The resource is not presently an unused resource. Ground water from the Madison is being used as stated in the Draft EIS. Additional use of this resource may or may not be beneficial depending on one's viewpoint. It is not felt that it is necessary to identify this use as beneficial or non-beneficial, but merely to identify its use. The Draft and Final EIS makes this identification.

6.E.2 SOCIOECONOMIC CONSIDERATION

Comments and responses related to socioeconomic considerations of the proposed action and all the alternatives except the no-action (railroad) alternative are included below. Comments dealing with no-action socioeconomic considerations are included in Section 6.E.13.

Comments in this section are grouped under the following headings: employment, housing impacts, tax revenues, population increase, socioeconomic impacts from drawdown, pipeline effects on railroads, and general socioeconomics.

Employment

136. Comment: "Page 3, Para. 5 of the DEIS shows that 'no significant impacts are anticipated from the addition of about 243 workers and their families to the affected Wyoming counties during operation phase of the project.' However, in a different part of the book, the number 534 permanent construction operation jobs is given. There should be an explanation of this apparent conflict of over 100%: The figure of 243 is shown on Page 1-14, Table 1-5." (Commenter 139.)

Response: A basic/non-basic ratio of 1.2 (direct permanent to service employment) was used to estimate the total employment generated by ETSI. Page 3, paragraph 5, of the Draft EIS indicates an increase of 243 permanent workers. Page 2-10, paragraph 6 estimates a total of 534 jobs or 243 x 1.2 = 290 + 243 = 543.

Economic base theory assumes that the introduction of additional basic jobs, even in established communities would result, according to the multiplier effect, in additional economic activity and jobs. In fact, the multiplier probably understates the generating leverage in the more established communities such as Gillette, which has become a regional trade center. That is, the rate of economic growth could increase faster than the 1.2 factor suggests.

137. Comment: "Page 4-12, how was the methodology determined for nonbasic employment? Why was the multiplier of .6 chosen?" (Commenter 138.)

Response: The methodology used to determine nonbasic employment was discussed on pages 4-19 and 4-23 of the Draft EIS. The basic/nonbasic multiplier of 0.6 was used to estimate the growth in the service sector from increases in the construction phase of these projects. This factor was based on an examination of the employment and other relevant economic indices in the region.

138. Comment: "Page 4-24, Table 4-7 Gillette Planning Area, 4th Quarter. This table in the DEIS shows a projected number of workers to be 1500. This does not agree with any of the previous numbers. 1500 is too high for main pipeline workers. 400 is a more realistic number for mainline pipeline construction." (Commenter 139.)

Response: Table 4-7 on page 424 in the Draft EIS refers to population increases for construction and service sectors during construction, not the number of construction workers involved.

Footnote (a) for the table indicates that the figures include families.

139. Comment: "What methodology is used to determine the labor force and service population ratios?" (Commenter 138.)

Response: See pages 4-19 through 4-29 of the Draft EIS for an explanation of the methodology.

140. Comment: Page 4-19, Para. 13, DEIS. "Secondary employment generated by the construction project would be about 600 workers at maximum." Page 4-48, Para. 1, Socioeconomics Technical Report. This indicates that the subsequent analysis is based on a "worst case condition."

In the fourth quarter of 1984, Table 4-5 on page 4-21 (DEIS) shows a peak employment of 1,015 workers for just that quarter. The previous quarter has only 732 workers, or 30% fewer, and the next quarter has only 91. It is difficult to conceive that an influx of workers over a three-month period will result in great numbers bringing in their children to impact the school sytem. In addition, the assessment of impact is also made on the assumption that all the workers will be newcomers, which ETSI feels is unlikely.

Information provided to ETSI by union leaders (attached to comment letter) conflicts with EIS statements that 100% of the construction workers would be non local and even 100% of the operation workers would be non-local. The net consequence of this worst case analysis is to grossly exaggerate the deficits shown in the Appendix. However, the total impact is still small.

Pages 4-30, 4-31; Tables 4-10, 4-11, Socioeconomics Technical Report. ETSI recommends that the Bureau in fact review its prime data source and recalculate the tables to show either a medium figure in place of the worst case or a minimum figure in addition to the worst case figures. (Commenter 139.)

Response: The assumption that 100 percent of the construction and operating work force will be nonlocal is realistic in light of the projected increase in labor demand, because the combined effect of the energy companies could nearly double the demand for labor in the region and the current labor market. Because of a limited local labor supply (for example, unemployment in Campbell County approached 3.8 percent in 1980), construction for the new energy projects will, by necessity, be filled by new-to-the-area workers. Should ETSI or any other new company employ local residents from other local jobs, the vacancy created will eventually be filled by nonlocal personnel.

It is conceivable that the "worst case" condition could exaggerate the potential impacts, particularly where employment fluctuates significantly. However, the one case where employment, population, and housing growth was estimated to be significant (21 percent increase in population) was in Niobrara County. According to Table 4-5, page 4-20 and 4-21 of the Draft EIS, employment (principally for the well field and water pump station) would remain relatively constant over the construction period, thereby encouraging the expansion of service sector establishment and employment. Thus, data seem to indicate that the worst case could be very accurate unless the labor market undergoes a drastic change.

The tables provided by the labor union on employees available during construction in 1984 seem to indicate that 1) there is sufficient local labor available to work on the ETSI project and 2) therefore no immigration of workers to the area is required. These figures and the conclusions drawn are misleading for the following reasons.

1. According to Table I submitted by the commenter, there would be 260 electricians available to work on ETSI projects. The 260 figure is derived from Table III, submitted by the commenter (Summary of Craftsmen Available for Construction in 1981) where 110 workers are from Wyoming Local 415 and 150 from Wyoming Local 322. But the union jurisdiction shows that the 150 workers (Local 322) would be coming from 13 counties, including several located at the other end of the state: Sweetwater, Teton, and Lincoln. These workers would either have to migrate to Campbell County for a period of several months to a year, or commute on a weekly basis and would therefore be considered non-local workers.

2. In addition to the proposed ETSI project, there are many other large-scale projects

proposed in Campbell County and other areas of the state, such as the Overthrust Belt, that will require construction workers. The combined effect is the 260 electricians will not be able to meet statewide demand let alone local demand.

Therefore, for assessment purposes, the assumption that about 100 percent of the construction workers would be immigrating to the area remains valid.

Housing Impacts

141. Comment: "The statement estimates 428 fixed-site, or permanent, employees for the Gillette area as a result of the construction of the proposed coal slurry pipeline. It is assumed that these fixed-site employees could be absorbed into Gillette's permanent housing market, but the statement does not take into account the number of dwelling units which would be required for the secondary, or non-direct, employees which would be generated as a result of the project." (Commenter 178.)

Response: Please refer to page 4-23 of the Draft EIS. This identifies the factors used to determine the population increase. It states that a 1.6 service workers per service-worker household factor was used to estimate the population increase for the service sector. The 428 figure referred to in the comment does not represent fixed-site permanent employees. Rather, as shown on Table 4-7 of the Draft EIS (page 4-24) entitled "Peak ETSI-Related Population for Construction and Service Sectors," it represents a population increase that includes service workers. In this case fixed-site does not mean permanent; it refers to the temporary construction and service workers and their families who would work at a fixed site (such as a preparation plant) as contrasted with main pipeline workers who would move continuously as the pipe was laid.

142. Comment: "Please make clear whether this percentage (21% population increase in Lusk) allows for the normal mitigating measures taken during such types of construction work, including trailer parks or temporary housing. Another consideration is that it is not known how many construction workers will actually reside in Lusk. These factors added together indicate that it should be pointed out that 21 percent is a worst case figure. It's important because the statement could mislead Lusk investors into over building local housing." (Commenter WY-5.)

Response: Unless mitigating measures are included as part of the description of the proposed action, they are not considered in predicting the impact of the proposal. As shown on page 4-28 of the Draft EIS, 21 percent is the predicted net increase in the population of Lusk as a result of the ETSI project. Also, as stated in the Draft EIS, this percentage increase represents an increase of 405 people for a period of 2 to 3 years during the construction phase.

There are many factors that indicate Lusk would be the primary Niobrara County community where workers would settle. See the Socioeconomics Technical Report (WCC 1980d), pages 4-45 through 4-49.

ETSI has not made a commitment to provide any temporary housing to help alleviate this impact. The company's only commitment, as stated in Measure 7 of the Mitigation section of Chapter 4 in the Final EIS, is to work with county officials to assess the potential problem.

143. Comment: "Page 3, Paragraph 6 of the Socioeconomics -Technical Report: 'Fixed-site and pipeline construction workers would increase the Lusk population by 21 percent for a period of one to two years. Substantial short-term housing shortages are anticipated in Lusk, as well as the Gillette planning area, especially during the peak construction period of 1984.'

ETSI disagrees with this percentage for Lusk and suggests it be changed subsequent to a reassessment of the city housing impacts. In November, 1980, 32 houses were up for sale in the Lusk area, and the housing market was depressed." (Commenter WY-5.)

Response: Construction of the ETSI facilities by 1984 would result in a 21 percent increase in population over the projected baseline for the town of Lusk. Even if there was a short-term surplus in housing in November of 1980, the combined effect of the energy projects in the area will cause a substantial increase in the demands for housing by 1984 and probably because of the rate in which this demand grew, also cause severe housing shortages. The 21 percent is basically an estimate of the magnitude of the increase. The point is that there will be a significant increase in the overall demand, and there may be some severe shortages.

144. Comment: "It is estimated in the EIS that 840 temporary dwelling units would be needed in the Gillette area by the 1,500 workers building the pipeline for about 6 to 8 weeks in the fourth quarter of 1984. The City estimated only 497 hotel/motel rooms in the Planning District which could be designated for persons wanting to stay one week or more. Moreover, the EIS acknowledges a short-term housing shortage, and suggests that this could be handled with existing temporary quarters, travel trailers, and the sharing of rooms by construction workers. This is not a valid assumption since it does not take into consideration other demands on temporary quarters brought about by simultaneous construction projects planned for 1984. In addition, it assumes a rental vacancy rate of 5% while City surveys indicate a rate closer to 1%. Since a short-term housing shortage is acknowledged, it may be useful to contact energy companies in the Gillette areas for assistance on finding temporary quarters during the construction of the pipeline through the Gillette area." (Commenter 178.)

Response: The existing stock of temporary quarters (500 to 600 motel and hotel rooms) would probably be inadequate for the temporary workers from the coal mines, power plants, as well as ETSI workers. In interviews with officials from the Ramada Inn (1980) and Holiday Inn (1980) in Gillette, the peak season vacancy rate was roughly five to seven percent. It is anticipated that, as has happened in the past, the overcrowded situation will be relieved, in part, by workers using travel trailers and camper.

ETSI is aware of the potential housing shortage and has committed to work with representatives of the impacted communities (see Measure 7 in the Chapter 4 Mitigation section of the Final EIS.)

145. Comment: "Page 4-29, col. 2, para. 3. The statement is made that the operating work crew (permanent) would number 243 persons residing throughout the counties. Further, permanent workers would replace construction crews, thus, there would be no impact on housing. Page 4-23, col. 2, par. 1 indicates a housing shortage with few recent housing starts. Page 4-29, col. 1, par. 5 indicates permanent staff would desire detached housing. It is obvious that transient and permanent workers have different needs and there is going to be a shortage of single family housing and a surplus of apartments and mobile homes. Clarification is necessary. Impacts to towns and/or counties should be discussed." (Commenter 231.)

Response: The issue of different housing preferences between temporary and permanent workers is well known and referred to on page 4-29 in the Draft EIS. Many communities have devised housing and land use mechanisms to address this issue such as permitting the use of mobile homes on single family lots (usually two to four mobile homes to one single family lot) as a temporary measure to overcome housing shortages as well as protect or secure land for eventual use for single family purposes. Impacts to towns and counties were discussed throughout the socioeconomic sections of Chapter 4 of the Draft EIS (for example, see pages 4-23 through 4-28).

146. Comment (in reference to the Socioeconomics Technical Report): Page 4-12, Table 4-4 has a footnote indicating the source of information on Gillette housing is dated 1978. The work may have been done in 1977, making it at least two and possible three years old. During the past three years, dynamic changes have occurred in Gillette. Housing is considerably more abundant today, and this information should be updated to avoid exaggerating the impact of ETSI personnel. This change affects tables in the Appendix dealing with net fiscal surplus/deficit. (Commenter 139.)

Response: The Stuart/Nichols reference cited on Table 4-4 of the Socioeconomics Technical Report was incorrect. Up-to-date data for Gillette and Campbell County was obtained from the Campbell County Chamber of Commerce in the spring of 1980 and was reflected in the Draft EIS. The incorrect data reference has been revised in the Final.

147. Comment: Page 4-20, Table 4-5 Column 9, 4th Quarter of the DEIS, indicates 670 main pipeline construction workers. Page 4-23, Para. 6, Housing, Line 7. Indicates 840 units for these 670 workers. But under Para. 4, 'Non local pipeline construction workers', line 2, the 1.3 x 670 factor gives 871 units which does not agree with the figure 840 units referred to on Page 4-23; and this is also inconsistent with the following item. Page 4-25, Table 4-8. Under Main Pipeline (100%) Total, 921 units required. Gillette Planning Area, 4th Quarter.

These three items should be checked for consistency. (Commenter 139.)

Response: The figures for housing units have been corrected so they are consistent in the Final Socioeconomics Technical Report and the Final EIS. The 1.3 factor is used for estimating population not housing units.

Tax Revenues

148. Comment: "Page 3, Para. 7 'Pipeline systems contribute relatively less to the tax base than do other types of projects under the present Wyoming tax structure.'

This is an erroneous statement. Change it to reflect the fact that ETSI will generate about $3.4 million of additional tax revenue per year for a pipeline 104 miles long, a tax fallout of around $35,000 per mile from the main slurry pipeline. In contrast, railroads, according to data provided by the UP representative to the Farm Bureau Transportation Committee, will produce about $1,500 per mile.

Add that 'According to 'Coal Development Alternatives' prepared by DEPAD for the Wyoming State Legislature in December, 1974, other types of projects such as gasification, liquefaction and unit trains produce on the order of $10,000 to $25,000 assessed valuation per unit of population over time. By comparison, coal slurry pipelines and electrical generating plants will produce over $80,000 per unit of population. So pipelines contribute relatively more to the tax base than most other types of projects.' Include attached chart showing this." (Commenter 139.)

Response: This statement was meant to reference the relative tax-generating capabilities of ETSI as compared to mines and processing facilities, not to other transportation facilities. This comparison has been deleted from the Final EIS, because the purpose of the impact analysis is to assess the impact of the proposed project, not to compare it to other projects.

149. Comment (in reference to the Socioeconomics Technical Report): "Page A-24, Last Paragraph 'The net fiscal impact of the ETSI project on the school district is negative (Table A2-15). The district relies almost exclusively on property taxes, and the assessed value of the ETSI

project per student associated with the project is less than most other projects (which have comparable numbers of students but much higher assessed values).'

This conflicts with the chart from the DEPAD 1974 report, 'Coal Development Alternatives,' attached. The chart shows that for ETSI, assessed valuation per unit of population ranks far superior to other projects that might be in the area, and approximately equal to power plants....

ETSI suggests that instead of considering the coal mines from the basis of both ad valorem taxes and severance taxes, it would be more to the point to compare them with coal slurry pipelines only on the basis of ad valorem taxes. It must be remembered that the ETSI project will also help to deliver coal at a fraction of the cost of any other coal transportation method, keeping coal competitive with other fuels and helping to protect the coal industry." (Commenter 139.)

Response: Table VII-3 from the DEPAD report compares the assessed value of ETSI (capital intensive) to other projects. However, any project's tax generating potential should not only include revenues from ad valorem tax but also from mineral royalties, severance taxes, and rate taxes. When these revenues are added in, extractive operations like coal mines, uranium mines, and oil and gas wells contribute a larger share of revenues.

The commenter's point regarding the elimination of the severance taxes from the public finance analysis would invalidate the fiscal impact evaluation for the reason stated above. The economic support and competitive advantages of a coal slurry pipeline to the Powder River Basin development, the Wyoming economy, and the U.S. coal industry are not issues generally discussed in an EIS. Data was not supplied to allow validation of the statement that this project would deliver coal at a fraction of the cost of any other coal transportation method.

150. Comment: "Now I want to make a comparison of tax revenues which the EIS does not make. Remember that I am talking about a railroad that is hauling unit trains of grain originating in Perkins County, and is also hauling three unit trains of one hundred cars of coal each week. Page 4-36 states that the projected property tax revenue for Perkins County in 1980 dollars are $630,000. Contrast that with the total property tax revenue for 1980 from 42 miles of coal hauling railroad of $3,001.16 The railroad tax is one-half of one percent of the estimated pipeline tax revenue....

I do think the EIS has done an excellent job on the ETSI proposal, especially as it would affect Perkins County. I am suggesting two places of wording changes that would more accurately reflect the "no action alternative". At this point, I am only raising the question as to whether the tax revenue comparison between the pipeline and alternatives should be made. I do know it is a huge consideration for Perkins County." (Commenter NE-1.)

Response: The question of comparative tax revenues from railroads and pipelines is an important, but an extremely complicated one. The railroads pay not only property tax, but also a value-based tax to each state through which the railroad passes. The tax is based upon the value of the railroad company, and each state's share is determined by the relative proportion of railroad business (usually in the form of operated miles, revenue, etc.) occurring in that state. The county share is determined by the number of miles of main-line track in that county.

Because of the complexity of this calculation, a direct quantitative comparison between railroad tax revenues and pipeline tax revenues is not practical. However, it can be said that as a percentage of total tax revenues collected in eligible Kansas counties, for example, railroad tax revenues averaged 1 to 5 percent in 1980. Statewide, railroad tax revenues represented 1.64% of total taxes collected.

151. Comment: "Even though you consider the project not having any significant cumulative socioeconomic impacts on the City of Gillette, we question what you consider to be 'significant'. In our opinion, the project would result in short-term and long-term socio-economic impacts which would be considered 'significant'." (Commenter 178.)

Response: The Draft EIS documents concerns that there will be a housing shortage due to the ETSI project (page 4-23) and a net fiscal deficit of approximately $6.5 million from 1984 through 1990 (Table 4-10, page 4-30). The criteria used to determine the significance of socioeconomic impacts were identified on page 4-1 of the Draft EIS. On page 5-6 the Draft EIS also states, "Cumulative impacts in Campbell County, Wyoming, would be substantial."

152. Comment: "This slurry pipeline which ETSI proposes should have minimal socioeconomic impact in Campbell, Weston and Converse Counties. Niobrara County will be the hardest hit with a 20 percent increase in population. The EIS points out that Niobrara County will have a 50 percent increase in property taxes, from $2.53 million to $3.83 million. It does not mention that most of this population increase will reside in Lusk which will not be receiving a large increase in its tax base." (Commenter 72.)

Response: The fact that Lusk would receive a relatively small share of the tax revenues, yet would have to provide the housing and public services for most of the workers was discussed on page 4-28 of the Draft EIS.

153. Comment: "Proposed Action Socioeconomic Considerations, Page 4-28, and also mentioned on

Page 5-6 which states, 'Since ETSI facilities will be located outside the town limits in northern Niobrara County, the town would not receive much of the increase in the tax base to offset cost increases.'

I would like to point out that the increased tax base created by the proposed ETSI pipeline and well field in the northern part of the county will benefit Niobrara County which has, by the way, the lowest valuation of any county in the State of Wyoming. The county needs additional taxes to run the county government, and especially to build and repair roads. This increase in taxes will also directly benefit Lusk with additional, much needed funds for schools, hospital, library and nursing home." (Commenter WY-7; also, 231.)

Response: The fact that Niobrara County would benefit from an increased tax base was mentioned on page 4-28 of the Draft EIS. It is not possible to predict how the increased revenues would be distributed or whether Lusk would receive funds for schools, hospital, library, or nursing home.

154. Comment (in reference to the Socioeconomics Technical Report): "Page A-11, Para. 2. 'However, if the preparation plants are valued separately, then the assessed value accruing to Campbell County would be substantially higher (procedure B, Table A2-3). This procedure would be more equitable, given the concentration of facilities and impacts in Campbell County.'

Delete the above. The comment is totally speculative and has no relevance to the EIS. There is no evidence to indicate that the Wyoming Department of Taxation and Revenue would make such a fundamental change in its policy." (Commenter 139.)

Response: Conversations with the Department of Revenue and Taxation (DRT) indicated that the Department had little experience with valuation of coal slurry pipelines (particularly with a system that includes large, capital-intensive, and highly valued preparation plants). As a result, the DRT is "feeling its way" through the valuation procedure. While the current practice is to value the pipeline and facilities as a total unit, it is possible that the DRT might choose alternative methods in the future.

155. Comment: "However, the EIS falls short in explaining the significant economic beneficial effect to Nebraska. We would be severely remiss if ever we overlooked this opportunity to stabilize costs to our people. The benefits become vivid when one compares the alternatives." (Commenter NE-4.)

Response: See Table 4-13 of the Draft EIS and Tables A-38 and A-40 of the Socioeconomics Technical Report (WCC 1980d), which identify the potential increase in property taxes to northwest and southwest Nebraska.

156. Comment: "I have a concern, and it seems to me on Page 4-31 that in your economical statement in

the Environmental Impact Statement, that you don't include Goshen County. It appears to me Goshen County has been deleted. I don't know why, but I'm concerned about it. Basically I'm concerned about it because, as was testified by ETSI at that time, based on your tax structure, Goshen County would benefit about $150,000 of ad valorem tax per year." (Commenter WY-9; also 139.)

Response: Goshen County was not deleted. The EIS focused on communities that might experience significant impacts. Under the proposed action, there would probably be no significant increase in the county's population from the ETSI spread crews; however, the county could annually receive additional tax revenues of about $128,000. As a result, Goshen County would not experience any negative effect but rather a net positive benefit from the project. See changes to the referenced table in the Final EIS.

157. Comment: "Secondly, this report did not consider the cost to the federal government in lost taxes should those communities and landowners in the Madison aquifer area decide to claim their rightful depletion allowance for the declining water table under their land." (Commenter NE-5.)

Response: Section 1508.14 of the Council on Environmental Quality's regulations implementing the National Environmental Policy Act states in part that "....when an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment. However, an environmental impact statement is not an economic impact statement, and possible economic harm to the federal government in the form of lost taxes is beyond the scope of this document.

Population Increase

158. Comment: "The BLM position appears to be that it is bad for communities in rural geographic areas to increase their existing population with railroad workers. It also insinuates that the influx of ETSI's temporary, transient, construction workers would be beneficial. We question the validity of the BLM 'conclusion.'" (Commenter 220.)

Response: The EIS does not conclude that transient pipeline construction workers would be beneficial for communities, whereas a permanent railroad workforce would be detrimental for these same communities. The EIS instead attempts to point out the magnitude of impacts due to the influx of new-to-the-area workers. In the case of the pipeline work force, impacts to the communities probably would be temporary in nature, because typically these workers can be absorbed without a change in long term lifestyle and expectation of the local communities.

159. Comment: "The Crook County well field is in an area of very sparse population and no cities to be affected. This is not addressed in the EIS." (Commenter ED-6.)

Response: As noted in the Socioeconomics Technical Report (WCC 1980d) on page 4-82, construction of the Crook County well field could affect the communities of Sundance, Moorcroft, and Hulett. In the Draft EIS (page 4-82), the reader is told impacts to Wyoming communities for the Crook County well field alternative would generally be the same as for the proposed action and is referred to that section for a discussion of impacts.

160. Comment: The statement seems to lose sight of the fact that other major construction projects may be occurring in the Gillette area which would substantially contribute to the cumulative socio-economic impacts. For instance, do you take into consideration the construction of Wyodak, Unit II, or the Hampshire Synfuel projects in your cumulative socioeconomic impact analyses? The Department of the Interior is also considering the leasing of additional federal coal in April of 1982. The specific quantity of coal to be leased has not yet been determined, but in any event the federal lease potential should have been included in the DEIS. Concurrent with the scheduled federal lease sale is the on going Bureau of Land Management's processing of Preference Right Lease Applications (PRLA's). There are 42 PRLA's in Campbell County and 16 PRLA's in Converse County which must be processed by BLM by December 1, 1984. It is quite likely that several of these PRLA's will prove to have commercial quantities of coal and will be in production within the time frame under consideration in the ETSI DEIS. In addition to the PRLA's, there are 11 outstanding coal leases in Campbell County and 8 leases in Converse County which may be developed and would create an additional impact on the aquifers as well as create more pressure for the limited water resorce. Development of the PRLA's, the underdeveloped leases and at least one synthetic fuels project will require more labor, auxiliary facilities and services which will, in turn, place additional population pressures on Campbell, Converse and possibly Niobrara counties. (Commenters 178, 72, and WY12.)

Response: Table 1-7 of the Final EIS has been revised to include other major proposed projects in the affected area. The proposed projects in the region were screened with regard to the likelihood of construction and operation within the time frame of the ETSI project, which in turn formed the basis for the projected baseline in the Draft EIS for Campbell, Converse, Weston, and Niobrara counties. Projected baseline estimates were drawn from both independent analyses and the Wyoming Population and Employment Forecast, Division of Research and Statistics, Department of Administration and Fiscal Control, June 1980.

Because of the uncertainties in timing and construction work force, the Hampshire synfuels project is not included in the accounting for cumulative impacts. It is highly improbable under current economic and federal funding conditions that the project would be approved and under construction during the projected construction time period of the ETSI project. Therefore, no cumulative impacts would occur.

The WyCoal Gas-Panhandle Eastern project in Converse County was not included in the Draft EIS, because there were uncertainties in its start date and size of the construction work force. While Panhandle has now released some of this data (3/25/81), there is still no information regarding the population distribution pattern. However, indications are that the most significant socioeconomic impacts of the Panhandle Eastern project will center on Douglas and Converse counties. While there might be spillover into the surrounding counties, the impact is not likely to be substantial. On the other hand, since those working on the construction of ETSI facilities (Niobrara well field and pump stations) are expected to locate principally in Niobrara County (mainly Lusk) and perhaps some in Edgemont, South Dakota, there should be little spillover into Converse County.

Additional coal may be leased in 1982; however, this does not mean that the mine facilities would be under construction during the proposed construction period for the ETSI project. Based on past experience of the time required to obtain mining plan approvals, cumulative impacts are not expected to occur.

161. Comment (in reference to the Socioeconomics Technical Report): "Page 4-9, Table 4-2 shows estimated population for various counties. Adjust these figures to reflect data now available from the 1980 census." (Commenter 139.)

Response: To update the text with 1980 Census statistics would not significantly affect the results of the analysis or the conclusions for the following reasons:

- The preliminary census population estimates were not very different from those estimated by the local communities. Converse County's population was different by five percent, Niobrara County by seven percent, Campbell County by nine percent, and Weston County by eleven percent.

- Impacts of ETSI construction activities were measured against two "projected baseline" periods: 1984 and 1990. Adjusting the projected 1980 base population would not significantly affect the accuracy of the 1984 baseline because of the uncertainty of the timing of these projects, the estimates of the construction crew sizes, and the estimates as to the relative growth of the secondary or induced sectors in each of the affected communities, and because the level of growth (which for some communities will nearly double the 1980 population) is so significant in comparison to a five or seven percent adjustment in the 1980 population.

Socioeconomic Impacts from Drawdown

162. Comment: "Also omitted from the discussion of impacts on South Dakota are the effects that water drawdown would have on the Black Hills area's two main industries, agriculture and tourism. If ranching wells cease flowing or are drawn down, and if hot spring and fishing stream flows are reduced (pp. 2, 2-8 - 2-10, 4-4 - 4-17, 5-1 - 5-3, 5-7 -5-12), our economic base would be seriously weakened. This issue should be discussed from an environmental, as well as from a socioeconomic, viewpoint." (Commenter 33; also, 74, 138, ED-7, ED-9, ED-22.)

Response: Data on these subject areas have been added to the Final EIS, Sections 4.A.8 (Agriculture) and 4.A.6 (Aquatic Biology). The level of base data does not allow a calculation of specific socioeconomic impacts. The exact impact would depend on a number of variables which cannot be determined without a detailed, lengthy survey of each potentially affected user. Also, since the changes would not occur all at once, but be spread over a lengthy period of time, the economic changes that would naturally occur over this period cannot be predicted.

ETSI has proposed extending the Wyoming protection program to South Dakota. This proposal is described in Appendix C-8 of the Final EIS.

163. Comment: "The third aspect that I would like to address is property value. When the water is taken away from the ranchers, the area here, there is no value then for people to come in and say, okay, I will build a ranch here, I will build here, because the water is gone. There's nothing for them to use. Therefore, the property value of the land in the area will be reduced; thus, affecting the financing of the school system." (Commenter ED-19.)

Response: Drawdowns may occur in the Madison aquifer and the upper aquifers as shown in Section 4.A.1 of the Final EIS. Results of the hydrology study indicate that none of the aquifers would be depleted even after 50 years; thus, the water will not be gone. It is possible some wells in the Madison and the affected upper aquifers may have to be lowered, but the exact costs of such modifications or any effect on property value or the school system cannot be determined.

164. Comment: "Page 5-19 of the EIS indicates tax payments along the slurry route will create new revenues. And, Page 4-28 indicates that the Niobrara County, Wyoming, tax base will be increased by 52 percent. However, this EIS is inadequate because no mention is made of the probable decline in the tax base of Fall River County, which county will receive no revenue from the project." (Commenter ED-7.)

Response: Drawdowns may result in stream and spring flow reductions that could affect irrigated croplands in some areas. Additional information on these impacts has been added to Section 4.A.8 and 4.F.5 of the Final EIS. Reduction of crop productivity could reduce the value of the land and hence lower the tax base. Actual changes that may occur to the tax base cannot be determined due to the complexity and lack of data on which and when specific springs would be affected, the actual amount used by each agricultural user, the period of use, etc.

165. Comment: "The National Park Service is greatly concerned not only about the potential loss of water from Devils Tower, but also by the possibility that the DEIS has not adequately considered the other costs for all areas that will be incurred. At Devils Tower, for example, water usage rose 76 percent from 1977 to 1980 (from 2,104,300 gallons to 3,701,800 gallons). Pumping costs rose from $179.56 to $314.20 for electricity only. It also required the use of more chlorine and more man hours besides the increased wear on the pumps. The main pump was installed in 1965 and the average useful life of a submersible pump is 15 years. A replacement pump (including installation) would cost about $2,000.00 today. The greater drawdown would mean operating costs would increase, and the pump would work harder and have to be repaired and replaced more often. Similar costs and effects should be considered for all the alternatives." (Commenter 61.)

Response: The agreement between the Wyoming State Engineer and ETSI (see Appendix C-3 of the Draft EIS) states that as a condition for awarding the well permits, ETSI must "pay any and all costs" of deepening any wells or lowering the pumps or constructing a new well to any existing Madison water users in Wyoming whose well has been interferred with by ETSI's pumping. If these conditions cannot be met, then ETSI would have to provide the affected user with substantially the same quantity and quality of water.

Pipeline Effects on Railroads

166. Comment: Many commenters raised the concern that the Draft EIS inadequately analyzed the impact of the coal slurry pipeline on the railroads. Commenters felt that there would be an impact and that the EIS should analyze all of the ramifications of this impact related to employment, economics, freight rates, community stability, taxes. (Commenters 72, 74, 90, 220, ED-4, ED-7, ED-12, ED-18, ED-19, OK-1, RC-5, WY-1.)

Response: It is the finding of this EIS that railroads would be transporting no less coal after 1985 when the coal slurry pipeline is scheduled to come online than they are currently transporting (1980). The total amount of coal to be transported from the Powder River Basin region will be a function of demand for that coal and the coal capacity of the systems designed to transport it. In order for the railroads to be worse off, they would necessarily have to be transporting less coal, the portion of coal that would be shipped via pipeline must be large enough so that, when subtracted from the total demand for Powder River Basin coal, the remaining tonnage would fall below the amount currently shipped by rail. This, however, would not be the case.

Table 6-7 indicates two different estimates for future demand for Powder River Basin coal.

For 1985, demand is estimated at 181.9 MMTA and 140.4 MMTA (Table A). For this calculation, the more conservative estimate of 140.4 MMTA will be used. The ETSI pipeline would have a load capacity of 37.4 MMTA. Subtracting this from total demand: 140.4 MMTA-37.4 MMTA = 103.0 MMTA net demand. The question is whether this amount of coal to be shipped by rail is above or below the current level.

To give the railroads the benefit of the doubt, current coal tonnage transported will be calculated at capacity operating levels. The Central Route capacity is given as 15-20 unit trains per day (DOT 1979). One unit train consists of 100 cars carrying 100 tons each. Thus, each train carries 10,000 tons: half of the 20 trains daily account for empty backhauls. Thus, 10 loaded trains daily carry 100,000 tons, or 36.5 million tons annually. Clearly, 103.0 MMTA, the net demand for coal after the pipeline, is greater than 36.5 MMTA, the 1980 Central Route capacity; consequently, it follows that the railroads would indeed not be transporting less coal in 1985 than they are presently. The figures reflect this same finding for the year 1990.

Given no decrease or abandonment of existing rail routes and in present coal-related traffic, there should be no cutbacks, and, hence, no diminished availability of rail service for agricultural people.

There would be no loss of existing railroad revenues. If the pipeline were constructed, the railroads and the pipeline would compete for future service.

State employment offices, city economic development offices, and railroad job service offices were contacted regarding railroad employment. In summary, these discussions offered the following insights:

1) Due to improved technology and improved rail efficiency, employment in the rail industry has been declining at the same time that traffic has been increasing.

2) In Kansas City, when the service of the Rock Island was assumed by other railroads, approximately 200 of the Rock Island 600 workers were hired by their railroads.

3) When the Burlington Northern announced openings for 25 electricians and 15 diesel mechanics, letters were sent out nationwide to people on the job service list. At the time of our contact, this service had on file 3000 applications from throughout the US.

4) As to personnel location, while the BN Alliance payroll at one time listed 3,367 persons, not all of these were in Alliance; some were working as far away as Wyoming.

Together these comments suggest that due to existing overemployment, it is

TABLE 6-7

FUTURE DEMAND FOR POWDER RIVER BASIN COAL: 2 ESTIMATES

	1980	1985	1990
Teknekron	109.4 MMTA	181.9 MMTA	225.2 MMTA
U.S. D.O.I.	--	140.4[a]	173.7[a]

Source: Teknekron, Market Prospects for Powder River Basin Coals, 1980-1990. Sept. 1979 (For Burlington Northern RR), P. 5. and U.S. Department of Interior, Bureau of Land Management, Final Environmental Impact Statement: Federal Coal Program April 1979, P.2-32.

[a] The government report presented a range of demand estimates: Low, Medium, and High. These figures are the Low estimates.

unclear what the relationship is between traffic and employment. The job service statements support the contention of a mobile workforce, which if not rehired locally due to a movement of traffic from one rail line to another, registers for and seeks employment elsewhere in the industry. Because there should be no cutbacks in rail service as a result of the proposed construction of the slurry pipeline, there should be no cutback in employment. It would follow that there should be no reduction in school enrollment, and hence no negative impact on school districts.

167. Comment: "If the coal slurry pipeline is authorized to proceed, higher rates on grain and general commodities should be anticipated to provide a sufficient return on investment for the railroads to continue operations. The Commission feels that these issues have not been adequately discussed." (Commenter 44.)

Response: Because there are no predicted adverse impacts upon railroads (see response to Pipeline Effects on Railroads Comment 166), the rate increases referred to by the commenter would not occur for reasons of making up lost revenue.

168. Comment: "There is a definite need to conduct more thorough regional economic analysis before any final decision is reached. The current and projected excess rail transportation capacity and the potential impacts on rail carriers who are dependent on coal traffic to stay afloat financially must be factored into the analysis. Likewise, the potential socioeconomic impacts associated with the immediate, yet short term, construction related population increases need to be more thoroughly analyzed. These dramatic population increases will undoubtedly result in increasing costs to local governments. These up-front costs may not be offset by long term tax base growth because of the small permanent workforce and the relatively small projected property tax revenues. The draft displays a negative net fiscal impact on local governments within Campbell County of $6,549,000 between 1984 and 1990. Campbell County may not need ETSI from a fiscal perspective. Similar with/without analysis should be conducted for local governments in Converse, Weston and Niobrara Counties." (Commenter 72.)

Response: Section II.2, page 11, of the No-Action Alternative Technical Report (WCC 1980i) includes a discussion of current railroad capacity. The only conclusion that can be reached with existing data is that the railroads that would be involved could transport the amount of coal projected to be transported by the proposed slurry pipeline. The analysis is based on the scope of the proposed project, not on the overall stability or capability of the various railroads to haul an unlimited tonnage of future coal that has not been mined or contracted for.

Page 4-35 of the Draft EIS includes a section on the predicted impact of the proposed project on the railroads that would be directly affected.

The comment does not provide any suggestions for more thoroughly analyzing the population increase impacts. The EIS summarizes the significant impacts resulting from the projected population increase. Each sector that could be affected by the increase was analyzed. A detailed analysis is included in the Socioeconomics Technical Report. It should be referred to for a more thorough explanation of the impacts.

As shown on Table 4-7, page 4-24, of the Draft EIS, the analysis did not predict any severe or dramatic population increases for Converse or Weston counties. Therefore, because significant impacts were not expected, the analysis was not carried further. Because the population increase predicted for Niobrara County was less than for Campbell County, it was not necessary to go into the same amount of detail. The significant aspects of the impact on Niobrara County were covered, however. See page 4-28 of the Draft EIS and pages 4-50 through 4-51 and 4-74 through 4-78 of the Socioeconomics Technical Report (WCC 1980d).

169. Comment: "I believe the EIS is somewhat deficient in that no comparison is made in the difference in long-range coal transportation costs between rail and pipeline modes. This should be a matter of concern to the public as well as the government on its effect on future cost of electricity." (Commenter KS-1; also NE-3.)

Response: The No-Action Alternative Technical Report (WCC 1980i), Section IV, pages 95 through 106, presents a cost analysis of railroad delivery of coal to the proposed ETSI markets.

However, this cost estimate was based on the rate-setting procedures that were in effect when the railroads were regulated. With deregulation of the industry, there is no way to predict what the rates may be in a free, competitive market situation. For the same reason, it was impossible to predict what the rates may be for delivery by pipeline. Pipeline rates would depend on the market situation and negotiations between ETSI and the coal purchasers. Therefore, it was not possible to include rate predictions in the EIS.

170. Comment: "It is not clear from the DEIS how the relative costs of transporting coal via slurry and via rail were derived. It would be helpful if the final EIS included a fuller treatment of the costs of alternative systems, outlining capital, operating, and maintenance costs separately. This will give the reader the opportunity to see how all of these elements are incorporated into the rate structure." (Commenter 211.)

Response: Several studies have developed comparative cost estimates for the movement of coal by rail versus coal slurry pipeline.

A summary of these was given in Figure IV-2 of the No-Action Alternative Technical Report (WCC 1980i). For the derivation of these costs, including the contributions of capital, operating and maintenance costs to the resulting rate, the reader is referred to the OTA study cited in the table and the sources that it used. The explanation of costing used for the routes in question is set out in Section IV-2 of the same technical report. A more detailed explanation of the ICC costing methodology can be found in the annual publication of the Interstate Commerce Commission (ICC) titled Rail Carload Cost Scales. This publication also sets forth the contribution to cost of the numerous cost elements. A similar route-specific calculation for the slurry pipeline has not been provided by ETSI.

See also Section 6.E.16, Economic Costs, Comment 478.

General Socioeconomics

171. Comment: "One final area of concern is that of schooling during the two to three years of construction activities in Niobrara County. The DEIS leads one to the opinion that the present school system can easily accommodate any impact. We question whether a proper assessment has been made in this regard." (Commenter WY-13.)

Response: As indicated in the Socioeconomics Technical Report (WCC 1980d) on page 4-39 and Table 4-14, the Niobrara School District currently has an excess capacity of 189 pupils. Considering the county's predicted growth and cumulative impacts of other projects, the school system would still have an excess capacity of 150 pupils in 1990 (see Table 4-25, page 4-76, of the technical report). This information was obtained through extensive interviews with the Superintendent of the Niobrara School District, as indicated on Table 4-14 of the same report.

172. Comment: "Two other socioeconomic impacts were excluded from all alternatives and all areas: effects the proposals would have on community stability and on politics. These topics are usually included in analyses of boom town situations. For more information, see Davenport, The Boom Town: Problems and Promises in the Energy Vortex, University of Wyoming, 1980; United States Commission on Civil Rights, Energy Resource Development: Implications for Women and Minorities in the Intermountain West, U.S. Government, 1979; Murdock, Energy Development in the Western United States: Impact on Rural Areas, Praeger Publishers, 1979." (Commenter 33.)

Response: Although the topics of community stability and politics are often analyzed for "boom town" situations, a boom-town situation is not predicted to occur as a result of the ETSI project. The largest population impact would be felt by Lusk, 21% over a period of two to three years. This is not considered to cause a boom-town situation, because the infrastructure of the town is already being expanded (see page 4-28 and Table 4-9 (p. 4-27) of the Draft EIS) and because of the short-term nature of the increase.

173. Comment: "Page 3-43. It is invalid to use data compiled in 1975 regarding voluntary travel distance by workers. In 1975, gasoline prices averaged $.55 per gallon. In 1980, they averaged around $1.25 per gallon, and are expected to rise about $.46/-gallon before 1982. Impacts to surrounding towns should be reassessed. Depending on the travel distance to the work site from the nearby counties, (p. 4-29, par. 1) an impact could conceivably be felt by a single county or community. This likelihood deserves discussion as it definitely could impact housing, schools, etc." (Commenter 231.)

Response: Evidence since 1975 substantiates the observations found in the initial Mountain West surveys both from Mountain West surveys of 1978 and other monitoring data. Most of the communities in energy-impacted areas are small with limited housing; therefore, workers have to travel quite a distance and are accustomed to making these long commutes to find available housing. In addition, a large portion of the construction work crews carpool to overcome the travel/commute problem. In all likelihood travel has not decreased, but probably has increased over the past few years, enabled in large part by more fuel-efficient cars. For example, recent statistics indicate that travel mileage increased while gasoline consumption remained constant and, in some cases, actually decreased.

174. Comment (in reference to the Socioeconomic Technical Report): "Page 4-59, Para. 1. The DEIS observes that the water accounts of Gillette will face a considerable deficit. For example, by 1984 it will be $1.8 million and by 1990 it will reach $12.4 million. To help counter this deficit, the city will need to charge $15 per thousand gallons in the initial years, tapering off to $1.30 per thousand gallons later. The reason for the deficit is the large capacity of the Gillette water system in relation to a few customers who will have to bear the cost among them in the early days of system operation. It should be noted that ETSI can help mitigate this economic impact on Gillette citizens by purchasing Gillette's surplus water. This would allow Gillette to sell considerable water to ETSI at a substantial price, reduce the rates to its residents, and more than overcome the deficit shown on Table A2-6 on Page A 15. In fact, if ETSI purchases only 4,000 acre feet a year from Gillette in 1990, the deficit could be completely eradicated at a cost to ETSI of about $28 per acre foot above the incremental operating costs. Adjust the text and table to show impact before and after ETSI's water purchase from Gillette." (Commenter 139.)

Response: The city of Gillette and ETSI signed a Memorandum of Understanding (MOU) on March 3, 1980, that represents only the intention of the sale of surplus water from the Madison project to ETSI and does not constitue a legal contract. In addition, this MOU, which appeared in Appendix C of the Draft EIS, does not specify any purchase price. Therefore it would be inappropriate and misleading to alter the text regarding the financial status of the city's water project.

175. Comment: "We note the frequent use of telephone conversations with local town and community clerks to derive socioeconomic impacts. We cannot accept this method as complete objective methodology to find actual impacts on human beings." (Commenter 8.)

Response: This method is known as the "key informant" or "local expert informant" technique and is a recognized, standard technique for social science field research. The purpose of the technique was to gather information from key community leaders to use in the impact analysis.

The technique was not used to derive socioeconomic impacts from local officials. It was used to gather basic data, which was then used in the impact analysis.

176. Comment: "No mention is made in the EIS as to how the Town of Lusk, which has never experienced impact, will deal with the potential problems. Among these are housing, fire, law enforcement, medical staff and facilities, sewer, water, streets and other public services and facilities. These potentially serious problem areas should be addressed and solutions found by ETSI before it begins construction in Niobrara County." (Commenter 72.)

Response: Over the past 30 to 40 years, Niobrara County has experienced several "boom stages" caused by energy developments. Lusk officials expect the population of the town will double by 1984 and have planned for the expansion, as discusssed on page 3-43 of the Draft EIS under the heading Projected Baseline for Niobrara County.

The EIS is not a planning document. To plan how impacts are to be handled is beyond the scope of the EIS and outside the responsibility of the federal government. Planning is a local government responsibility. The purpose of the EIS is to identify the impacts that could result from implementation of a project.

177. Comment (in reference to the Socioeconomics Technical Report): "Page 4-11, paragraph 6 states very few temporary measures are available to meet the minimum health standards. This is not true in Wyoming. Without considering the temporary measures customary in Wyoming, any calculations of socioeconomics impacts will over-inflate the cost of municipal water and wastewater services. It is common for a mobile or other temporary unit to develop wells for drinking water and septic tanks for wastewater. These temporary measures do not impact on municipal utility systems." (Commenter 139.)

Response: Nearly every city and town in the region is facing problems with the proliferation of poorly designed, constructed, and maintained wastewater treatment facilities. Problems range from septic fields placed in poorly drained impervious soils to the periodic flooding of treatment facilities placed in flood plains.

Most of the well water in this region needs to be treated for either high concentration of TDS (totally dissolved solids) or sulfur and fluorides. Unfortunately, much of the water from private wells is not treated; thus these water sources may not meet minimum health standards. The stated impacts in the Socioeconomics Technical Report are felt to be reasonable and not over inflated due to some people's use of private wells and septic tanks.

178. Comment: "We would suggest that the final EIS would consider the political, social and economic impacts on the whole body politic. For example, would the investment tax writeoff be 10% or 12%. Would there be tax-free bond exemption as suggested for the SD West River Aqueduct? How would this affect the efficiency of the slurry line. If these provisions were allowed for this first slurry line, what would other slurry line companies do -- also line up for the tax benefits? Should the more energy efficient railroads' decline as planned slurry lines come into operation be charged also against the energy efficiency of slurry lines as shown in the EIS?" (Commenter 8.)

Response: The ETSI project would be financed with private capital. Discussion of this financing is beyond the scope of the EIS. The impacts of the project, as determined by the available data, were included in the Draft EIS. Costs have no relationships to energy efficiency.

179. Comment: "There are several items not listed in the EIS that I want to mention. First of all, the good probability, if not possibility, of Niobrara County obtaining a Wyoming women's prison right here in Lusk. Secondly, the spillover from the four thousand construction workers at the Panhandle Eastern Coal Gasification Plant. Third, the good possibility of the Tri-State Generation Power Plant, which we may get, which is another 3,000 workers. The spillover of population, therefore, makes it misleading that it's only a 21 percent increase in population in Niobrara County. This greatly affects the Criminal Justice System, and as probation and parole officer, I receive the entire Criminal Justice System from the juvenile problems to the adults to the transients and so forth... I would like to, like I said, address my concern with the fact that the EIS does not even seem to attempt to address the entire criminal justice aspect with the exception of possibly briefly mentioning local police officers." (Commenter WY-14.)

Response: Of the three proposed projects cited in the comment, only the women's prison in Lusk should be considered in regard to the cumulative socioeconomic effects in Niobrara County and Lusk. These effects are discussed in Section 4.A.2 of the Final EIS.

A final proposed site has yet to be chosen for the Tri-State power plant. In all likelihood, construction for this project would not begin until after the completion of ETSI. Construction schedule and workforce data on the WyCoal Gas (Panhandle Eastern) synfuels plant were not available last fall when the Draft EIS was prepared. Although Panhandle Eastern has some data available now, the population distribution and potential spillover into Lusk is still not available. However, it is expected that a large percentage of the work force would probably locate in Douglas in Converse County. An EIS is presently being prepared for the WyCoal Gas project that will incorporate more information on this project as it becomes available and will assess in more detail the cumulative impacts to the region.

The Wyoming Department of Administration and Fiscal Control (DAFC) estimates the construction of the women's prison will require a work force of 15 to 20 people for about two years (2nd quarter 1982 through 2nd quarter 1984). DAFC estimates a peak work force of between 40 to 50 people for about 13 months during much of 1983.

While most of the workers are expected to settle in Lusk, there could be some workers who choose to live in Wheatland or Torrington and commute to Lusk. As the construction phase of the Missouri Basin Power Plant nears completion, housing vacancies in Wheatland have begun and will continue to increase.

Given this situation, it is anticipated that about half of the construction work force would locate in Wheatland. Therefore, during peak periods, the added construction personnel from the women's prison who locate in Lusk might be between 20 to 25 workers.

Given the relationships identified in the Socioeconomics Technical Report (WCC 1980d) on basic/nonbasic employment, households, and family sizes, the construction of the women's prison would cause an additional 80 or so people to locate in Lusk. In the initial analysis, ETSI-related population (fixed-site) would increase the projected 1984 Lusk population of 1900 by 405 people or 21.3 percent. The combined effect of population associated with the building of the women's prison and the ETSI facilities would increase the projected baseline population by 485 people or 25.5 percent.

It is recognized that large numbers of construction workers along with rapid population growth could result in a number of social and cultural problems to small rural communities.

With respect to the criminal justice system, ETSI would have to pay annual property taxes of $1,321,000 to Niobrara County (see Table 4-11 of the Draft EIS). Some of these taxes could be used by the county to provide assistance to the county's criminal justice system.

180. Comment: "Second, several socioeconomic effects are omitted. The potential socioeconomic effects on South Dakota are completely ignored, except for the Oahe alternative (pages 4-104 - 4-105). The effects on the Black

Hills area for any of the pipeline alternatives could, and our experience says would, be extensive. The reason for this deficiency appears to be the flawed assumption that pipeline workers and railroad workers would live in Wyoming or in Alliance, Nebraska.

Our experience with the energy boom in the Gillette, Wyoming, area has been that many people who work there are willing to commute eighty or more miles to live in the northern Black Hills in South Dakota ("Priority Listing Approved of Energy-Impacted Cities," Rapid City Journal, June 16, 1978; Sixth District Council of Local Governments, Energy Impacts and the Effects of a Severance Tax on the Western South Dakota Counties, 1978, pages 4-5, 34). As the Niobrara well field would be about fifteen miles from Edgemont, and as the Crook well field would be about forty miles from the South Dakota border, we can expect similar population impacts from pipeline activities." (Commenter 33.)

Response: It is anticipated that only a few of those people working on energy projects in the Gillette Planning Area and southern Campbell County would choose to locate in the Black Hills area of South Dakota. This reasoning is based on data collected by the Wyoming Department of Economic Planning and Development and published in a report titled Mineral Development Monitoring System. Each energy-related operation in the state submits information on production schedules, employment, and employee resident distribution. A review of the projects in Campbell County indicated that none of the people working on projects in Campbell County chose to live in South Dakota. And only a small percentage chose to live in Crook or Weston counties.

181. Comment: "The South Dakota State Veterans Home located in Hot Springs, South Dakota, the Veterans Administration Medical Center, Domicilliary and Outpatient Clinic, located in Hot Springs, South Dakota, both of which stand to be impacted not only by the potential loss of water, but by the adverse impact on the recruitment of physicians, consultants, professional and technical employees." (Commenter ED-7.)

Response: The South Dakota State Veterans Home, located approximately one-half mile west of the Fall River near Hot Springs, uses approximately 0.2 cfs over the year (a peak use during summer months of approximately 0.5 cfs and 230 gpm) from a local well supply (Namminga 1981). It is predicted that the Evans Plunge spring area will experience a reduction of, at most, 2 cfs. Since Evans Plunge springs have a fairly consistent flow of at least 18 cfs and the average use of water from the spring area is about 8 cfs (3600 gpm), a reduction of flow of 2 cfs does not present a serious impact on water users.

The commenter fails to explain why it is felt that there would be impacts to the Veterans Home. The reduction in stream flow predicted for the Hot Springs area should have no effect on the patient load at the center. Neither should it have any effect on the recruitment of personnel.

182. Comment: "Page 4-52, Para. 1 of the Socioeconomics Technical Report states another nine workers would be required at the Niobrara well field. This contradicts Table 2-7, which shows eleven which consists of 9 technicians and operators and 2 supervisory personnel." (Commenter 139.)

Response: This section of the Final Socioeconomics Technical Report has been corrected.

183. Comment (in reference to Socioeconomics Technical Report): "Page 4-62, Table 4-22, 'Net Fiscal Impact of ETSI Project.' Indicate that the numbers given refer to thousands of dollars. Also change the number $495,000 shown for 1984 in the Gillette General Fund Account to $498,000, as indicated in Table A2-11.

The final number $6.5 million, given as the magnitude of the fiscal impact for the period 1984 to 1990, is extremely high. This total is based on several worst-case assumptions of the numbers of incoming construction workers, incoming service workers, sizes of their families and lengths of stays. However, even taking this worst-case possibility, the total negative impact of $6.5 million loses importance against such figures as the $57 million annual surplus expected for the Campbell County School District by 1990." (Commenter 139.)

Response: The errors in Table 4-22 identified in the comment have been corrected in the Final Socioeconomics Technical Report. Similar changes have also been made in Table 4-10 of the Final EIS.

The "loss" of $6.5 million between 1984 to 1990 is substantial. Unless the state legislature changes the law, there is no mechanism to transfer school district funds to the city's coffers. This is a situation faced by many communities in the state. In 1980, the Wyoming Supreme Court ruled that the present methods for school financing resulted in inequities between school districts in the state. As a result, the state legislature may be reducing the revenue generating capability of the Campbell County School District, thereby reducing substantially the $57 million budget surplus.

184. Comment: "Just one thing I meant to add was that in the Environmental Impact Statement you will notice that none of the Colorado towns or the impacts upon them were noted, and we thought that maybe there should have been some statement as to the impact upon those towns, not just those in our neighboring states of Wyoming, Nebraska, Kansas, and on down the line." (Commenter CO-2.)

Response: Only the Colorado alternative would affect towns in Colorado. (Neither the proposed action nor any other alternatives would have project components in Colorado.) The Colorado towns that would be affected by the Colorado alternative were discussed in Sections 3.D.2 and 4.D.2. of the Draft EIS.

6.E.3 SLURRY PIPELINE RUPTURES AND SPILLS

185. Comment: "Safety features available to avoid slurry spills in wetlands and in Class 1 waterways should be discussed." (Commenter 211.)

Response: Special considerations that would minimize or avoid slurry spills in wetlands and waterways are incorporated in the pipeline design (see Appendix C-10 of the Draft EIS and the appendix of the Ruptures and Spills Technical Report). The use of heavier wall thickness pipe and radiographic testing of the girth welds at all water crossings ensures greater pipeline strength, meaning that incorrect pipeline operation would result in line failure at other, weaker locations. The planned use of concrete-coated pipe at many stream crossings would also reduce the probability of equipment rupturing the line.

186. Comment (in reference to the Ruptures and Spills Technical Report): "As a footnote on the ruptures and spills discussion, the geologist retained by the railroads feels it is questionable if previously settled coal could be resuspended from the deposits at the bottom of a lake unless the lake is very shallow and subject to bottom scour at the time of freshets. (Pg. 123)" (Commenter 122.)

Response: The comment states that resuspension is likely only if the lake is shallow and subject to bottom scour during freshets. This agrees with the conclusions presented in the Ruptures and Spills Technical Report (WCC 1980j), page 69, which states, "In general, if the reservoir were large as in the scenario, most of the coal would eventually settle to the bottom of the lake and contribute to the permanent sediment structure." Freshets are a primary resuspension mechanism as discussed on page 69 of the same technical report, "Based on the one lake scenario, it appears that the medium and coarse fractions of coal (which make up 80% of the total by weight) will settle out in an area near the point of entry of the spill into the lake. This material may migrate through and be distributed over the lakebed by forcing associated with later episodic or seasonal events, such as storms or spring freshets, for example."

187. Comment: "The EIS states that spills on wetlands would be more severe and could result in localized significant changes in vegetation and wildlife habitat. Additional analysis needs to be made of potential impact on specific locations." (Commenter ED-23; also, 78, 141.)

Response: Due to the page limitations of an EIS, a detailed analysis of slurry spill impacts on all habitats could not be included. However, a detailed analysis of two typical wetland areas and one specific area of concern (a waterfowl preserve including wetlands) was included in the Ruptures and Spills Technical Report (WCC 1980j). Please refer to the Bayou Cocodrie and Bottomland-Hardwood spill scenarios (numbers 7 and 8, respectively) and the Deception Creek ancillary spill scenario analyzed in the Ruptures and Spills Technical Report. The Bayou Cocodrie and Deception Creek were discussed under aquatic impacts, whereas Bottomland Hardwoods was discussed under terrestrial impacts.

Due to the extensive length of the pipeline and the number of wetlands that the proposed and alternatives routes crossed, the potential impacts were discussed in general terms and by using the above mentioned scenarios. These scenarios were chosen using the criteria discussed in Section 4.A of the Ruptures and Spills Technical Report and were determined to be representative of the major wetland types located along the pipeline route.

Additional discussion of impacts to wetlands as a result of a slurry spill has been included in the Final EIS (Section 4.A.3).

188. Comment: "Although the possibility of spills are mentioned, the DEIS does not mention the possibility of bioaccumulation of toxic elements or compounds released during these spills." (Commenter 151.)

Response: The simulation tests on water quality of the slurry indicate indicate that potential toxic elements or compounds are not expected to be present in sufficient concentrations to result in any significant bioaccumulation following a spill. Also, it is extremely unlikely that a slurry spill would occur repeatedly at the same location.

189. Comment: "In discussing a coal slurry spill on page 4, reference is made to its 'essentially nontoxic' nature, however, it is also stated that 'Large volume spills in small streams would result in the largest losses to fish and other aquatic life. Small volume spills or spills in larger streams would result in more localized losses to aquatic organisms and short-term changes in the aquatic habitat, since the concentration of the coal slurry would be more quickly diluted to harmless levels.'

This discussion could also expand upon the toxic constituent studies referred to on page 4-107 and 4-111, Characteristics of Dewatering Plant Effluent and Relationship of Discharge to Existing Standards. A data summary of the cited references to supplement Table 4-36 through 4-40 should be included to graphically demonstrate the water quality and chemical character-istisics of coal slurry and dewatering effluent.' (Commenter 150.)

Response: A distinction should be made between types of aquatic damage. The statement on page 4 of the Draft EIS, "Large volume spills in small streams would result in the largest losses to fish and other aquatic life," was made in reference to the physical effects of the coal slurry particles such as smothering and clogging of gills rather than any toxic effects. The same was true with respect to the statement on small-volume spills. In the Final EIS, these statements have been reworded to better reflect the actual intent. Section 4.A.3 and the Summary of the Final EIS have been revised.

190. Comment: "Attention is given to the effects of the coal on aquatic organisms in case of ruptures or spills, but the effect of the slurry water, high in TDS and BOD, on affected lakes, streams, or wetlands has not been addressed." (Commenter 231.)

Response: Impacts resulting from spill-related high TDS and BOD levels were addressed in Section 4.B.4 of the Ruptures and Spills Technical Report (WCC 1980j) and Section 4.A.3 of the Draft EIS.

191. Comment (in reference to the Ruptures and Spills Technical Report): "In the 'Summary' (R-S, p. 99) the statements concerning 'significant dissolved oxygen depletion' are misleading. As this paragraph is written, it implies that sudden decreases in DO are insignificant to an aquatic community. The effects of sudden DO decreases depend upon time (daily and seasonal) and the tolerance of that aquatic community to DO stress. This tolerance varies with regards to the nature of the stream (upland vs. lowland), temperatures, etc. Although apparently insignificant, DO reductions, especially during spawning season or periods of low flow, could devastate an aquatic community. Please adjust the final EIS to reflect this point and clarify the summary on the effects of ruptures and spills." (Commenter 215.)

Response: All statements made in the "summary" section on page 99 of the Ruptures and Spills Technical Report (WCC 1980j) relate to water quality parameters only. Please refer to page 104 for a description of the impact criteria used for aquatic biological analyses and to Table 4-42 on page 111 for spill scenario sites where dissolved oxygen (DO) depletion would significantly affect aquatic communities. The DO data are also discussed under each scenario heading.

192. Comment: "Only in the Surface Water Quality Technical Report (SWQ) is there a significant discussion of the pH of the slurry water (p. 10-15). Spill scenarios deal only with SO_4, Cl, TDS and BOD parameters. Why not pH? Arkansas Department of Pollution Control and Ecology personnel believe that pH of slurry from a rupture (aerobic conditions) will not be just "slightly acidic" (SWQ, p.10), but moderately to strongly acidic. If this is true, chemical behavior of coal slurry under aerobic conditions should be more fully explored. Drops in pH will totally disrupt the aquatic community, causing massive mortalities and result in eutrophication of afflicted waters. Please specifically ad-

dress the chemical behavior of slurry when it comes into contact with air or water (as in the case of a rupture) and effects of low pH effluent on aquatic communities in the Final EIS." (Commenter 215.)

Response: The pH of the slurry following a rupture (aerobic conditions) is not likely to be strongly acidic for several reasons:

(1) The "acid drainage" reaction, which is characteristic of eastern coals, is not likely to occur for the proposed (western) coal. This is because the proposed Wyodak coal has a much lower sulfur content than eastern coals; the sulfur that does occur is usually found in the organic form, which does not leach as readily as the pyritic form (Moore 1977, p. 28; UCLA/-SAI 1978, pp. 35, 36).

(2) Western coals contain considerable alkalinity, which serves to neutralize some of the acidity formed (UCLA/SAI 1978, page 35).

(3) Actual slurry simulations studies under aerobic conditions have shown that strongly acidic (low pH) conditions do not develop. Investigations by the University of Arkansas, using Gillette, Wyoming, coal with both distilled water and wastewater simulating coal slurry under aerobic conditions, showed that the pH did not drop below 6.0 (Moore 1977, p. 49; Sanguanruang 1977, p. 37).

193. Comment: "Mixing of finely-ground coal with water creates a situation whereby phenols contained in the coal can be leached out by the water. Since phenols are classified as hazardous wastes by EPA, this becomes significant in the discussion of pipeline ruptures and spills. Are phenols likely to be contained in the slurry line water? Will spills from the slurry line result in contamination of the environment with phenols? How will any hazardous waste materials generated in the slurry line be disposed of? These issues should be addressed in the EIS." Commenter ED-4.)

Response: As discussed in Section 1.G of the Surface Water Quality Technical Report (WCC 1980c), national standards of performance for the discharge of coal slurry effluent have not yet been promulgated (Telliard 1979). The analysis for phenolic compounds has been included in the simulation investigations performed on ETSI coal water sources. Chemical analyses were performed on the slurry filtrates, using both Madison and Oahe Reservoir water sources with Wyodak coal.

The 129 EPA "priority pollutants" were analyzed for, including the following phenolic compounds: 2,4,6 - trichlorophenol; 2-chlorophenol; 2, 4-dichlorophenol; 2, 4- dimethylphenol; 4-chlorophenyl; phenyl ether; 4-bromophenyl; 2-nitrophenol; 1, 2-2-diphenyl hydrazine; 4-nitrophenol; 2, 4-dinitrophenol; pentachlorophenol, and pherol. All of these constituents were found to be below the limits of detection (e.g., less than 5μg/l for all constituents except for 2,4-dinitrophenol, which was less than 200μg/l).

194. Comment: "Operating features for preventing and minimizing spills are given in Appendix C-7. Two of the methods used for identifying spills were regularly conducted aerial reconnaissance and ground patrols. It is agreed that both of these methods are useful in detecting potential problems and identifying spills. However, the time interval between inspections plays a crucial role in the effectiveness of a program of this nature. Therefore, the FES should address the frequency of inspections." (Commenter 72.)

Response: Additional information on the frequency of inspections has been added to Appendix C-10 of the Final EIS (formerly Draft EIS Appendix C-7).

195. Comment: A contingency plan should be worked out and incorporated into the EIS prior to any federal, state or local permit issuance." (Commenter 113; also, 122, 141, 168.)

Response: The development of a coal slurry contingency plan is beyond the scope of an EIS and is usually prepared as a separate document. Typically, these plans are not prepared until later in the planning stages, as they are heavily dependent on the final design of the pipeline, which has not been completed yet. In addition, ETSI is not required by law to develop a spill contingency plan. However, general guidelines on the types of response actions (containment and cleanup) that ETSI would take in the event of a coal slurry spill have been included in Appendix C-11 of the Final EIS.

196. Comment: "The impact statement should address the following:

(1) The temporary or long term loss of land productivity due to spillage of oil, refined petroleum and brine.

. . .

(3) The temporary loss of income to oil and gas producers and first purchasers of oil and gas due to the cutting of lead lines and product lines. These are transportation arteries and should receive the same considerations of inconvenience and temporary loss of income as highways would.

(4) Major pipelines that carry gasoline and natural gas operate under several hundred psi. It seems that the impact of both safety and environment should be addressed in relation to the passing of the slurry pipeline under these other lines." (Commenter 168.)

Response: Any construction requiring excavation runs the risk of rupturing existing pipelines. Pipeline construction contractors are generally quite aware of the hazards involved in rupturing other pipelines in operation and will exercise extreme caution in areas containing underground pipelines. It is also an established practice to notify the pipeline operators that work is being done in the vicinity of their line and verify its exact location. Many times the operator will dispatch an observer to the construction site to ensure the line is not accidentally ruptured.

During new pipeline construction, the existing lines are almost never purposely cut, but rather are left in place with the new pipe installed slightly below. If the existing lines were cut either purposely or by accident, the economic impacts should be minimal as normal operations should be restored within 1 or 2 days. In addition, pipelines generally have sufficient storage capacity at either end to maintain normal shipping and receiving operations during shutdowns that are periodically required for routine maintenance.

Impacts from spills due to accidental rupture of existing pipelines are anticipated to be relatively minor. This is because the pipeline operator would be notified immediately and shutdown would occur within several minutes. Also, the construction crews at the site will implement response actions immediately, thus containing the spill at its source. As a result, the impacts will be limited to an area already disrupted by construction activities.

With regard to the safety issue, there have been reported cases of injuries and even death from accidental rupture of high pressure pipelines. However, since location of these lines are known, the probability of a rupture occurring is remote.

197. Comment: "The mention of how the most major Black Mesa Pipeline spill cleaned itself up is ludicrous. Very few ETSI spill scenarios compare with that spill." (Commenter 141.)

Response: The discussion of the Black Mesa coal slurry pipeline spill on pages 3 and 4 of the Ruptures and Spills Technical Report (WCC 1980j) was not intended to imply that the spill "cleaned itself up," but rather to document the fact that the coal slurry was left to be dispersed by natural physical processes, because it was felt that cleanup would result in greater overall environmental damage. The decision to take no cleanup action was made jointly by the Bureau of Land Management and the Arizona Game and Fish Department. In addition, the latter agency felt that the coal was a good soil additive and would act as a water purifer. The discussion of the Black Mesa spill in the final technical report has been revised to better reflect the government agency involvement in deciding to take no cleanup actions.

Documentation of the Black Mesa pipeline spill was included to provide some perspective on what might happen in the event of a typical operational spill and was not intended to be compared with the ETSI spill scenarios, which utilize "worst-case" spill volumes.

198. Comment: "In our opinion a precise example of the inadequacy of this report is the way in which slurry pipeline ruptures and spills were projected. We are not given the formula used in forecasting 2.70 spills over a ten year period in this 1800 mile slurry line using a one-spill event in the 293 mile long Black Mesa slurry line. We recall the testimony of Russell Train in his testimony before House Hearings on Coal Slurry Line Legislation (94-8) 1975, page 46: 'According to Pacific Gas and Electric Company engineers, problems continue with the Black Mesa pipeline mentioned in Senate Rept. 93-1072. Biologists from the University of New Mexico are continuing to report periodic large discharges of slurry fluids from that line at a location called Secret Pass in Arizona in order to avoid separation of the slurry and their clogging of the line. Discharge of such low quality water along with coal being slurried has a substantial potential for contamination of surface and ground water.'" (Commenter 8.)

Response: The rationalized spill frequency discussion is presented in Section 1.D of the Ruptures and Spills Technical Report. This frequency analysis presents data gathered on liquids pipelines and arrives at a two-leak-per-year scenario for the ETSI system.

Based on an accident-per-mile value of 0.0015 (Table 1-2) for 1975 (the mean year of Black Mesa's 10-year operations period), we would expect four spills to have occurred if Black Mesa operations were the norm for all liquids pipelines. In fact, only one reported spill has occurred on this 273-mile pipeline. This fact tends to support the argument that newer pipelines such as ETSI's should have spill frequencies below the norm of all liquids lines for which spills are reportable to the Office of Pipeline Safety Operations.

Concerning the testimony given by Russell Train before the House Hearings on Coal Slurry Line Legislation in 1975, both the University of New Mexico and New Mexico State University biology departments were contacted (Dr. Loran and Dr. Dick-Peddie) and neither were aware of any work their organizations might have done on discharges of slurry fluids from the Black Mesa pipeline. Also notable is the fact that the pipeline supplies coal to the Mohave Generating Station, which is operated by Southern California Edison. The original Pacific Gas and Electric information was not ascertainable, and to our knowledge is not valid.

199. Comment: "The lack of concern over impacts in the event of a coal slurry spill leaves us to wonder what the researchers consider important. Many statements - 'asides' - are seemingly off the cuff, i.e., 'A coal slurry spill is not expected to result

in any risk to the health or safety of any human.' (Page 4) When? How do we know what long-term impacts could occur. In referring to impacts on groundwater, worst-case conditions, it is (assumed), '...no chemical reactions would occur and no contaminants would be absorbed by the soil, only the federal secondary drinking water standards for TDS, sulfates, and possibly manganese may be exceeded.' 'No biological impacts of any significance are anticipated.' (Page 4-41).

It is noted several places, that a spill would be 'long-term' and 'significant', if occurring in aquatic or wetland situations. This, to us, seems to say it would be significant.

The one Black Mesa Pipeline spill referred to on Page 4-40 had a devastating affect on the terrain involved, as photos show. (Attached). This was a 'significant impact' to the area, even in the desert." (Commenter 220.)

Response: A detailed and extensive examination of the coal and slurry water composition was conducted along with a professional review of the findings, which concluded that neither the constituents nor their projected concentrations would result in significant impacts in most cases. Only a few of the constituents found in the slurry water are expected to exceed federal drinking water standards, and spills entering surface waters would generally be diluted rapidly to levels within the federal standards (see Table 2-3 of the Ruptures and Spills Technical Report (WCC 1980j). Thus, no long-term impacts are anticipated to the health or safety of any human as a result of a coal slurry spill at any time during the project life. The primary factor determining the significance of impacts from a coal slurry spill is the environment within which the spill occurs.

The statement "no biological impacts of any significance are anticipated" on page 4-41 (actually 4-42) of the Draft EIS was made in reference to a spill impact on ground water, which was determined to be minor even in a worst-case situation (see pages 70 and 100 in the Ruptures and Spills Technical Report [WCC 1980j]). Conversely, wetlands and other aquatic habitats are highly sensitive areas and are susceptible to significant and long-term impacts as stated in the Ruptures and Spills Technical Report (WCC 1980j) on pages 120-122 and the Draft EIS on pages 4-41 and 4-42.

The discussion of the Black Mesa pipeline spill in the Draft EIS and Ruptures and Spills Technical Report was included to document an historical coal surry spill, not to establish the significance of the resulting impacts. However, the fact that only small pockets of coal remained after 5 months and that the spill was barely visible after 1 year denotes fast recovery, which is generally accepted as an indication of having had minimal impacts. The spill did not enter any aquatic environments and the vegetation in the area was not adversely affected and, in fact, was greener the following year.

Even though the aesthetics of the area were somewhat impacted by the spill, the Arizona Department of Game and Fish and the U.S. Bureau of Land Management representatives did not consider it significant enough to justify cleaning up the discharged slurry (please refer to the response for Ruptures and Spills Comment 197.)

200. Comment: Where the Draft EIS talks about a break or rupture causing the release of as much as 544,000 barrels of coal slurry, we point out that this is purely a hypothetical number which is based on the assumption that coal slurry behaves as petroleum would in an oil pipeline. In the unlikely event of a rupture, any actual spill would be much less because of the tendency for slurry to thicken and form soft plugs in the line, which will be effective in reducing the amount of slurry that is discharged. It would have been more objective to project more typical spill rates rather than the improbable rates (4,000-540,000 barrels of Page 4 in the DEIS Summary)- even though they are insignificant. Considering the above points would lead to a more realistic range of 500 to 150,000 barrels. (Commenters LA-2, 139.)

Response: On page 4-40 the Draft EIS states, "the impact assessment is derived from a detailed impact analysis of eight worst-case spill sites..." and "the anticipated yearly spill magnitude should also be considered conservative..."

The question as to whether or not soft plugs would form in the pipeline after a rupture has occurred has been raised and considered during the spill-size projection process. In keeping with the philosophy of selecting the worst-case situation and due to the absence of data indicating that soft plugs would form in all rupture situations, the case simulations were performed assuming no soft or hard plug formations. All simulation runs, however, accounted for the fact that coal will settle out of the coal slurry as velocity in the various segments of the pipeline drop below the minimum transport value. The model and assumptions were discussed on pages 25 and 141 of the Ruptures and Spills Technical Report (WCC 1980j).

The argument that soft plugs may form is a valid one, although the extent and ultimate effect may vary considerably depending on the circumstances surrounding the rupture, and plug formation cannot be assured, certainly, in the sections of the pipeline where the velocities are above the normal deposition velocity values of the slurry particles. In the case of complete ruptures with large static heads available, these velocities remain high enough to suspend the coal particles in most sections of the pipeline for significant amounts of the total spill times predicted.

The U.S. Environmental Protection Agency (EPA), in its March 1979 report on Environmental and Pollution Aspects of Coal Slurry Pipelines, states that "the ruptured line drains all continuously higher pipeline elevations." The EPA, in its study, did not comment on plug formation tendencies.

Based on the estimated quantity of material released at the one reported Black Mesa spill incident (two sites) in February 1977, it appears that significant soft plugs did not occur until after a significant part of the draindown sections had emptied. The Montfort paper of March 1980 presented at the Fifth International Technical Conference on Slurry Transportation states concerning the February spill, "A large volume of slurry escaped in uncontrolled flows at rates which finally became very low and created numerous semi-dry plugs." This statement combined with an evaluation of the Black Mesa profile indicates that most of the drainable sections had drained and that the solids remained as semi-dry plugs in the low points with little or no holdup of water or solids upstream of these low points.

Further, the paper above states, "Ruptures were repaired and slow flow pumping of water began at upstream station. This began at 0+36 hours and continued slowly at pumping rates between 0 and 1000 gpm (0.06 m^3/s) versus 4000 gpm (0.25 m^3/s) normal for 10 hours at which time hydraulic communication was established throughout the section." The quantity of water required to fill the pipeline section further indicates that a significant portion of the drainable sections had in fact drained.

Based on the discussion above, the assertion that the spill model "is based on the assumption that coal slurry behaves as petroleum would in an oil pipeline" appears to be incorrect. Thus, the estimates of sizes for the selected worst-case spill sites are plausible, and not "a hypothetical number."

201. Comment: "The Technical Report cites the average oil spill between 1968 and 1974 as 1058 barrels. But the average slurry spill used in the Technical Report is two orders of magnitude (100 times) greater." (Commenter 139.)

Response: The average oil spill size was obtained for pipelines of all sizes and ages and inherently assumes the design parameters associated with those pipelines. The spill size equation reflects the fact that generally oil and liquids have more closely placed valves than the ETSI pipeline configurations evaluated (which assumed no valves between pump stations). The fact that standard oil and volatile liquids pipeline designs utilize isolation valves very liberally relative to coal slurry pipelines tends to reduce the spill sizes occurring on those lines. Federal regulations concerning safety in the case of volatile liquids pipelining has led to significant numbers of isolation valves.

The Technical Report does not claim that the average spill size will be anywhere near the quantities presented, but only that the eight possible spill scenario sizes are possible, but unlikely to occur.

A similar evaluation, as performed for the ETSI pipeline to project spill sizes for specific locations, when applied to the known Black Mesa spill in 1977, produced quantities similar to those inferred or reported for the Black Mesa spill in the Montfort paper (see response to Ruptures and Spills Comment 200) and the Office of Technology Assessment study on the "Environmental Impact of Coal Slurry Pipelines and Unit Trains, Draft Final Report" of October 10, 1977.

Maps containing 200-foot contours were utilized in preparation of the profiles. Deliberate care was used in interpolating between contour lines to obtain an accurate profile.

One should note that the Black Mesa line is 18 inches in diameter and that potential spill sizes would generally be smaller than for the many larger-diameter pipelines of the ETSI system.

202. Comment: "Page 141 of the Technical Report assumes the type of spill was either a complete break or a puncture but does not specify the ratio of the two spills. This ratio is important because in the few minutes required for an automatic shutdown, the loss of slurry in a rupture is much smaller than for a complete break." (Commenter 139.)

Response: A predicted or historical ratio of complete rupture versus puncture type breaks is not available, but one can look at Table A-1 of the Ruptures and Spills Technical Report (WCC 1980j), page 133, and possibly draw some conclusions. Generally corrosion, equipment rupturing line, and to a certain extent defective pipe and girth welds could tend to be small size ruptures. In general, it appears that a larger number of small ruptures occur relative to the number of complete ones.

The ratio is not important, generally, if shutdown is based on the 1.5 percent of flow figure ETSI would be utilizing. As shown on Table A-4 of the technical report (WCC 1980j), ETSI should be able to detect holes in excess of one inch in diameter. Once shutdown has occurred and if no isolation valves are available to close and further isolate the section, then the line would continue to drain unchecked until repair crews arrive and are able to work.

203. Comment: "Page 1, Para. 7 cites Spills and Ruptures as an Area of Controversy. Page 4, Para. 6 of the DEIS summarizes impacts associated with Spills and Ruptures.

The Technical Report on this controversial topic is not properly reflected in the DEIS which omits this significant statement now in the Technical Report: '...it cannot be emphasized too strongly that the likelihood of any of the line breaks evaluated ever occurring, let alone the volumes projected ever actually being discharged from the break, is extremely remote.'

Moreover, a balanced perspective could be better achieved if the validity of the simplifying assumptions were explained in Volume 1." (Commenter 139.)

Response: The fact that it is unlikely a line break would occur has been clarified in the Ruptures and Spills section of the Final EIS Summary.

204. Comment: "Spill scenarios should be developed to predict damages to water supply reservoirs (large and small reservoirs and river withdrawals). These and the economic impacts of such occurrences should be incorporated into the final EIS. Such predictions would help in the location of shut-off valves. Development of emergency procedures for communities threatened with the loss of their water supply due to a coal slurry pipeline rupture would be of great benefit." (Commenter 215.)

Response: The potential for slurry spills disrupting domestic water supplies is a genuine concern and was discussed in general terms on page 121 of the Ruptures and Spills Technical Report (WCC 1980j); a brief discussion has been included in Section 4.A.3 of the Final EIS. The location of municipal water intakes downstream of pipeline crossings was among the criteria used to select the various spill scenarios. As a result, Spill Scenario 4 (Ruptures and Spills Technical Report) was selected primarily for this reason. A reservoir spill scenario (Scenario 5) was also included in the technical report. Although this reservoir is not used as a source of municipal water, the degree of water quality degradation from slurry spills entering water supply reservoirs can be derived from this analysis.

The economic analysis of slurry spills impacting water supplies was not conducted for the reasons given in the following dicussion. During the spill scenario site selection, a survey of the municipalities located downstream of pipeline crossings revealed that very few were partially or totally dependent on potentially impacted surface waters for their water supply. The data required from these municipalities to perform a quantitative economic analysis was generally inadequate. In addition, no significant impacts were expected to occur from a spill as most of these towns had at least a 24-hour storage supply should water intakes be temporarily shut down for various reasons including maintenance. Any suspended coal particles that might enter the system prior to shutdown would likely be removed by filtration and flocculation units incorporated in the municipality's water treatment facilities.

Degradation of water quality with the exception of turbidity levels, is also expected to be minor as tests have concluded that the slurry water would only exceed federal drinking water standards for a few constituents and when spilled into an aquatic environment would be diluted rapidly to levels within the standards (see Table 2-3 of the Ruptures and Spills Technical Report WCC 1980j). In most spill situations, however, it is anticipated that the affected communities would implement a water quality monitoring program for a period of time following a spill to ensure drinking water standards are not exceeded at any time and that coal that may have settled in the stream is not producing any residual effects on water quality.

Specific emergency procedures were not prepared for communities whose water supply might be threatened by a slurry spill for the same reasons that an economical analysis was not conducted. Information on general spill response actions to be implemented in the event of a spill has been added as Appendix C-11 of the Final EIS.

205. Comment: "The statement concerning the high survival rates of 'common fish' exposed to high TDS and SO_4 concentrations (R-S, p. 104, last paragraph) is misleading in that it implies that little damage would be done to a fish community by these pollutants. These 'common fish', although tolerant to various parameters, could represent only a small portion of the standing crop of that particular community affected by a rupture. If the other fish present are not as tolerant as the 'common fish', vast portions of the fishery could be destroyed. That would be a significant effect. Please have the final EIS reflect that high TDS and SO_4 concentrations could also have a 'highly significant' effect on fish depending upon their sensitivity to coal slurry pollutants." (Commenter 215.)

Response: The high TDS and SO_4 concentrations are very short-lived and extremely localized. Fishes are highly mobile and would avoid these localized impact areas if possible. Given that these effects are localized and short lived, it seems highly unlikely that "vast portions of the fishery could be destroyed."

206. Comment: "If coal slurry spills will cause fish kills, what is the causative mechanism? Including a description of the chemical constitutents, nature, and interactions of coal slurry in an aquatic environment will help clarify the inconsistent characterization of coal slurry as "essentially nontoxic" with the implied toxicity of dilution to "harmless levels". (Commenter 150.)

Response: Causative mechanisms, resulting in fish and aquatic insect kills, were discussed in Section 4.B.4 of the Rupture and Spills Technical Report (WCC 1980j). High TDS and reduced dissolved oxygen levels would result in nontoxic stress. Physical effects such as siltation effects on eggs, larvae, and benthos as well as gill clogging could also cause kills.

6.E.4 VEGETATION AND WILDLIFE

Comments and responses related to vegetation are listed first, and those related to wildlife follow.

Vegetation

207. Comment: Page 5, Col. 2, Para. 3 and Page 4-89, Col. 2, Para. 2. The Colorado butterfly-weed has not been officially proposed for listing. It may be proposed in the near future, possibly before the final EIS is written. It is also not addressed in the Memorandum of Understanding that is referenced (page 4-89). (Commenter 140.)

Response: The fact that this plant has not been officially proposed for listing has been clarified in the Final EIS Summary and Section 3.D.3. In addition, references to the Colorado butterfly-weed have been deleted from Section 4.D, because it has not been formally proposed as a threatened or endangered plant.

It has been determined that the Memorandum of Understanding will not be required for this project; therefore, all references to it have been deleted in the Final EIS.

208. Comment: "Drawdowns of the Madison formation aquifer will reduce streamflows (see DEIS, page 4-52), but the effects of this reduction on stream and streamside communities is not considered in a systematic way. Some effects which could be predicted are reduced species diversity, reduced productivity, and possible destruction of habitats used by certain endangered and threatened plant species in southwestern South Dakota (Adoxa moschantellina L., Epipactis gigantea Dougl., and Adiantum capillus-veneris L.)." (Commenter 151.)

Response: The 1 cfs flow reduction due to Madison Formation pumping is not expected to result in significant, long-term impacts to streams in the area. Species indigenous to streams that are already of an intermittent nature would not be expected to be adversely impacted by this drawdown, because they are already adapted to intermittent stream conditions (see Draft EIS, page 4-52, Column 1, paragraph 2; and column 2, first two paragraphs). Species diversity is not expected to be reduced in intermittent streams affected by a flow reduction for the same reasons stated above.

Stream productivity may be reduced about 25 percent in year-class strength. This was discussed in the Draft EIS on page 4-52, paragraph 1.

The three plant species mentioned in the comment do not appear on the Fish and Wildlife Service Section 7(c) list or in the Review of Plant Taxa for Listing as Endangered or Threatened Species published in the Federal Register on December 15, 1980 (see Table A-8 in the appendix of the Threatened and Endangered Species Technical Report).

209. Comment: "Page C-2. What will be the function of the environmental coordinators? Who will employ them? Will BLM have any input into their selection?" (Commenter 140.)

Response: The environmental coordinators would be hired by ETSI. Their function would be to ensure that the necessary contacts are made with various federal, state, and local agencies. Construction on federal land and procedures required for protection of cultural resources and threatened and endangered species would be monitored by BLM and/or FS personnel.

210. Comment: "Page C-3. Will the onsite reclamation specialist have power to hold up the project if necessary? Who controls this person?" (Commenter 140.)

Response: The onsite reclamation specialists would be hired by ETSI. These people would be responsible for reclamation work on private lands. Construction on federal lands would be monitored by either BLM or FS personnel. As stated in paragraph 4 on page C-3 of the Draft EIS, the construction could be stopped under certain conditions by a reclamation specialist.

211. Comment: "Very little discussion is given to the construction of the pipeline on steep slopes, and the environmental impacts of terracing, such as erosion. Terracing might also affect drainages. The DEIS should address this problem." (Commenter 141.)

Response: Refer to Appendix C-1 in the Draft EIS. Concerns relating to pipeline construction and restoration on steep sloping areas were discussed in the Erosion Control and Revegetation section by stages of construction. Use of terracing was specifically identified under the heading of Backfilling and Cleanup.

Following of these procedures should eliminate any significant impacts of this nature. These procedures only can be required on federal land. As identified in Appendix C-1 of the Draft EIS, ETSI has committed itself to follow the same procedures on private land, subject to the landowner's concurrence.

212. Comment: The DES states that a few small areas where adequate vegetation cannot be established and maintained would require critical area treatment with continuing erosion control measures. The FES should outline what critical area treatment is and quantify the amount of area involved." (Commenter 72.)

Response: Critical area treatment measures were identified by stage of construction, restoration and revegetation process in Appendix C-1, Erosion and Revegetation section of the Draft EIS.

Quantification of critical area occurrence and extent would be very speculative due to variables such as weather conditions during restoration, final right-of-way alignment, and abrupt variation in soil characteristics. General critical area conditions have been evaluated and identified through use of general soil inventories.

As explained in the appendix, an on-site reclamation specialist would provide expertise to direct applicable restoration procedures when special conditions are encountered. Technical assistance would be obtained from local district offices of the Soil Conservation Service.

213. Comment: "The recommended route goes through an extremely fragile section of Nebraska known as the Sandhills, famous for their peculiar "blowouts." Even such minor soil disturbances as telephone poles have problems. Yet recommended for soils treatment are ETSI's General Construction, Operating, and Reclamation Procedures. (p. C-1)" (Commenter 8.)

Response: "The high wind-erosion hazard, typical of the soil of the "Nebraska Sand Hill" was recognized and discussed in Section 4.A.4, page 4-42 in the Draft EIS.

Implemention of the erosion control and revegetation measures outlined in the Erosion Control and Revegetation Guideline in Appendix C-1 would minimize and adequately control soil blowing where soils have been disturbed by project construction. Specifically, Appendix C-1 stated mulching practices or matting would be used in critical areas where wind and water are serious erosion hazards.

214. Comment: "Techniques to be employed in reclaiming and stabilizing banks at stream crossing points are not specified in Appendix C-1 beyond the statement that 'banks would be stabilized to prevent erosion.' Adding a mitigating proviso ensuring that said banks would then be replanted in native vegetation would allay our concern that disturbance of the banks might constitute more than a temporary adverse impact on stream values." (Commenter 4.)

Response: Techniques and measures to stabilize and restore banks at stream crossings were presented by stage of construction and restoration process in Appendix C-1 of the Draft EIS. The statement that "banks would be stabilized to prevent erosion" refers to the right-of-way and site clearing stage of construction and is explained under that heading. Refer to the sections on backfilling and clean-up, land preparation for seeding, and revegetation (reseeding and planting) for restoration and revegetation measures applicable to stream-bank restoration.

Application of appropriate measures selected from the Erosion and Revegetation Guideline in Appendix C-1 would assure effective stream-bank restoration. In addition, ETSI is committed to implement a mitigation measure that addresses stream-bank restoration (see Applicant-Committed Measure 8 of the Mitigation section included in Chapter 4 of the Final EIS). However, neither the BLM nor FS can enforce implementation of this measure on private land.

215. Comment: "Some mention should be made about the utilization of the timber and wood cut from the proposed route. An effort should be made to salvage all merchantable timber, pulpwood, firewood, etc., and utilize it in an effective manner. The possibility of making firewood available to the public as a source of energy should be of considerable interest to those who have wood-burning stoves and fireplaces." (Commenter 218.)

Response: Refer to Appendix C-1, Erosion Control and Revegetation section of the Draft EIS. The intent of paragraph 2 under "Right-of-Way and Site Clearing," is to imply that merchantable timber and non-merchantable timber would be utilized or disposed of at the discretion of the landowner. This statement has been clarified in the Final EIS.

216. Comment: "The final EIS should emphasize that any herbicides applied along the right-of-way for the purpose of weed control during reclamation efforts must be EPA approved. The statement should further explain that the application work conducted must be done under the careful scrutiny of a professional person certified under existing EPA programs as a Certified Pesticide Applicator." (Commenter 226.)

Response: Refer to Appendix C-1, page C-5 of the Draft EIS which states, "The use of biochemicals such as herbicides, fungicides, and fertilizers would comply with state and federal laws..." This would include any EPA legal requirements.

217. Comment: "The EIS does not address the problem of noxious weeds resulting from ground disturbance. The applicant should be required to consult and cooperate with Weed and Pest Districts along any pipeline route." (Commenter 72.)

Response: Refer to Appendix C-1, Erosion Control and Revegetation section. With implementation of applicable measures outlined in the revegetation guidelines and assistance of local expertise, the problem of noxious weeds is expected to be minimal to nonexistent. However, in the Use of Biochemicals section of this appendix, use of herbicides is provided for, if necessary, and would comply with state and federal laws regarding use.

In the Final EIS, this section has been revised to include compliance with local laws in addition to state and federal laws, so Weed and Pest Districts would be included. Also, the statement regarding who would be contacted for approval of a written plan for use of biochemicals has been revised to include "appropriate pest control agencies."

218. Comment: "Page 4-58, Para. 5 'ETSI has proposed to use biochemicals, primarily herbicides, for the maintenance of the pipeline right-of-way and pump stations.' ETSI does not plan to use herbicides on the right-of-way proper. In fact, ETSI has indicated it will monitor the success and maintain revegetation programs along the right-of-way." (Commenter 139.)

Response: In the Final EIS, the quoted sentence has been revised to state that if ETSI needs to use biochemicals to maintain the right-of-way or facility sites, their use and application would have to be state and federally approved.

219. Comment: "The statement is made that 'actual impacts on vegetation would be generally insignificant and for the most part temporary.' However over 6,000 acres of land will be deforested for at least 50 years. This should be considered a significant long term impact." (Commenter 72.)

Response: The statement "actual impacts on vegetation would be generally insignificant and for the most part temporary" refers to the native range vegetation types and understory vegetation in woodland areas. This has been clarified in Section 4.A.4 of the Final EIS. Also, the paragraph discussing impacts to woodlands has been expanded and clarified.

Wildlife

220. Comment: "Page 6, Col. 1, Para 3. A statement is presented that the black-footed ferret, red-cockaded woodpecker, bald eagle, and American alligator would not be affected by the project. Until the surveys are completed for the black-footed ferret and the red-cockaded woodpecker, the impacts are not known." (Commenter 140.)

Response: The inaccurate statement cited in the comment has been deleted from the Final EIS Summary.

221. Comment: "Page 3-59, Slurry Pipeline System. In Oklahoma the proposed action route would pass through the Fort Gibson Game Management Area between mileposts 819 and 827. This area is managed for upland game, white-tailed deer, and waterfowl by the Oklahoma Department of Wildlife Conservation." (Commenter 140.)

Response: This information has been added to Section 3.A.4 of the Final EIS.

222. Comment: "Page 4-45, Col. 2. Para. 3. Remove the word 'mitigation'. Reword the sentence to indicate that actions to avoid impact to black-footed ferrets would be taken." (Commenter 140.)

Response: The suggested revision has been included in Section 4.A.5 of the Final EIS.

223. Comment: "Page 4-48, Greater Prairie Chicken. The statement that 'Temporary loss of strutting grounds would not affect the prairie chicken in Oklahoma' as referenced to Short, 1980 is taken somewhat out of context from the reference source. The referenced material only indicated that 'the pipeline probably would not have significant long-term impact on the tall grass habitat if the trench is back-filled with parent material first and topsoil on top.' This referred to prairie chicken habitat in general, not specifically to strutting grounds." (Commenter 140.)

Response: The greater prairie chicken discussion included in Section 4.A.5 of the Final EIS has been revised.

224. Comment: "The Oklahoma Department of Transportation's Wildlife Management Specialist has reviewed the report and offers the following comments: 'Two caves containing known gray bat (*Myotis grisescens*) and possible Indiana and Ozark big-eared bat (*Myotis sodalis* and *Plecotus townsendii ingens*, respectively) populations occur on or near the proposed route of the Coal Slurry Pipeline Market alternative. These caves are located south and west of Lyons, Oklahoma in Adair County near Station MB 454 of the market alternative. These three species of bat are endangered and any disturbances during the construction of the Coal Slurry Pipeline should be avoided.'" (Commenter 45.)

Response: These bat species are discussed in the Threatened and Endangered Species Technical Report, Section 3.A.1. As explained in that section, the pipeline would be located well east and south of known cave habitat for gray bats. The Indiana and Ozark big-eared bats are not expected to be affected by the project in Oklahoma either.

225. Comment: "We also had our Biology Unit review the sections of the Impact Statement on Wildlife, Aquatic Biology and Threatened and Endangered Species. They found the DEIS generally comprehensive and appropriate and the only suggestion offered was that it would be appropriate to update the references for breeding range of the Least Tern. This work is available from Marvin Schwilling of the Kansas Forestry, Fish and Game Commission, Wildlife Research Office, 1803 W. 6th St., Emporia, Kansas." (Commenter 168.)

Response: In the Final Threatened and Endangered Species Technical Report, the reference for breeding range of the least tern has been changed to the more recent Kansas Forestry, Fish and Game Commission paper cited in the comment.

6.E.5 AQUATIC BIOLOGY

226. Comment: "Page 3-62, paragraph 1 mentioned species considered rare in Wyoming by Clark and Dorn (1979). This reference should be either deleted throughout the EIS or qualified. It represents only the opinions of those two individuals and not any agency or legal classification. The publication titled Current Status and Inventory or Wildlife in Wyoming also should have been consulted." (Commenter 72.)

Response: The Wyoming Game and Fish Department publication cited in the comment was consulted for information on Wyoming wildlife. The Clark and Dorn references have been replaced (where appropriate) with references to the Wyoming Game and Fish Department publication in Section 3.A.5 of the Final EIS and throughout the Final Aquatic Biology Technical Report (WCC 1981g) and the Final Threatened and Endangered Species Technical Report (WCC 1981f).

227. Comment (in reference to the Aquatic Biology Technical Report): "Pages 2-1, 2-2 and 2-3 display fisheries data but fail to present information available from our department." (Commenter 72.)

Response: Table 2 (page 2-3) of the Final Aquatic Biology Technical Report (WCC 1981g) has been revised to include fishes reported in the drainage by the Wyoming Game and Fish Department (Fleischer 1978). The text was expanded to include these new species.

228. Comment: "Page 3-60, Fish descriptions included several references but failed to include the Wyoming Game and Fish Department. Since this department is the fisheries management agency

for Wyoming, this oversight is significant. Fisheries data are inadequate without the display of information available from this source." (Commenter 72.)

Response: The description of the affected aquatic environment in Wyoming relied mainly on distribution data presented in Baxter and Simon's 1970 Wyoming Fishes published by the Wyoming Game and Fish Department (Bulletin No. 4). Subsequently, fisheries data on file in the Wyoming Game and Fish Department in Cheyenne was reviewed and compared with distribution data presented by Baxter and Simon (1970) and Wesche and Johnson (1980). The Wyoming Game and Fish Department does not typically collect fisheries data in intermittent waters in the state (Wyoming Game and Fish Department 1981) and consequently other sources, when they are stream specific (i.e., Wesche and Johnson 1980) are the only source of baseline data available. We do, however, recognize the Wyoming Game and Fish Department as the responsible fisheries management agency in the state. Where their data are available, the Final EIS (Section 3.A.5) references the Wyoming Game and Fish Department data. Similarly the department's data has been referenced in Sections 2.A.1, 2.A.2, and 2.A.3 of the Final Aquatic Biology Technical Report.

229. Comment: "Page 3-63, Col. 2, Para. 4. This statement characterizes the major Nebraska drainages as 'generally sluggish and silted in nature.' Most of Nebraska's major drainages are fairly swift-flowing, sand-bottomed streams. Only portions of a few drainages located primarily in the southeastern part of Nebraska could be characterized as sluggish and silted." (Commenter 140.)

Response: Section 3.A.5 of the Final EIS has been revised.

230. Comment: "Page 3-90, Col. 2, Para 2. The statement mentions the streams crossed by the Market Alternative that are considered important fisheries. However, the Illinois River and Barren Fork Creek contain aquatic resources of sufficient significance to warrant special mention. Both are high-quality streams which provide good fishing for smallmouth bass as well as a variety of other species. Also, the Neosho pearly mussel (Lamsilis refinesqueana) has been found in both streams. This mussel is very limited in occurrence and, although having no legal protection under the Endangered Species Act at this time, may be listed as proposed in the future." (Commenter 140.)

Response: A discussion of the Illinois River and Barren Fork Creek aquatic resources has been added to Section 3.B.5 of the Final EIS.

231. Comment: "Page 4-52, Para. 4 'The most available refuge for aquatic biota would be Angostura Reservoir, which would become severely overcrowded,' referring to the drying of the Cheyenne River. Delete this concern. The biota of the stream is distinct from the biota of the reservoir.

As the DEIS notes, no long-term biological damage would occur to life in the Cheyenne River system, because it has evolved to sustain aquatic life under extreme drought conditions." (Commenter 139.)

Response: The discrepancy identified in the comment has been corrected in Section 4.A.6 of the Final EIS.

232. Comment: "Page 4-58, Para 2. 'In wide rivers where construction would last for several weeks and would precisely coincide with initial migration periods, spawning could be limited to unaffected downstream areas.' Suggest deleting this concern. In no case would construction block the river flow, and migrating fish would not be deterred by construction activites. Paragraph starts out noting that spawning could be limited to unaffected downstream area and then proceeds to tell the reader this is an unlikely impact as migrating fish would use unaffected transect areas as migrating corridors." (Commenter 139.)

Response: Section 4.A.6 has been revised to clarify the discrepancy identified in the comment. Spawning could be affected where construction coincides with migration periods. However, construction schedules would ensure that construction would not coincide with critical fish migration or spawning activities.

233. Comment: "Page 4-75, Market Alternative. Impacts of this alternative on aquatic resources appear to have been omitted." (Commenter 140.)

Response: Because the impacts of the market alternative on aquatic resources would not be significantly different from those described for the proposed action, they were not restated. This was explained in the introductory paragraph of Section 4.B of the Draft EIS. Although the proposed action section on aquatic biology was specifically referred to (4.A.6), aquatic biology was inadvertently omitted from the list of resources that would not be discussed. This error has been corrected in Section 4.B of the Final EIS.

234. Comment (in reference to the Aquatic Biology Technical Report): "Possible flow reductions of 5 cfs in Sand Creek are related to this option. Sand Creek is the only Class I stream in northeastern Wyoming. Any proposal to dewater this stream should receive careful site-specific assessment to quantify and mitigate any habitat loss." (Commenter 72.)

Response: A 5 cfs reduction in flow in Sand Creek is only an 18% reduction. Data presented by Binns and Eiserman (1979) indicate that a decrease of that magnitude would not be anticipated to significantly affect trout productivity in Sand Creek.

235. Comment: "The South Dakota Department of Game, Fish and Parks is gravely concerned over the long term effects of this project on the streams in the Black Hills area. Water yield to the Black Hills streams is currently one of the major problems presently confronting fish man-

agement in the Black Hills. Low stream flows caused by withdrawals, pine forested interception, evapotranspiration and channelization has diminished the fishable waters from 1,004 miles in the early 1900's to less than 270 miles in 1964. Pumping the Madison formation to the extent planned under the proposed action would affect all the streams in the Black Hills and allow more rapid infiltration and reduced flows. This would be disastrous to marginal streams especially during the months of July through November.

Though we lack specific data to evaluate the potential effects, it is reasonable to suspect that during the dry months of the year all the streams in the southern and eastern Black Hills would be would be incapable of maintaining trout fisheries as they presently exist." (Commenter 138; also, 74, RC-3.)

Response: Based on subsequent meetings with the South Dakota Game, Fish and Parks, available data on impacts have been reassessed and Section 4.A.6 of the Final EIS has been revised.

236. Comment: "Additionally, it is quite possible that operation and production of Cleghorn Springs State Trout Hatchery, which is currently operating on minimum spring flows, would be seriously curtailed or put out of operation. Likewise, if Spearfish Creek flows are affected to the extent indicated in the DEIS, McHenry National Fish Hatchery located northwest of Spearfish could be seriously affected." (Commenter 138; also, 74.)

Response: Cleghorn Springs is roughly 40 miles east of the area that would be affected by the drawdown. Consequently, no impacts are anticipated for the Cleghorn Springs area.

The McNenny (incorrectly referred to in the comment as the McHenry) and Spearfish fish hatcheries, however, do lie within the affected area. According to the South Dakota Department of Game, Fish and Parks, the loss of 1 cfs of water at either of these hatcheries would cause significant long-term impacts, which would be indicated by reduced production from the hatcheries.

Section 4.A.6 of the Final EIS has been revised to reflect these impacts.

237. Comment: The DEIS states that there will be an increase in the duration of time the Cheyenne River will be dry from 14 to 33 days. The DEIS does not consider this significant but realistically and statistically it is and biologically it will certainly cause a decrease in species diversity. The DEIS also does not discuss the impact that a decrease in base flows will have upon other surface drainages in the Black Hills. The DEIS should identify the minimum flow requirements for these streams and provide South Dakota recourse to stop withdrawals should these drainages be jeopardized. The EIS fails to adequately cover the impact on the aquatic resources of the Black Hills. (Commenters 74, 140, 226.)

Response: Appropriate changes have been made in Section 4.A.6 of the Final EIS and in Section 3.A.2 of the Final Aquatic Biology Technical Report (WCC 1981g). Only streams with available fishery data could be assessed in detail.

Minimum flow recommendations have been included for streams for which recommendations have been made by the South Dakoka Department of Game, Fish and Parks. Minimum flow requirements are unknown for other streams that may be affected.

Mitigation of impacts is discussed in Section 6.E.14 in the response to Mitigation Comment 443.

238. Comment: "Page 4-14, Col. 2, and Page 4-17, Col. 1 refer to changes in groundwater discharge rates to streams and springs in the immediate area of ETSI well fields.

Suggest that discharge numbers include percentages to allow for an easier interpretation of Sec. 4.A.6. Converting to percentage figures allows the reader to understand the 'not significant in affecting the biology of Cascade Creek.'" (Commenter 139.)

Response: The conclusion of "no significant effect" has been changed to "significant impacts anticipated" after additional data from the South Dakota Department of Game Fish and Parks was received. The stream and spring flow reductions are presented as the amount that would be reduced rather than the percent reduction, because the total stream and spring flow varies throughout the year. Thus, the percent reduction due to ETSI's pumping would also change.

239. Comment: "The aquatic biology portions of the DEIS are inadequate for both the Niobrara and Crook County well fields. These portions do not make it clear that the decrease in stream flows will be cumulative for all watersheds in Western South Dakota. As an example, the DEIS states there will be a one (1) cfs decrease in the Cheyenne River, where as, in fact it will be a seven (7) cfs decrease (if not more) due to the cumulative decrease of Hot Springs and Cascade Springs." (Commenter 74.)

Response: Section 4.A.6 of the Final EIS has been revised to reflect cumulative impacts. However, the decrease of 7 cfs is not correct, because part of it occurs above Angostura Reservoir and part below. The reservoir would ameliorate any change in flow below the reservoir resulting from the small change above the reservoir.

240. Comment: "Crawford National Fish Hatchery, located in Crawford, Nebraska, is dependent upon ground water pumped from wells in Fort Robinson State Park in order to maintain their fish production operation. The hatchery currently operates on approximately 500 gallons of water per minute. This amount is considered to be the minimal level for maintaining a viable fish hatchery operation. Any reduction in ground water availability to the hatchery

could seriously jeopardize their operation. Also, the hatchery utilizes springs flowing into Soldier Creek to provide water to several trout-rearing ponds adjacent to the creek. Reductions in the spring flow into these rearing ponds could seriously impact their fish production capability.

Also, any reduction in ground water availability in the Fort Robinson area could affect the present water supply for the State Park. The Park is dependent upon wells to provide water for domestic use, recreation facilities that include a swimming pool, and put-and-take trout ponds in the Park." (Commenter 140.)

Response: The area around Crawford, Nebraska, is located at the extreme eastern edge of the 50-year drawdown area of the Madison Formation (Map 4-1). It is not anticipated that the 25-foot drawdown would cause a significant impact to water supplies to the fish hatchery or to Fort Robinson State Park; once pumping ceased, water levels would rapidly recover (Figure 4-1). Refer to Section 4.A.1 of the Draft EIS for the technical discussion of the drawdown and recovery rates.

241. Comment: "The DEIS concentrates on basin mainstems because flow duration data are, generally, only available for these mainstem stream sections, it assumes that tributary streams would be biologically altered to a greater extent than their mainstems. Thus Coxes Lake, Crow Creek, Redwater Creek and other waters of the northern hills are not mentioned or impacts to them addressed. The same can also be said for numerous small streams in the southern hills. We agree with the aforementioned assumption and feel the proposed plan would seriously impact the Black Hills fishery." (Commenter 138.)

Response: The comment is referring to page 4-51, column 2, paragraph 3, of the Draft EIS. The last sentence in the paragraph states that biological impacts to tributaries of mainstem streams would be greater than impacts to the mainstem. In the Final EIS, Section 4.A.6 has been modified to reflect that impacts to the Black Hills fishery from a 1 cfs surface water drawdown would be significant, particularly in tributary streams.

242. Comment: "The (Pulaski Co. Audubon Society) would like to see a better comparison of the proposed action and any alternatives concerning major environmental impacts. We believe several factors were not adequately evaluated, such as wetlands, water quality, floodplains, air quality, and terrestrial and stream ecosystems. Specifically, the wetland areas in Pope and Conway counties of Arkansas which the pipeline plans to cross were not even mentioned in the EIS." (Commenter 78.)

Response: The comparison of the proposed action and the alternatives (Chapter 2) has been revised in the Final EIS. However, this comparison deals only with significant impacts.

In the vicinity of milepost PMB-1010 the proposed action would likely traverse known wetlands habitat. According to Ken Smith, Arkansas Nature Conservancy (1980), this habitat has particular value to a variety of wildlife species. Chapter 3 (page 3-16) of the Terrestrial Biology Technical Report (WCC 1980e) stated that construction activity in this habitat could cause significant, long-term impacts. This area and potential impacts were added to Section 4.A.5 of the Final EIS. Other wetland habitats south of Little Rock do not lie in the proposed pipeline corridor.

243. Comment: "Impacts of proposed action on vegetation and aquatic biology. The entire discussion of the impact of pipeline construction on streams, rivers and wetlands should be expanded and the impacts quantified where possible. The impacts on these areas must be detailed in this decision document because the approval of 50 or more river crossings is one of the major federal actions under study in this EIS. If accurate quantification is not possible for parameters such as BOD and turbidity, then worst case analyses must be performed." (Commenter 46.)

Response: Basically, site-specific baseline water quality data do not exist at stream crossings that would be affected. However, since construction activities through stream crossings are short-lived, impacts that would result from a concommitent increase in TDS and BOD are short term; since recovery from the initial construction would be rapid (see Section 4.A.6, page 4-52, of the Draft EIS), no long-term or significant impacts are anticipated.

If the project were approved, ETSI would apply for Corps of Engineers permits for individual stream crossings. Since specific applications have not been made, exact crossing areas are unknown. These permits would not be granted unless the Corps was certain stream crossing impacts would be minimized (see Appendix D-7 of the Draft EIS).

The EIS is not a decision document. Refer to Section 6.E.16, EIS Regulations Comment 469 for further explanation of this point.

244. Comment (in reference to the Threatened and Endangered Species Technical Report): "Page A-3, Table A-1 includes four federally endangered species for Wyoming that have not been documented here. The Kendall Warm Spring dace is the only federally endangered fish species presently known to occur in Wyoming. Three state listed species are presented on page A-4. This listing is incorrect as Wyoming has no endangered species law." (Commenter 72.)

Response: Table A-1 in the final technical report has been revised.

245. Comment: "The list of 'Fishes Inhabiting the Ouachita River...' (Table 42, page 2-119, Aquatic Biology Technical Report) is a poor piece of work. Inclusion of fishes endemic to the upper Ouachita and Saline River drain-

ages is totally unnecessary in discussions pertaining to the fishes of the middle and lower Saline and the lower Ouachita River drainages. This list is faulty in a number of cases (e.g., the Etheostoma microperca record from the upper Saline River drainage has long been known by Arkansas ichthologists to be invalid). This list is chaotic. It is the only one not in phylogenetic or alphabetical order. It is repetitive (e.g., Campostoma anomalum is mentioned twice). The groupings are arbitrary and insignificant. The credibility of its authors is at question when the pigmy sunfish (Elassoma zonatum), a Centrachid which reaches a maximum of 2", is included in the section called 'Game Fishes'. Please discard this list and contact either Dr. Neil H. Douglas at Northeast Louisiana University (Monroe, Louisiana), or Dr. H.W. Robison at Southern Arkansas University (Magnolia, Arkansas) for more qualified assitance an accurate information." (Commenter 215.)

Response: As indicated in the Aquatic Biology Technical Report (WCC 1980g), the species list in question was taken verbatim from Exhibit 12 of the Special Report, Fish and Wildlife, Ouachita River Basin Study, Arkansas and Louisiana. Federal and state agencies responsible for that publication include the Forest Service, Soil Conservation Service, Arkansas Soil and Water Conservation Commission, Louisiana State Soil and Water Conservation Commission, and the Louisiana Office of Public Works. This report is dated July 1979. According to Dr. Tom Buchanan's Key to the Fishes of Arkansas (1973), there are six records of recent collections (1960-1972) of the least darter Etheostoma microperca in the upper Saline River drainage (see Map No. 71 of Buchanan's key). No published data (to the best of our knowledge) exists to verify the claim that the list is invalid. The pygmy sunfish was listed in the aquatic biology technical report as a game fish, because it appeared that way in the Ouachita Basin report referenced above. It is not typical practice to edit drainage species lists reported in the literature. However, after conversations with the commenter, we have relisted Table 43 in phylogenetic order to alleviate confusion and have also removed the game fish classification.

246. Comment: "Pages 1-48, and 4-18 indicate there would be no release of the coal cleaning scrub water or scrubbed substances from the cleaning operation. Page 4-94 sec. 4.E.2 indicates there would be degradation to the stream invertebrates due to release of 200 tons/year of scrub water substances. This requires further study and explanation." (Commenter 231.)

Response: According to project description information (pages 1-48 and 4-18) of the Draft EIS, no releases of coal cleaning scrub water or scrubbed substances would occur. The 200 tons/year figure refers to fugitive dust releases, not coal cleaning scrub water substances. This error in Draft EIS Section 4.E.2 has been corrected in the Final EIS.

247\. Comment (in reference to the Aquatic Biology Technical Report): "Release of water from Keyhole is suggested to compensate for a 2 cfs decrease in flows downstream. The EIS states that apparently additional 2 cfs releases would not significantly affect the reservoir fisheries. Data on inflow and outflow quantities are needed to verify this statement before it can be accepted." (Commenter 72.)

Response: The discussion about use of Keyhole Reservoir to mitigate the 2 cfs flow reduction in the Belle Fourche River has been deleted from the Final Aquatic Biology Technical Report and Section 4.A.6 of the Final EIS.

6.E.6 CULTURAL RESOURCES AND PALEONTOLOGY

248\. Comment: "The report is somewhat weak as to where these resources occur. Archaeological sites are not randomly or evenly distributed in space, so the sites per square mile figure is misleading. Oklahoma Department of Transportation linear transect surveys (such as the pipeline survey would be) indicate that many more sites are likely to be found in Muskogee, Sequoyah, and Adair Counties than in Grant, Kay, or Noble Counties. This type of information would seem to be valuable in scheduling of cultural resource surveys so that construction would not be held up or controversies arise.

A second weakness is in procedures for archaeological materials uncovered during pipeline construction after the cultural resource survey. Are these to be ignored or will BLM hire the necessary archaeologists to monitor construction? Perhaps a training program in recognition of archaeological materials for contractors or BLM personnel would be valuable here." (Commenter 45.)

Response: Distribution of sites by county was not discussed in the EIS. More detailed information than was presented in the Draft EIS was included in the Cultural Resources Technical Report (WCC 1980h). All known sites within a 10-mile study area of the proposed and alternative pipeline routes were identified in this report. This data will be used to design and schedule field surveys if the project is approved.

A Programmatic Memorandum of Agreement (PMOA) has been signed by the U.S. Forest Service and the Bureau of Land Management. It was included as Appendix D-3 of the Draft EIS. Stipulation 13 provides that all project employees are to be briefed on cultural property concerns and that a qualified archaeologist will monitor areas of surface disturbance.

Stipulation 14 provides for pipeline salvage plans covering all potential emergency situations to be prepared by BLM in consultation with the State Historic Preservation Officers and the Advisory Council on Historic Preservation. Consequently, all cultural resources discovered during construction would be evaluated and afforded consideration in accordance with the PMOA.

249. Comment (in reference to Appendix D-3, page D-7 of the Draft EIS): "Issue is taken with the wording of this stipulation, i.e., 'The opinion of the landowner will be submitted if immediately available'. I believe the landowner should have the opportunity to comment especially given the extended time frame of this project." (Commenter 216.)

Response: As the Programmatic Memorandum of Agreement (PMOA) has been signed by the U.S. Forest Service and Bureau of Land Management, it is inappropriate to change the actual wording. However, in accordance with the PMOA, the landowner's opinion would be sought on properties being evaluated for National Register eligibility. Determinations of eligibility may be made without the landowner's opinion if it is not received in a timely manner. In all cases where a property is nominated to the National Register, the landowner's opinion would be considered as required by the Code of Federal Regulations (36 CFR 1202).

250. Comment: "The staff of this organization has reviewed the subject EIS. Our major finding was a lack of reference to paleontological sites in the path of the pipeline. It is our feeling that there is a potential that the path will disrupt such sites in Nebraska. We recommend that BLM contact Dr. Allen D. Griesmer, 213A Morrill Hall, University of Nebraska-Lincoln, Lincoln, NE 68588 in this regard." (Commenter 44.)

Response: The inventory of the paleontogical resources that may be traversed by the proposed pipeline in Nebraska, which was provided by the commenter, has been included as an appendix to the Final Cultural Resources Technical Report (WCC 1981h). Paleontological resources also have been mentioned in the Final EIS, Sections 3.A.6 and 4.A.7.

251. Comment: "Appendix D-3 should be expanded to include paleontological investigations. Perhaps this could be done along the lines of the law which requires cooperation between Nebraska Department of Roads and state agencies (Neb. RRS 39-1363) as attached. There are also federal laws that address this area." (Commenter 44.)

Response: It is not necessary to include paleontological investigations in Appendix D-3. Any paleontological resources that are discovered in association with cultural affiliations will be recorded and and evaluated in accordance with the procedures outlined in the Programmatic Memorandum of Agreement.

252. Comment: "On page 5-16 it should be pointed out that with proper salvage agreements, as previously recommended in this memo, the destruction of paleontological resources would not have to be irreversible." (Commenter 44.)

Response: The applicant cannot be required to enter into salvage agreements for all paleontological resources; therefore, the statement regarding commitment of resources was not changed in the Final EIS.

253. Comment: "Finally the line may disturb fossil sites in the (Pawnee Buttes) area. While those fossil sites are located on private land, consideration should be given to avoiding those areas in the event of a major archaeological resource being lost or damaged." (Commenter 219.)

Response: As stated in Section 4.A.7, page 4-58, of the Draft EIS, avoidance is the preferred means of mitigation of possible impacts from the proposed pipeline. Avoidance or other site mitigation would be accomplished in accordance with the Programmatic Memorandum of Agreement, included as Appendix D-3 of the Draft EIS.

6.E.7 AGRICULTURE

254. Comment: "In addition, the EIS limits its comments on agricultural impact to the loss of farm land. However, one of the most serious impacts will of course be the actual loss of water for agricultural purposes since large volumes of water from the Madison, Minnelusa, Sundance, and Inyan Kara aquifers supply stock and domestic water for agriculture. Loss of water for irrigation must also be addressed since the EIS estimates that the anticipated loss of flow at Cascade Springs will be 4 cfs. This amounts to 3,000 acre-feet per year and since the flow of Cascade Springs is already appropriated for irrigation, this additional loss of 3,000 acre-feet for irrigation use is significant. This is enough water to irrigate 1,000 acres of irrigated cropland from this one spring alone, the total loss of potential irrigated cropland from all wells and springs is substantially greater. These impacts were not discussed in the EIS." (Commenter ED-8; also, ED-4, ED-10, ED-15, NE-8, 138.)

Response: The 4 cfs volume of water is equal to approximately 2,896 acre-feet of water for irrigation. The acreage of cropland irrigated by this volume of water is dependent on factors that are highly variable, such as soil type, type of crop relating to consumptive water use, climatic conditions, and type of irrigation system and its efficiency.

Section 4.A.8 of the Final EIS has been revised to include agricultural concerns related to potential water loss effects on livestock water and irrigated cropland.

255. Comment: "The Wyoming Department of Agriculture takes strong exception to the statement on page 4-61 in the EIS, which states that 'the impact of crop production loss would be relatively minor from a regional standpoint, since it would be spread over 6 states.' It is this line of thinking that is contributing to the loss of three million acres of agricultural land in the United States annually. Decision makers have got to understand and mitigate the cumulative effect that eventually results when agricultural land use is altered." (Commenter 72.)

Response: It is recognized that cumulative effects of projects can result in significant cropland conversion trends and contribute to large cropland losses. Recent land-use studies indicate the largest cropland conversions are mainly associated with and occur in areas surrounding urban development and commercial projects.

Cropland and prime agricultural land were recognized (in Sections 4.A.8; 4.C.4, 4.D.7, 4.F.5, and 4.G.5 of the Draft EIS), and impact assessments made are commensurate with total project effects to cropland conversion, providing decision makers with sufficient information.

256. Comment: The EIS should state what impacts could occur in constructing the pipeline across irrigation ditches and the possible interference with headgate structures. What type of arrangements would be made when irrigation easements are involved? (Commenters 89, KS2.)

Response: Refer to Appendix C-1 in the Draft EIS. Pipeline construction across irrigation canals, ditches, and irrigation water control structures is addressed in the Erosion Control and Revegetation section, under the heading Backfilling and Cleanup: "All structures such as terraces, levees, underground drainage systems, irrigation pipeline and canals would be restored to preconstruction conditions, so that they would function as originally intended." Specific pipeline depths and construction techniques to avoid or mitigate impacts to irrigated cropland would be determined during easement negotiations between ETSI and the landowner, irrigation company, and/or irrigation district officials. Therefore, no significant impacts are expected.

257. Comment: "The estimated drawdown in the Madison formation in Wyoming will have a significant effect on the farmers and ranchers that use groundwater for domestic and irrigation use. The increased cost, energy requirements, and associated economic and social effects of pumping the water from increased depths are not adequately addressed in the EIS. It is possible that some farmers and ranchers may be driven out of business by such increased costs." (Commenter 83.)

Response: The Third Party Beneficiary Agreement between the Office of the Wyoming State Engineer and ETSI (see Appendix C-3, p. C-11 to C-22 of the Draft EIS) states that ETSI shall pay any and all costs of deepening wells and lowering pumps or provide the same quantity of water to the existing users prior to ETSI's interference. Based on this agreement, all existing Wyoming users of Madison water would be assured of future comparable quantities of water at no additional cost.

258. Comment: "Not mentioned in the EIS is that Cascade Springs is a major contributor to the flow of the Cheyenne river just above Angostura Dam. Therefore, the cfs reduction in flow of the Cheyenne River coupled with the 4 cfs reduction in flow of Cascade results in a loss of 3,620 acre-

feet, which feet per year inflow into the Angostura Reservoir. This Reservoir is the sole source of water for the Angostura Irrigation District, as well as a significant recreational facility. The mean discharge downstream of Angostura Dam on the Cheyenne River is about 1.2 cfs annually. This is also taken from the USGS water data record report of SD-77-1, or basically a net loss of the inflow versus outflow of 3.8 cfs. This would be an annual loss to Angostura Reservoir of about 2,750 acre-feet of water which would not be available for irrigation. This I consider a significant agricultural, as well as an economic impact, that's not addressed in the EIS statement and should be looked further into in the review process." (Commenter ED-15.)

Response: The average discharge of the Cheyenne River at Edgemont, South Dakota, has been 103 cfs (USGS Water Data Report, SD 79-1) over the last 37 years of record. Before the Cheyenne River flows into Angostura Reservoir, it receives additional inflow from Hat Creek, Plum Creek, Red Canyon Creek, and Cascade Springs Creek. Therefore, the average inflow to Angostura Reservoir from the Cheyenne River is at least 103 cfs. The worst-case estimates of a 1 cfs reduction of flow in the Cheyenne River (upstream of the inflow from Cascade Springs Creek) and a 4 cfs reduction in the flow of Cascade Springs Creek due to project operation amounts to a 5cfs reduction of inflow to Angostura Reservoir from the Cheyenne River. A 5 cfs reduction in Cheyenne River inflow to Angostura Reservoir amounts to an inflow reduction of less than 5 percent.

The average discharge of the Cheyenne River below Angostura Dam is 78.5 cfs (USGS Water Data Report, SD-79-1) over 33 years of record, not 1.2 cfs. Additionally, the average flow of the Cheyenne River downstream at Buffalo Gap, South Dakota, has been 110 cfs (USGS Water Data Report, SD-79-1) over 11 years of record.

This data indicates that the effects of project operation on outflow from Angostura Reservoir would be relatively minor and impacts to agriculture and economics to the Angostura Irrigation District would not be significant.

6.E.8 AIR QUALITY AND NOISE

Comments and responses related to air quality are listed first, and those related to noise follow.

Air Quality

259. Comment: "There are two obvious weaknesses. The first one is a lack of information on any air pollution potential; especially at the slurry dewatering stations. This could be a non-problem, but for those of us who do not know how such a plant operates, it would be beneficial to include a short description of the process." (Commenter LA-1.)

Response: The air pollution potential of the slurry dewatering plants was addressed in

Appendix G-6, pages G-17 through G-19 of the Draft EIS. The operation tion of the dewatering plants was described in Section 1.G.4 of the Project Description Technical Report (WCC 1980a). The air pollution potential of the dewatering plants was not mentioned in the text of the Draft EIS, because no significant impacts were found.

260. Comment: "Page 1-15, col. 1, par. 1, does not include emission quantities for the 22.4-MMTA plant. The emission quantities which are listed in this paragraph exceed permitted levels. An explanation is warranted." (Commenter 231.

Response: Controlled particulate emissions from the proposed 22.4 MMTA coal preparation plant are estimated to be about 362 tons per year. (This point has clarified in the Final EIS, Section 1.F.2, Coal Slurry Preparation Plants.) Sulfur dioxide and nitrogen dioxide emissions would be about 138 and 70 tons per year, respectively.

Prevention of Significant Deterioration (PSD) permit applications have been filed with EPA Region 8 and the state of Wyoming for the 5 and 10 MMTA coal preparation plants. If the project is approved, a modification to the PSD permit will be required for the 22.4 MMTA plant.

261. Comment: "In Appendix G-6 entitled "Air Quality Impacts of Operation of a Coal Fired Boiler at the Cypress Bend Dewatering facility", it is implied that a Prevention of Significant (PSD) permit application has been submitted for the coal slurry preparation plant in Cypress Bend, Arkansas. Contrary to the statement in this section, no PSD application has been received in EPA Region 6 for this facility. If this alternative is chosen as the actual method to be used, PSD would apply to the Cypress Bend Dewatering Facility due to boiler emissions from the burning of 300,000 tons/year of coal." (Commenter 226.)

Response: No slurry preparation plant is intended for Cypress Bend, Arkansas. However, a slurry dewatering plant would be necessary at this location. The reference in Appendix G-6 refers to the applicant's data for the coal slurry plant as a means of estimating air quality impacts at the Cypress Bend plant. If this alternative were approved, ETSI would submit appropriate applications to the EPA.

Noise

262. Comment: "Noise levels generated by the proposed action and alternatives have not been covered sufficiently." (Commenter 231.)

Response: Noise emissions may arise from crushing and grinding operations at the coal preparation plant. Noise level estimates in coal preparation plants have been added to Section 1.G.1 of the Final Project Description Technical Report (WCC 1981a).

Operational noise from the coal slurry pipeline is negligible. However, pump stations along the route will generate noise, and noise level estimates for pump

FIGURE 6-3

CALCULATION OF NOISE LEVEL REDUCTION

Noise levels are reduced by 3 to 6 dB for each doubling of distance away from the source. Using a conservative 4dB reduction per doubling distance, this premise can be stated as an equation:

$$N_D = N_{50} - \left(\frac{4\text{dB} \times \log_{10} (D/50 \text{ ft})}{\log_{10} 2} \right)$$

where N_D and N_{50} are expressed in decibels and D is distance expressed feet. N represents the noise level at the distance D from the noise source. Solving for D allows one to calculate the distance at which the sound level drops to a given value.

$$D = \text{antilog} - \left(\frac{N_D - N_{50}}{13.29} \right) + 1.70$$

Since the noise levels are expressed in decibels (which are logarithmic functions of sound-level power), it is not possible to add the numbers directly. The procedure for adding these levels is essentially to convert the decibels to power equivalents, add these numbers directly to obtain a sum, and convert this sum back to the corresponding decibels.

stations have been added to Section 1.G.3 of the Final Project Description Technical Report (WCC 1981a).

Noise levels associated with operation of the coal unit trains were discussed in Section 4.I.3 of the Draft EIS.

263. Comment: "The draft EIS needs to be strengthened in the discussion of associated noise impacts. The analysis presented on pages 3-127, 4-104, and 4-119 is too general to provide for adequate evaluation of the significance of the impacts discussed. The noise analysis on page 4-119 explains that unit trains used as an alternative would be expected to cause significant noise impact; however, the number of people affected would be dependent upon the population distribution along the rail route. This is not a sufficient basis for evaluating the noise impacts. Rather, the final EIS should provide noise contours along both the proposed and alternative slurry pipeline or rail routes depicting the anticipated noise levels and the receptors to be affected. Also, any mitigation measures needed to control noise levels within acceptable limits should be addressed in the final EIS." (Commenter 226.)

Response: Noise sources associated with the proposed action would include the coal preparation plants and the pipeline pump stations. Operational noise from the pipeline itself would be negligible. Unit train operations (no-action alternative) would also be a source of noise. Noise impacts were deemed significant if receptors would be exposed to levels in excess of 55 decibels, A-scale (dBA). The methodology used to calculate noise level increases and results of the analyses are presented below.

Noise can be defined as disturbing, harmful, or unwanted sound. Since this definition is very subjective, the Environmental Protection Agency (EPA 1974b) has published guidelines for noise levels that are considered to be noninjurious to public health and welfare. The level that causes interference and annoyance during outdoor activity is 55 dBA.

A decibel (dB) is a unit of measure of sound pressure. The A weighted sound pressure scale (dBA) gives more weight to sound frequencies to which the human ear is more sensitive. The scale is logarithmic, so the apparent loudness doubles with each 10 dB increment in sound level.

Noise levels are reduced by 3 to 6 dB for each doubling of distance away from the source. This premise can be stated as an equation as shown in Figure 6-7.

Noise levels expected to be generated by various components of the proposed action and alternatives have been discussed in the responses to Noise Comments 262 and 263. Using these levels and the above methodology, the distance to where the noise impacts (including background noise) would become insignificant was calculated. An existing background noise level of 40 dBA was assumed.

Noise impacts from the coal preparation plants are expected to become insignificant beyond about 870 feet. This assumes no attenuation by terrain and vegetation. Significant terrain features could produce an attenuation of about 25 dBA. Because of the rural nature of the plant locations, no significant impacts to ambient noise levels are expected.

Noise impacts from the pipeline pump stations would be expected to become insignificant beyond about 92 feet. Again, no terrain or vegetation attenuation was assumed.

Based on estimate of current rail activity (DOT 1980b), the distance to the 55 dBA contour is expected to range from about 400 to 800 feet. The increases in rail traffic under the no-action alternative would extend this distance to about 1000 to 1500 feet. This assumes no attenuation by terrain or buildings, which would decrease the distance. At these distances, substantial portions of small towns along the rail route would be significantly impacted.

Thus, the 55 dBA noise contour would extend about 1500 feet on each side of the rail route. Receptors within this area would be significantly impacted. The exact number and type of these receptors is unknown. Currently there are no EPA-required mitigation measures for train noise other than compliance with federal regulations.

The proposed and alternative pipeline routes would not be significant noise sources during operation. Thus, no noise contours were generated.

6.E.9 RECREATION RESOURCES, TRANSPORTATION NETWORKS, AND VISUAL RESOURCES

Comments and responses related to recreation resources concerns are listed first, followed by those related to transportation networks, and, then, visual resources.

Recreation Resources

264. Comment: "We are especially concerned with possible reduced flows in the Niobrara River as it is a candidate for inclusion in the National Wild, Scenic and Recreation River System. Also, three segments of the Niobrara are listed in the Heritage Conservation and Recreation Service's draft 'Nationwide Rivers Inventory,' and the Niobrara is among the 47 rivers listed in the so called '5-D' Report, requiring special consideration by Federal agencies. The implications of these designations and the impact of the pipeline project should be specifically presented in the final EIS." (Commenter 226.)

Response: Base flow to the Niobrara River derives from rocks hydrologically isolated from the effects of pumping from the Madison aquifer system at the Niobrara well field. Thus, no reduction of flow is predicted to occur in the Niobrara River.

265. Comment: "The States of Arkansas and Oklahoma are in the process of establishing and maintaining natural heritage programs that systematically locate and describe the state's significant natural features. The programs are designed to gather information on important plant and animal communities, land forms, and geologic features, which are helpful in planning for development and conservation. The environmental statement does not mention whether any features in these state systems have been impacted.... Coordination efforts with (Arkansas and Oklahoma State Heritage Program contacts) related to possible impacts should be indicated in the final statement." (Commenter 4.)

Response: The EIS focuses on significant impacts; those features in Arkansas and Oklahoma that would be impacted are discussed in various sections of Chapter 4 of the Draft EIS. Throughout the preparation of the Draft EIS, we have coordinated and received data and input on impacts from the Arkansas Natural Heritage Commission, Arkansas Natural Areas Plan, Arkansas Natural and Scenic Rivers Commission regarding recreation resource concerns as incorporated in the Draft EIS.

In addition, the Draft EIS was formally reviewed by the Arkansas and Oklahoma state governments through the state clearinghouse system. All concerns raised in the official state comments have been responded to in the Final EIS.

266. Comment: For the states where the NRI list has been finalized, the list is markedly different from the draft list on which information in the environmental statement is based; therefore, there are errors in some text and table references to specific Inventory components. The Proposed Action alignment would not cross any Nationwide Rivers Inventory (NRI) streams in those states where the NRI list has been finalized. Other project alternatives, however, would cross the following Inventory streams:

Cheyenne River, - South Dakota crossed by the Oahe Alternative Water Supply System at approximately mile 0-103

Arikaree River, - Colorado crossed by the Colorado Alternative at approximately mile C-348

Saline River, Kansas - crossed by the Market Alternative at mile MB-127

Grouse Creek, Kansas - crossed by the Market Alternative at mile MB-291

Caney River, Kansas - crossed by the Market Alternative at mile MB 308. The Caney River at MB-354, 373 is in Oklahoma. (Commenters 4, 36.)

Response: In the Final EIS, Table 3-26, Table 3-34, and Sections 3.A.9, 4.A.10 (proposed action); 3.B.8, 4.B.3 (market alternative); 3.D.8 (Colorado alternative); and 3.H.1 (Oahe alternative) have been revised to reflect the information included in the final list of inventoried rivers of the Nationwide Rivers Inventory, Phase I, published on February 20, 1981.

A further check of the route maps shows the market alternative crosses the Saline River at milepost MB-125 rather than MB-127 as mentioned in the comment.

267. Comment: "References to the NRI in the text are somewhat inconsistent and sometimes misleading. For instance, it is stated on p. 3-106 that HCRS has 'inventoried the Arikaree River for consideration . . . as a possible National Wild and Scenic River.' It is also stated that the Cheyenne river has been 'inventoried . . . for national protection' (p. 3-117) and been 'identified for study by the Heritage Conservation and Recreation Service' (p. 4-106, 4-107). It should be made clear that rivers included in the Inventory possess values that have been identified as being nationally significant, and they may be eligible for inclusion in the National System. These rivers are not afforded protected status nor are they now being studied for inclusion in the national Wild and Scenic Rivers System." (Commenter 4.)

Response: In the Final EIS, references to the Nationwide Rivers Inventory, Phase I, and its implications to the National Wild and Scenic Rivers System have been revised in Sections 3.A.9, 4.A.10 (proposed action); 3.B.8, 4.B.3 (market alternative); 3.D.8, 4.D.8 (Colorado alternative); and 3.H.1, 4.H.1 (Oahe alternative).

268. Comment: "A possible indirect adverse effect of the project on Nationwide Inventory rivers could result from the annual 20,500 acre-foot requirement for water to operate the system. The deep wells of the Niobrara County field, or the alternative Crook County field, would have an effect on surface water, estimated at from 1 to 4 c.f.s. by the end of the project period, at points on the Little Missouri, Cheyenne, and Belle Fourche Rivers. Though these points are well upstream from segments of the rivers identified in the NRI, it should be determined whether such deficits would significantly affect downstream flow in the Inventory streams." (Commenter 4.)

Response: Surface flow would not be noticeably affected on the Little Missouri, Cheyenne, and Belle Fourche rivers at the stream segments identified in the National Rivers Inventory as a result of streamflow reductions shown on Table 4-3 of the Draft EIS.

269. Comment: "Number one, as to the location through A 39 of the map section, the alternate route that would pass through the proposed study area that the National Parks Service has done in Osage County, Oklahoma, and the southern portion near Cedarvale. I am wondering why that was not included in the statement on wilderness areas and the fact they are not going to be impacted." (Commenter KS-4.)

Response: The Wilderness Act of 1964 provides for the review and evaluation for possible wilderness consideration of existing units under the National Park System. The proposed Tallgrass Prairie National Park has yet to be designated by Congress as a unit under the National Park System. Therefore, no wilderness consideration by Congress can be given to the "proposed" Tallgrass Prairie National Park. Beyond this, the market alternative pipeline route would pass northeast of the proposed Osage Unit (one of three proposed units to comprise the proposed National Park area) and would not have any significant impacts on recreation resources on this proposed unit.

270. Comment: "In addition, the Illinois River and Barren Fork Creek have not been included in Table 3-26 under Scenic and Recreational Waterways Crossed (both of which are State Scenic Streams in Oklahoma and both of which would be crossed by the proposed alternative route)." (Commenter 113.)

Response: Table 3-26 of the Draft EIS identified scenic and recreational waterways that would be crossed by the proposed action. Both the Illinois River and Barren Fork Creek would be crossed by the market alternative pipeline route at mileposts MB-437 and 440, respectively, not the proposed route. Both rivers are listed on Table 3-34 of the Draft EIS, which lists the scenic and recreational waterways that would be crossed by the market alternative.

271. Comment: "Page 7, Para. 3 and Page 4-63, Para. 8 'Of particular concern for the proposed action would be temporary construction-related impacts due to crossing the proposed Walnut Creek Recreation Area in Kansas.' And Page 4-63, Para. 8, 'The slurry pipeline would traverse the proposed Walnut Creek Recreation Area... resulting in disruption to recreation use and the quality of user experience.' The ETSI pipeline will avoid this relatively small area. Delete this concern." (Commenter 139.)

Response: Based on a letter from ETSI stating that the pipeline would avoid the proposed Walnut Creek Recreation Area (see Appendix C-12), Table 3-25 and Section 4.A.10 of the Final EIS have been revised.

272. Comment: Page 7, Para. 7 and Page 4-63, Para. 3 both state that project-related newcomers to the Gillette, Wyoming, area would cause an increase in local hunting activity. Wyoming law requires a greatly increased hunting license fee for non-residents and a specific time period during which an application must be submitted. The attached table describes license fees and application deadlines. Residency takes one year to establish. Because non-residents are not usually hunters, because their license cost would be higher, and because few construction workers will be present during the midwinter period when applications are due, it is projected few of them will interfere with Wyoming hunting. In addition, union leaders have provided data that leads to the expectation that the only in-migrant workers for the construction project will be 137 welders, who are expected to stay in Wyoming only briefly. Therefore, if there were any increase in hunting, it would be only minor. (Commenter 139.)

Response: Based on a review of the Wyoming regulations governing hunting licenses, it was determined that an increase in hunting would not be a major consequence of the proposed action, although some increase could be expected, possibly impairing the quality of the recreation experience. In the Final EIS, the Summary and Section 4.A.10 have been revised to reflect this.

273. Comment: "We do not subscribe to the statement on pp. 4-106 and 4-107 referencing the Oahe Alternative Water Supply System: 'The crossing of the Cheyenne River (identified for study by the Heritage Conservation and Recreation Service) would not have impacts because human access is not accommodated at that point.' There would certainly be impacts, but we do not believe the crossing will have lasting adverse effects." (Commenter 4.)

Response: This sentence has been revised in the Final EIS, Section 4.H.1.

Transportation Networks

274. Comment: "The effect on existing transportation systems, especially highways, in transporting materials should be discussed in greater detail in the Final EIS." (Commenter 211.)

Response: Effects on highways, railroads, and river traffic were studied as part of the EIS impact analysis, but in all cases traffic disruption would be short-term and minor. The significance criteria that was used in analyzing impacts to highways and railroads was explained in Section 4.A.11 of the Draft EIS. All impacts of note that were identified in the analysis were Transportation Network sections included in Chapter 4.

No impacts on river traffic were discussed in the Draft EIS, because the additional tow traffic on the Mississippi River due to the Cypress Bend pipeline-barge alternative would be insignificant. As stated on page 1-17 of a 1977 report issued by Rieber and Soo, "The open channel of the Lower Mississippi River is capable of handling an unlimited capacity and should be able to accommodate coal traffic of 70 to 75 million tons with ease." Under the Cypress Bend alternative, an average of two tows would leave the barge loading facility daily; a total of 18.6 million tons would be towed annually.

275. Comment: "It is rather difficult to accept as truth a document which also has one glaring error, at least; namely, that there has been no problem with degradation on Highway 59 because of movement of heavy equipment. We have traveled that highway a lot and there's been a lot of degradation, and I'm sure it's from heavy equipment. No little car would do it." (Commenter WY-2.)

Response: The movement of heavy equipment along Highway 59 (Douglas Highway) in the vicinity of Gillette, Wyoming, has contributed to surface degradation. An appropriate change has been incorporated in Section 3.A.10 of the Final EIS.

276. Comment: "The EIS states on pages 7 and 3-81 that the proposed pipeline construction across highways would have no significant impact on them. No reference is made about contacting State, County and Township officials for permits to cross these highway rights-of-way. In each case, permits may require specific types of construction. The respective policies regarding accomodation of utilities should also be recognized. Therefore, even though the impact may be minimal, we believe the EIS should acknowledge the need for permits and identify that such coordination will be accomplished." (Commenter 211.)

Response: The Final EIS has been revised to include both federal highway crossing permits issued by the Federal Highway Administration (FHWA) and state highway crossing permits issued by the affected states. These permit actions appear in Section 1.F.4 and Appendix D-1 of the Final EIS.

Visual Resources

277. Comment: "A proposed electric transmission line will cross to the north of the Pawnee Buttes area and there will also be microwave towers in the vicinity of the Buttes. The impacts of this transmission line to the visual resources of the Pawnee Buttes area will be tremendous. An electric transmission line already exists in the area which may have a potential for utilization by this proposed pipeline. Additional overhead transmission lines will significantly impair the aesthetics of the Pawnee Buttes area." (Commenter 219.)

Response: A discussion of the visual resources of the Pawnee Buttes area has been added to Section 3.D.9 and 4.D.9 of the Final EIS.

278. Comment: "In the discussion of visual resources, the scenic overlook along the highway in Russellville, Arkansas, should be mentioned and coordination obtained with the Arkansas State highway agency." (Commenter 211.)

Response: Mr. Kinslow of the Russellville District Headquarters of the Arkansas State Highway and Transportation Department was contacted concerning a scenic overlook along the highway in Russellville. Two overlooks occur within the area. One overlook was reported to be 15 miles north of the town of Dover, which would make it over 17 miles from the proposed pipeline route. The second overlook is located along Interstate 40 west of Russellville, overlooking the Arkansas River Valley to the south and approximately five miles south of the proposed right-of-way. No significant visual impacts are anticipated because of the tree-covered, rolling hills that would break up any line-of-sight view of the project.

6.E.10 ENERGY EFFICIENCY

279. Comment: "Energy Efficiency (p. 2-1, Sec. 2.A and Appendix E). There is some confusion and controversy surrounding the energy efficiency of coal slurry lines. The calculations presented here seem straight forward and reasonable, but they do little to resolve questions that have been raised in previous studies. We

suggest that these sections in the DEIS be rewritten to respond directly to all available information on slurry line efficiency.

Specifically, we would direct you to a 1978 EPA study which stated that the Black Mesa pipeline system encounters total energy losses equivalent to 25.6% of the Btu content of transported coal (U.S. Environmental Protection Agency. 1978. "Environmental Assessment of Coal Transportation." Interagency Energy/-Environment R&D Program Report. EPA-600/7-78-081. National Technical Information Service. Springfield, VA. 141p.). You might also review a study by the Upper Midwest Council (cited in the above EPA report) which calculated a total energy cost of 15.3% of coal energy content for a hypothetical 700 mile pipeline transporting 12 million tons of Sarpy Creek coal per year.

While we are not experts in this field, we would like to suggest a possible line of inquiry concerning energy efficiency reports. Some of the confusion surrounding slurry line efficiency seems to stem from assumptions about the role played by coal fines. These fines result from the grinding process and from comminution in the pipeline. They comprise 16-20% of the coal shipped in the Black Mesa line and might account for an even higher percentage of ETSI coal because of the grinding characteristics of Powder River Basin coal. Some energy efficiency studies, such as yours, appear to proceed on the assumption that these fines can be recovered and combusted as efficiently as larger coal particles. Other studies assume that the fines fraction is extremely difficult to de-water, and has less efficient combustion characteristics than other slurry pipelines. We urge you to pursue these questions vigorously, and to present a more complete discussion of dewaterinig and combustion efficiency in the Final EIS." (Commenter 46; also, 141, OK-1, WY-4.)

Response: The 1978 EPA study referred to states that the Black Mesa Pipeline system encounters total energy losses equivalent to 25.6 percent of the Btu content of the transported coal. (See "Environmental Assessment of Coal Transportation", EPA/600/-778081, p. 53.) Of this 25.6%, 22.7% is stated to be due to "coal quality loss (due to 29% combined moisture content of coal cake and underflow)." These figures are not correct. A logic error was made in the calculations. An inconsistent basis of one pound of any moisture content coal either as-mined or dewatered, fed to the boiler was used. The author reasoned that the extra water entering the boiler was not coal, and, hence, multiplied the extra water content by the coal heating value and considered this a debit to the energy efficiency, along with the heat required to vaporize the additional water. The error in logic is that it is only additional water entering the boiler, not a lack of coal. The fact is that the same amount of as-mined coal (or bone-dry coal) enters the boiler in both the rail and pipeline delivery cases (with additional water in the case of dewatered pipeline coal), and the only penalty to pay is evaporation of the excess water. Therefore, on a consistent basis of one pound of as-mined coal entering the boiler, the correct calculation is as follows: Assuming 29% total moisture, a 72°F entering temperature and 280°F stack gas exit temperature, the difference in energy required to heat and vaporize 29% moisture pipeline coal versus 10.74% moisture "as-mined" coal may be calculated using the same methodology as shown in Appendix E of the Draft EIS in the Boiler Moisture Feed Correction section, p. E-16. Refer to Figure 6-4 for this calculation.

As shown in Figure 6-4, the net heating and vaporization energy loss would be 2.65%, not 22.7% as noted in the EPA study. This would bring the total percent energy loss figure to 5.55%, not 25.6%. This 2.65% value for coal quality loss correlates quite closely with calculations done by William F. Banks for the U.S. Department of Energy (Bank 1977; p. 6-4). Banks states that the net additional energy required to heat and vaporize the Black Mesa coal at Mohave is 710,153 Btu/ton or 355 Btu/lb of 10.74%-moisture coal. His result is slightly higher than shown above, since he used 70°F, rather than 72°F, as the entering temperature, and he used 32% moisture, rather than the 29% moisture used in the EPA study. His 355 Btu/lb is equivalent to a 3.2% loss. Banks' overall energy consumption figure (unadjusted) of 1,292,0000 Btu/ton, or 646 Btu/lb, equates to a 5.9% loss.

Net percentage losses for heating and evaporation of excess water in the ETSI pipeline would be less than Black Mesa, because the moisture content of rail-delivered coal of 29.49% is quite close to the 32.73% projected moisture content of pipeline-delivered coal. Appendix E, page 17, of the Draft EIS shows a boiler feed moisture correction of 109,175 Btu/ton. Using a heating value of 16.7 x 10^6 Btu/ton at 29.49% moisture gives percent losses due to heating and evaporation of

$$\frac{(100)\ .109175 \times 10^6}{16.7 \times 10^6} = 0.65\% \text{ losses}$$

Some of the other factors that make up the reported 25.6% energy loss for Black Mesa in the EPA study are also questionable. These factors are included in Table 6-8.

Since both the air preheat and slurry heating impart heat energy to the slurry, which is therefore not required in combustion, some of the debits shown above for gas consumption and slurry heating should be omitted. (At the maximum, only heat exchanger efficiency losses and centrate heat losses should be included.) This would cause the total 5.55% energy loss to be even lower.

Reference is also made to the Upper Midwest Council Study. The commentor notes an energy loss of "16.3% of the energy content for a hypothetical 700-mile pipeline transporting 12 million tons of Sarpy Creek coal per year." Pages 6-14 through 6-18 of the Upper

FIGURE 6-4

CALCULATION OF ENERGY REQUIRED TO HEAT AND VAPORIZE 29% MOISTURE COAL VERSUS 10.74% MOISTURE "AS-MINED" COAL

Using the methodology shown in Draft EIS Appendix E-2, Boiler Feed Moisture Correction, assuming 29% total moisture, a 72°F entering temperature and 280°F stack gas exit temperature, the difference in energy required to heat and vaporize 29% moisture pipeline coal versus 10.74% moisture "as-mined" coal may be calculated:

Change in enthalpy to evaporate the water is the same -- 1133.7 Btu/lb. -- to maintain constant boiler efficiency.

(1133.7 Btu/lb water) (additional lbs water in dewatered coal/lb of mined coal)

Using 1 lb of as-mined coal (10.74% moisture) as a basis:

(1.0 - .1074)(1) = .8926 lbs. bone dry (bd) coal
(.8926 lb. bd) + (.29)(X total lbs wet coal) = X
X = 1.2572 lbs. of dewatered coal (29% moisture)
(.29)(1.2572) = 0.3646 lbs. water in dewatered coal

Lbs. of water in as-mined coal:
(.1074) (1) = .1074 lbs.

Additional water is then
(.3646) - (.1074) = .2572 lbs. of additional water

Boiler efficiency energy correction, or "coal quality loss," becomes:
(.2572) (1133.7) = 291.6 Btu/lb of 10.74%-moisture coal.

Using an average Btu value for Black Mesa (per the referenced report) of 12,300 Btu/lb of bone-dry coal, or (.8926) (12,300) = 10,979 Btu/lb of 10.74%-moisture coal (as-mined), gives a percentage energy loss of

$$\text{Net Heating and Vaporization Energy Loss} = \left(291.6 \ \frac{\text{Btu}}{\text{lb.}}\right)\left(\frac{1}{10{,}979 \ \text{Btu/lb}}\right)(100) = 2.65\%$$

Thus, the net heating and vaporization energy loss is 2.65%.

TABLE 6-8

QUESTIONABLE ENERGY LOSS FACTORS FOR BLACK MESA PIPELINE SYSTEM IN EPA STUDY

Item	% of Energy Transported
Power consumption (slurry preparation, pumping, dewatering)	0.72
Gas consumption (air preheat)	1.2
Slurry heating to 140°F	0.98
Coal quality loss	22.7
TOTAL:	25.6

[a] Factors listed were included in: U.S. Environmental Protection Agency. 1978. Environmental Assessment of Coal Transportation. Interagency Energy/Environment R&D Program Report. EPA-600/7-78-081.

TABLE 6-9

BASES OF VARIOUS
SLURRY PIPELINE ENERGY STUDIES

PARAMETER	ETSI DEIS (1)	BLACK MESA EPA SZABO (2)	BLACK MESA DOE BANKS (3)	UPPER MIDWEST COUNCIL (4)
Length - Miles	1664.0	273.0	273.0	700.0
Throughput - MMTA	37.4	3.8	4.2	12.0
Moisture Content of "As-Mined Coal" - %	29.49	10.74	10.74	?
Moisture Content of "As-Burned Coal" - %	32.73	29.0	32.0	?
Water Gathering Included	Yes	No	Yes	?
Slurry Grinding Included	No	Yes	Yes?	Yes?
Slurry Pumping Included	Yes	Yes	Yes	Yes
Slurry Dewatering Included	Yes	Yes	Yes	Yes
Heat Loss of Extra Moisture to Boiler Included	Yes	Yes(5)	Yes	?
Electric Grid Losses Included	No	No	Yes	No?
Conversion Losses for Converting Coal to Electricity Included (e.g., to produce electricity for pump motors)	Yes	No	Yes	Yes

(1) Energy Transportation Systems Inc. Coal Slurry Pipeline Transportation Project Draft Environmental Impact Statement. Bureau of Land Management. November 1980.
(2) EPA 1978b
(3) Banks 1977
(4) Murphy 1974
(5) Calculated erroneously, as explained.

Midwest Council report address this issue, but there is no mention of the 16.3% energy loss. The commenter does state that 8.23 x 10^{12} Btu's are consumed annually in pipeline transportation. This is equivalent to 4.08% of the energy transported. In another paragraph the commenter states that this energy loss, at the raw energy level, (after allowing for power plant conversion efficiency) is equal to 1,470,000 tons of coal per year. This is equal to 12.25% of the 12 million tons of hypothetical annual transport. It is possible that the commenter erroneously added these two figures to arrive at the noted 16.3%. In any event, the methodology of determining the energy losses is not given, and only some of the bases are given. It is not known what was included or excluded from the analysis. It appears that the commenter's approach was to use general energy consumption figures from the literature or discussions with industry personnel, i.e., a certain number of Btu's per ton-mile for pipelines and railroad. The study was not done on a hypothetical case study basis where energy losses for each system were built up based on elevation differences, pumping horsepower, motive power requirements and other engineering calculations. It appears that this study simply calculated energy losses from industry rules of thumb without regard to the bases of such figures. This is not a valid approach for detailed energy analysis, and comparison with the Draft EIS figures or other case studies is not meaningful.

At this point it should be noted that comparison of energy consumption figures between various studies is very risky. Each study or investigator tends to use different bases. Some report results are based on the amount of coal required as input to a power plant. Others do not include these conversion losses. Some include electrical grid losses in transporting power from the power plant to the pipeline pump station, and others exclude them. Some have given credit for the fact that grinding at the slurry preparation plant avoids the same grinding at the power plant. Others have debited this to the pipeline. Table 6-9 compares the bases of several of these energy studies. The bases are all different, and the results <u>cannot</u> be directly compared. Each of the studies attempts to be consistent internally so that comparisons between various transport modes within a particular study are valid.

It is not feasible to compare numbers from the various reports without redoing most of the basic calculations on a common basis. Such an analysis is beyond the scope of this EIS. Its purpose is to make a one-to-one comparison of pipeline versus other modes of transport on a rational and comparable basis. As noted in Section 2.A, the values of the Draft EIS are "comparative" only. "Comparative" refers to internal comparison with alternative actions in the Draft EIS only, because some equivalent and minor energy debits have been excluded.

The second part of the comment deals with the combustion efficiency of coal fines. The coal must be reduced to a fine size for combustion, which is approximately 100% passing 100 mesh (.149 mm). This fine size is required regardless of whether the coal is transported by pipe or rail. Therefore, the fines in the pipeline slurry in themselves do not pose a combustion problem. There is an effect on overall energy efficiency, however, which is indirectly a result of having fine material, i.e., minus 325 mesh (.044 mm) particles in the slurry. The finer particles are more difficult to dewater than coarse particles. Therefore, the energy estimates for dewatering must include the centrifugation, clariflocculation, filtration, and steam necessary to dry all of the slurry (both fine and coarse) delivered to the dewatering plant. Energy estimates in the Draft EIS have included these energy losses, and, therefore, the "effect of fine particles" was included in the energy consumption values shown in Draft EIS Tables 2-1, 2-2, and Draft EIS Appendix E Tables E-1, E-4, E-5, and E-6. No loss of fines is anticipated. The dewatering circuit will recover all of the coal solids. Refer to Section 1.G.4 - Dewatering Plants, pp. 1-82, Project Description, Technical Report (WCC 1980a), for a more complete description of the dewatering process and facilities.

280. Comment: The consideration of the energy efficiency of the various alternatives should include the energy needed to make materials and to build the pipeline and related facilities. These represent irretrievable commitments of resources not associated with the already existing and already adequate rail transportation system. Considering that the railroads are already in place, these omissions seriously distort the alternatives' relative energy efficiency; although the No Action alternative is still called most energy efficient (p. 2-5). It is also not clear whether the following were included: the energy required to pump well water through the gathering lines to the well-field pump station; or the energy costs to present water users for additional pumping or trucking of water following drawdowns; or the energy costs of maintenance. (Commenters 33, 89, 151, ED-4, ED-8.)

Response: Energy is consumed during construction of a coal slurry pipeline or upgrading a railroad for unit train operations. This energy consumption is largely in the form of motor fuels.

Pipeline construction energy was evaluated by the Office of Technology Assessment (OTA 1977). For a hypothetical system transporting 35 million tons per year of coal from Wyoming to Texas, construction energy was estimated to be 2400 Btu per ton of coal transported over 35 years, or 0.6% of the energy required for operations. Stated another way, the average energy consumed in pipeline construction was estimated to be 0.014% of the energy transported.

The OTA study went further and considered the energy required to manufacture the steel to make the pipe, rails and other major equipment for the cases studied. They recognized that over the 35-year study period replacements of rail, wheels, and hopper cars would be made. They projected that the related energy expenditure would be 0.08% for the pipeline case and 0.06% of the energy transported in the rail case.

Those energy requirements for construction and manufacture were not significant when compared to the accuracy of the estimates for the ETSI project, so were not computed for the ETSI project.

The irretrievable commitment of resources associated with construction of the slurry pipeline was discussed in Section 5.D, Commitment of Resources, page 5-16, of the Draft EIS.

The energy required to lift well water and pump it through the well field gathering lines is included in the analysis. For instance, in the Niobrara well field case, page 1-51 of the Draft EIS describes the well pumps as requiring 190 to 210 horsepower to "provide hydraulic lift from an average depth of 1700 feet, with additional head to move the water through the gathering system...." An average of 200 hp per well is included in the Niobrara water supply energy calculations shown on page E-26 of the Draft.

Referring to the energy cost due to the projected drawdown of others users' wells as a result of the project, and taking the Niobrara well field case for an example, an estimate can be made of the energy cost. Table 5-1 of the Draft EIS shows drawdowns projected due to the planned production without the ETSI project and due to the project. Table 3-4 of the Draft shows the project production by other users. Using the increased drawdown (increased pumping head) and projected production volumes, the final year (2035), worst case energy cost is 258 Btu/ton of coal transported, or 0.0015% of the energy transported by ETSI. The energy cost would be less in earlier years due to the lesser drawdown in those years. This amount is insignificant within the accuracy of the ETSI project estimates, so therefore it was not, included in the estimates.

The energy consumed in railroad or pipeline maintenance, mainly motor fuel, is less significant, so it was not estimated for this evaluation.

281. Comment: "As an aside, we wonder if the preparers of the EIS have included in its projected raw energy use the power required for such things as communication systems, blinker lights and cross-arms. These are necessary energy requirements for rail operations and even though They may be small individually, we must remember there are over four million grade crossing incidents per year. On this basis, these energy requirements could add up to a very significant factor." (Commenter LA-2.)

Response: The raw energy utilized for such things as communications systems, blinker lights, control stations and cross arms is less than one thousandth of one percent

(0.001%) of the total comparative energy consumed in the rail cases. The pipeline uses a similar amount of energy for its control and communications system.

Based on the calculated energy use at (1) the rail crossings and (2) for pipeline control and telecommunications, neither of the two cases require significant power when referenced to the comparative energy consumed in the rail and pipeline cases shown in the Draft EIS, Table 2-1, page 2-2.

282. Comment: "The conclusions reached in the net energy analysis, while favorable to the railroads, differ considerably from our own studies. Attached is a report submitted to the Kansas City Southern in 1978 providing the model which was discussed with Woodward-Clyde. Factors suggested by G. William Frick of the firm of Van Ness, Feldman & Sutcliffe are relevent to the analysis, but WCC has apparently chosen to segregate rail construction and utility plant operations in a manner which we feel is inappropriate." (Commenter 122.)

Response: The three-page paper done by Van Ness, Feldman and Sutcliffe for Philip Brown, Assistant General Counsel for the Kansas City Southern Railway Company, has been reviewed. The rationale for using factors different from those suggested by Frick are found in the responses to Energy Efficiency Comments 279 and 280.

283. Comment: "As a matter of fact, if calculations were made of the construction costs of the water treatment plants as well as the energy consumption needed over a 50 year period to treat the water, it may well be that the 1% disadvantage of the proposed plan over the recycling alternative would be eliminated.

In this regard, it is interesting to note that the BLM has considered the energy consumption for water treatment to be "insignificant" and in the comparison of the energy efficiencies assumed that the recycling alternative would require water treatment when, in fact, it would not. (See, Table 2-2 and footnotes found at page 2-3 of EIS)." (Commenter ED-8.)

Response: In Chapter 2 of the Draft EIS, the "return water line" alternative was mistakenly referred to as a recycle case. For this alternative, the Draft EIS assumed that water would be taken from the Mississippi River at a single point near the downstream end of the system and pumped to Wyoming (Draft EIS pp. 1-71). No recycling of water actually would be involved, so water treatment would still be required at each slurry dewatering terminal. For the proposed action, the energy required to pump water from the Mississippi River over that used by the Niobrara well field can be found from Draft EIS Table 2-1 on page 2-2:

Return Water Line (Recycle)	849,000	Btu/ton
Niobrara Supply Case	664,000	Btu/ton
Additional Energy	185,000	Btu/ton

This represents an increase of 28% in total project energy consumption for the return water line case over the Niobrara water supply case.

Note that even if the water treatment facilities were eliminated only 994 Btu/ton of energy would be saved (Draft EIS Table E-1), which is only 0.5% of the additional energy required by the return water line alternative.

A true recycle line (closed loop) alternative is included in the Final EIS for comparison. It is beyond the scope of the EIS to evaluate costs, but it must be noted that a true recycle line (or the return line) would require additional construction costs and land, several times the costs and impacts of eliminating the water treatment plants.

284. Comment: "Page 5, Para. 2 of the DEIS summarizes the full efficiency of different alternatives on the basis of Btu/ton of delivered coal....

EIS calculation of fuel efficiency should include loss of fuel due to ruptures of pipeline and derailments of coal cars. This has been omitted from the back-up calculations of Appendix E.

...An overlooked factor is the amount of diesel and gasoline consumed by vehicles waiting to cross railroad tracks as unit-trains block traffic.

Using data from the No-Action Technical Report and the attached calculations, we find another 23,000 Btu/ton should be assigned to the No-Action Alternative calculations in Appendix E." (Commenter 139.)

Response: Coal windage losses from railroad cars was assessed in the Draft EIS (see page E-19 of Appendix E). Losses of coal from pipeline spills and railroad car derailments have been added to Appendix E-3 of the Final EIS. Results of the evaluation of fuel consumed at rail crossings during blockage also have been added to this appendix.

285. Comment: "Table E-3 (Volume 1, p. E-6) lists the energy conversion factor (heat rate) for the input electrical energy in a fossil fuel steam plant as 10,400 Btu/kWh. The factors may vary from this to about 9,700 Btu/kWh. Modern plants such as are becoming more common along the pipeline route tend toward the lower figure which affects the energy requirements by about 7% and would therefore reduce the energy consumption on the pipeline alternatives." (Commenter 139.)

Response: While a figure of 9700 Btu/Kwh or less for input electical energy in a fossil fuel steam plant is attainable for individual plants, an average figure must be used for the entire length of the pipeline. Also, environmental constraints on new power plants will decrease their efficiencies.

Recent discussions with the Federal Energy Regulatory Commission (Kleber 1981) and the Electric

Power Research Institute (Diaz-Tous 1981) confirm that an average input energy conversion factor of 10,400 Btu/Kwh for both current and future coal-fired power plants along the slurry pipeline route should be used.

286. Comment: "Page E-8 , last line of the DEIS states, 'The total Btu loss in cleaning one ton of coal is --------416362 Btu/ton.' The cleaning plant 'loses' coal in the cleaning process back to the mine (Volume 1, Page E8). This report assumes that the returned coal is "irretrievably lost". This assumption is not correct, because while the heat content of the returned coal is low, it is in no sense used up in the process. It is also returned to its point of origin and is still theoretically available at some later date." (Commenter 139.)

Response: The irretrievability aspect of the cleaned coal refuse is debatable. While the heat content of the coal refuse is theoretically available at some later date with changes in technology and economic incentives, it is felt that, from a realistic veiwpoint, it would not be available during the lifetime of the ETSI project, because no economically feasible method exists for its recovery. In addition, the very high ash and sulfur content of the refuse might prevent it from ever being retrieved.

The other aspect considered is that this coal is mined and available for shipment. In other words, if the coal were not cleaned and the refuse not returned, it would be shipped as in the other cases. Hence, it is an energy debit to the coal cleaning alternative.

If a strict irretrievability concept is chosen, without this 427 x 10^3 Btu/ton energy debit, the coal cleaning alternative is only about 8 x 10^3 Btu/ton higher in energy consumption than the proposed action.

While, from an environmental viewpoint of irreversibility and irretrievability in commitment of resources, the cleaned coal refuse may not be considered a penalty, from an energy efficiency standpoint the refuse is considered a penalty, because the heat content is lost from the system when it is not shipped or available for delivery.

Discussions of this point have been added to Appendix E and Chapter 2 of the Final EIS.

287. Comment: "Page 2-5, Points 1-7 list energy components excluded from the energy consumption analysis and not included in Table 2-1. Add '8. Energy benefits resulting from solar and wind energy facilities that may be built.'

Stationary facilities such as pipeline-support facilities--preparation plants, pump stations and dewatering facilities--can be adapted to use renewable energy resources, including wind and solar power. By way of contrast, mobile energy users such as railroads cannot be adapted to these particular renewable resources." (Commenter 139.)

Response: It is technically feasible to generate some of the project's energy from renewable resources. ETSI has not included any such energy sources in its project descriptions, nor committed the company to building any of their facilities to use solar energy. Therefore, they were not considered in the energy efficiency evaluation. Because they were not proposed, technically they were not excluded.

288. Comment: "I doubt that the high energy efficiency shown in alternative number 1, the all-rail alternative (570,000 Btu/-ton) reflects the fact that the rail carriers are seriously contemplating electrifying their major coal hauling routes. Such electrification would result in even greater efficiency, much of which would result from what is called "regenerative braking". This refers to when a electric train is descending a grade, the engineer can electrically switch the locomotive traction motors to become generators. The power thus generated slows the train and returns to the trolley wire the electrical power produced. This energy is in turn utilized by other trains and reduces the overall electrical demand at the main generating station. In addition to being more efficient, the electric locomotive is non-polluting." (Commenter 169.)

Response: The use of coal-fired locomotives and rail electrification (including any "regenerative braking" benefits) is discussed in the Final EIS (see Section 1.R.4 and Appendix E).

289. Comment: "We feel that many readers of the Draft EIS may conclude that rail is a more energyefficient mode of transportation coal than slurry pipelines. We feel that this is demonstrably not the case. It should be recognized that the rail modes use diesel fuel, a large volume of which is imported from foreign sources. The pipeline will use electricity derived from domestic coal. The Btu per ton for the pipeline cases cited in the Draft EIS is based on the use of coal energy. Obviously, diesel fuel is a high quality form of energy and this fact must be taken into account when comparing the raw energy values." (Commenter LA-2.)

Response: Based on the parameters used to determine the energy efficiencies in the Draft EIS, rail transport is slightly more energy efficient. The Draft EIS identified the fact that the rail mode used diesel fuel (see page 2-1, column 2, partial paragraph 1, and page 2-12, column 2, partial paragraph 1). In addition, Tables 2-1 and 2-2 (pages 2-2 and 2-3) of the Draft EIS present figures for the rail modes for diesel made from oil as well as diesel made from coal. The trade-off then becomes the additional amount of energy required for the pipeline versus use of an import affecting the nation's balance of trade and the national energy policy. The Draft EIS pointed out these differences for the reader and decision maker.

290. Comment: "The BLM's EIS states (Pages 2-5 and 2-12 for instance) that rail transportation is the most energy-efficient method of transporting coal - well over pipeline efficiency in Btu's/ton. It does add that railroads use diesel fuel, and assumes this contributes to U.S. reliance on foreign oil. This statement is a conclusion of BLM, based on their subjective understanding of the national energy policy (See page 2-12). We question the waste of energy in using damp coal, which would require more energy to make energy - to produce electricity." (Commenter 220; also, OK-1.)

Response: The statement regarding national energy policy is felt to be quite accurate. Any further use of diesel fuel, although a small percent of the total used in the U.S., will contribute to foreign oil purchase, either directly or by displacement.

The second half of the question relates to energy consumed in burning damp coal. First, both rail deliveries and pipeline deliveries of coal will result in damp coal being fed to the boilers. Moisture out of the pipeline dewatering plant is 32.73%, and moisture in "as-mined" coal or rail-delivered coal is 29.49%. The boiler efficiency loss for this moisture difference has been included in the energy analysis. See Appendix E, pages E-15 and E-16 of the Draft EIS.

Second, the excess energy consumption of 94,000 Btu/ton of coal [(664-570) x 10^3 Btu/ton] for the proposed action (with Niobrara water supply) over the no-action (all-rail) alternative equates to 3.5 x 10^{12} (or 3.5 trillion) Btu/yr additional energy consumption, or about 210,000 tons of coal per year. The no-action (all-rail) alternative consumes approximately 534 x 10^3 Btu/ton of coal for crude oil, or 20.0 x 10^{12} (or 20.0 trillion) Btu/yr of energy, which equates to approximately 3.3 x 10^6 (or 3.3 million) barrels of crude oil that would contribute to foreign purchases.

291. Comment: "What is the energy cost of these losses (to development of uranium mining due to competition for ground water) compared with the energy savings gained by using the coal slurry." (Commenter ED-1.)

Response: An evaluation of the energy efficiency of various alternative energy sources, such as nuclear energy, is outside the scope of this EIS (see page 1-1, column 2, partial paragraph 1, of the Draft EIS). The object of the energy evaluation was to determine the energy efficiency of the proposed transportation system and the alternative transportation systems.

292. Comment: "We note the bibliography and text makes use of Perry Rahner's work at the SD School of Mines and Michael Reiber's studies at the University of Illinois, yet in the interests of objectivity fails to note any real conclusion of the two scientists. Their conclusions in going through their studies were completely negative in the efficiency of coal slurry lines over present methods of transportation." (Commenter 8.)

Response: Conclusions of other authors were not presented, because different studies of comparative energy efficiencies for different projects and/or routes will yield different answers and conclusions. Factors such as distance, tonnage rate, coal moisture content, and the basis of the study have a large effect upon the energy efficiencies determined. These other studies were done prior to ETSI's identification of the routes and specific horsepower requirements for the proposed action that was assessed in the Draft EIS.

Section 2.A.1 (pages 2-1 to 2-6) and Appendix E of the Draft EIS presented the energy efficiencies of the various alternatives studied for the ETSI coal slurry pipeline. This is an actual case study involving specific parameters, and comparisons with other systems is of little meaning.

293. Comment: "Windage loss is another component of energy for the No-Action Alternative. Calculations of windage loss on the basis of differential weight of rail cars for a given haul fail to account for the influence of moisture pickup from rain or from the increase in equilibrium moisture content as the coal picks up moisture when the coal cars move from the high dry areas to the moister destinations. Some sources show this on the order of 1% rather than the 0.1% used in Appendix E of the DEIS." (Commenter 139).

Response: As stated on page E-19 of the Draft EIS, the 1% value mentioned by Faddick (1979) has not been substantiated. The 0.1% value used was obtained from the Office of Technology Assessment.

6.E.11 PROJECT DESCRIPTION

294. Comment: "Why doesn't the EIS address the question of why the well field was selected where it is?" (Commenter ED-7.)

Response: The Niobrara well field was part of the proposed action. The proposed action was developed by ETSI and submitted to BLM as part of their application for the required right-of-way. The EIS assessed the impact of this proposal, along with other potential water sources. For analytical needs and EIS use, the reason for the site selection of the well field is immaterial.

295. Comment: "I would add, it appears to me your model implies sufficient water in the Madison, but the EIS does not explain the necessity for a reserve water supply agreement between ETSI and the City of Gillette." (Commenter ED-17.)

Response: Additional water sources, including the Gillette reserve water source, were considered in the EIS to provide the decision makers with other alternative choices if impacts to the Madison water source are considered unacceptable.

296. Comment: "One of the major impacts discussed is the hydrologic drawdown of the Madison Aquifer as ETSI pumps 20,200 acre-feet of water per year to mix with coal for slurry. Using calculations that one acre-foot of water is 43,560 cubic feet of water (7.48 gallons per cubic foot), or 325,828 gallons per acre-foot. Multiplying 20,200 annual acre-feet by 325,828 gallons, the conclusion is that 6,581,725,600 gallons of water per year will be drawn from the aquifer. (The City of Pittsburg, Kansas, with a population of approximately 20,000, consumes 3.5 million gallons of water per day.) It becomes apparent that 1 mile of 42" pipeline contains 380,000 gallons of coal slurry, half of which (190,000 gallons) is water. At full capacity, there will be 354,920,000 gallons of water in the 1868 miles of pipeline. Slurry moving at a rate of 2 miles per hour means a flow-through of 9,120,000 gallons of water per day, or 3,328,800,000 gallons per year. ETSI's projected need is 6,581,725,600 gallons per year (20,200 acre-feet annually) -from the aquifer. What necessitates nearly twice the gallonage drawdown per year compared to documented need?" (Commenter 220.)

Response: The approximation techniques used by the commenter have two errors. The diameter of the main pipeline is 46", as mentioned on page 1-17 of the Draft EIS. The length of time the coal takes to get through the pipeline is about 17 days, as mentioned on page 1-72 of the Draft EIS. The slurry flow rate would then be about four miles per hour, or roughly double the velocity estimated by the commenter. This would also double the quantity of water required. Also the mileage of the slurry line is 1664 instead of 1868. A more exacting technique was used to estimate the quantity of water needed, as detailed on Figure 1-4 of the Project Description Technical Report (WCC 1980a).

297. Comment: "The EIS consistently presents the figures of 20,000 acre-feet per year as the amount of water necessary to pipeline the slurry coal. How was this number generated and how wide a gauge of error can be expected? We understand that the slurry will be operated with an approximate mixture of fifty percent coal and fifty percent water. It appears that this mixture is similar to the one used in the Black Mesa pipeline. Can one safely project the same fluid mechanical characteristics to the much larger ETSI pipe? The EIS should present a range of water volumes necessary to transport the three million tons of coal projected for the pipeline. We are concerned that if greater amounts of water are needed from the wellfields, the environmental effects will be much worse than those presented in the EIS." (Commenter 226; also, RC-2.)

Response: A material balance, shown on Figure 1-4 of the Project Description Technical Report (WCC 1980a), shows that the slurry will contain 41.7% by weight bone-dry solids (Note 2) under the full 37.4-million-ton-per-year design conditions. That design condition will utilize the full 20,000-acre-foot-per-year water allocations granted under Wyoming Enrolled Act No. 10 (see Draft EIS Appendix C-2, page C-7, paragraph d).

A number of methods have been used in the literature to numerically describe the percentage of solids in a slurry, so it is important to identify the method used before making comparisons. In addition to the bone-dry weight concentration method commonly used, saturated solids weight, dry solids volume, and saturated solids volume have been used to define slurry percent solids. These definitions result in values in the 40% to 60% solids range, which leads to the common generalization of a slurry as a 50/50 mixture of coal and water. Specifically, the ETSI project is based on using 41.7% bone-dry coal by weight in the slurry.

The system description covers the ultimate or design capacity of the system. This design condition defines the maximum volume of water required which provides a basis for sizing the system. Therefore, the maximum amount of water required is as stated in the project description, while in practice the water usage will under many conditions be less. The range of water requirements would vary below the design value, depending on annual throughput requirements. Since ETSI is restricted from using more than 20,000 acre-feet per year of water, adverse design errors would result in reduced system coal carrying capacity.

Although there are many similarities between the Black Mesa and ETSI slurry designs, the ETSI design must be unique to the coal quality and system geometry. For instance, the Black Mesa system operates with 46% to 48% by weight bone-dry solids in its slurry (Montfort 1980), while ETSI's design is for 41.7% solids.

298. Comment: "The third point is on the coal slurry. While the assumption that 50 percent coal and 50 percent water by volume slurry can be utilized by the pipeline is used by the Environmental Impact Statement, there is no supporting evidence offered by any support documents. A published lecture by Dr. Shen of Colorado State University states a slurry of 35 percent coal is optimum and 25 percent is realistic in a line this size." (Commenter ED-9.)

Response: See response to Project Description Comment 297 for a general discussion of slurry ratios.

Slurries of other minerals or of different quality or sized coal will have different design solids concentrations. This explains how Dr. Shen can be quoted as saying that 35% solids by volume was common. Discussion with Dr. Shen revealed that he used that figure in his lectures as his general feeling in order to orient students. He pointed out that the actual value for any particular system might be quite different. (Shen 1981)

299. Comment: "The same table (Table 1-3) suggests that 105 acre-feet per year will be required from two local wells for Kansas booster pump stations. This is misleading as it implies that Kansas water would be used for the slurry line operation. This is not the case, and ETSI has stated all along that no Kansas water will be used in the pipeline." (Commenter 139.)

Response: As identified on Table 1-3 (page 1-9) of the Draft EIS and page 1-80 of the Project Description Technical Report (WCC 1980a), the major use of the 105 acre-feet would be to compensate for evaporation from the storage ponds.

300. Comment (in reference to the Project Description Technical Report): "Why isn't there any discussion of the use of local water at the pump stations outside of Wyoming? It appears that local water would be used for many of the attendant ponds to compensate for evaporation. The use of that water may have significant impacts on existing water uses; for example, if a system were shut down, and the pipe needed to be flushed to remove a blockage. Depending on the nature of the clog, it might be necessary to use large volumes of locally extracted water to backwash the pipe. The effects from such an operation should be studied. In fact, the whole discussion of water supply for the 20 or so pump stations outside of Wyoming should be cleared up." (Commenter 141; also 122, 220.)

Response: The description of system nonroutine operation (page 1-98, Project Description Technical Report WCC 1980a) makes no mention of use of local water for flushing the line. The technical report (WCC 1980a, page 1-94, Start Up) explains that the water to fill the line and the ponds originates from the Wyoming well field. Page 1-80, sixth item from the top of the page, states that water at the pump stations would be used only for domestic and utility uses and for storage pond evaporation makeup. The amount of water required at each pump station would be small and would not cause local impacts.

301. Comment: "The EIS should contain information regarding pretreatment of the transport medium prior to combination with the coal. A discussion should be included on any additives, such as hexavalent chromium, and their purpose." (Commenter 226.)

Response: Neither the EIS nor Project Description Technical Report described any additives, because none are planned for the water transport medium in the coal slurry pipeline.

302. Comment: "The Draft EIS gives the impression that the hydrostatic testing of the pipeline would be conducted all at one time, requiring 1,650 acre-feet of water and raising questions about the safe discharge of that water. This is a gross overestimate for a very simple reason. In actual pipeline practice, hydrostatic testing is done in a segregated manner, rather than on a total project basis. This means that a particular section of the pipeline will be isolated and hydrostatically tested.

The water in the tested section can then be discharged at approved locations and using approved methods to prevent any adverse pollution. It can also be displaced to the next segment of the pipeline where the testing procedure is repeated for that segment. By following these procedures, the entire line can be tested by using only a small amount of water from a given source." (Commenter LA-2; also, 139.)

Response: Hydrostatic testing of the main line and its laterals could require a maximum of 1650 acre-feet of water. Table 1-3 of the Draft EIS indicated that it would come from various locations, which does not give the impression that the testing would be done all at once. Since pipeline construction would be done by a number of contractors working independently, it was not possible to estimate the amount of water reuse as is normally done.

303\. Comment: "All we're talking about is what is probably going to happen with the water when it does reach its destination where the coal is dewatered and so on. We were discussing a situation in southwest where Boeing Corporation built a coal slurry pipeline from Utah to California. Once they dewatered the coal there, they wound up entering into contracts to sell the water to local municipalities there. We were just wondering about that possible question getting answered in the final statement, too. About once the South Dakota water gets down to where it's going, what's likely, what use is probably going to be made of it?" (Commenter RC-5.)

Response: Two points raised in the comment need to be corrected. There is no existing coal slurry line from Utah to California, and South Dakota water would not be used for the ETSI project unless the Oahe alternative were selected. The Draft EIS discussed two possible final destinations for the slurry effluent (water removed from the coal slurry). Under the proposed action, the water would be supplied to the power plant customers for cooling-water makeup or other in-plant uses (see Draft EIS Section 1.F.2, Coal Slurry Dewatering Plants). Under the water discharge alternative, the water would be treated to meet standards set by the Environmental Protection Agency and would then be discharged into nearby rivers or streams (see Draft EIS Section 1.O).

304\. Comment: "This EIS is inadequate in that the section dealing with the discharge of water in that section makes no mention of conservation of water, merely that it will be dumped into streams in the south. Water is an irreplaceable natural resource." (Commenter ED-17.)

Response: Water discharged to existing streams along the slurry pipeline route would add to the supply of those rivers and thus have potential further use.

The question of conservation of water is addressed in the Final EIS (see Section 1.R.5, Slurry Water Recycle).

305. Comment: "The EIS should identify the type and quantity of any wastes to be generated during construction and operation of the project. It should also identify the method of disposal of these solid wastes and any adverse effects upon either surface or groundwater. If State licensing is required, this should be explained and the status of approval identified." (Commenter 226.)

Response: Solid waste accumulated during construction of the project components would be relegated to local waste disposal sites, from which it would be periodically trucked to the nearest approved city or county waste disposal operation.

Human wastes would be disposed of by the subcontractors supplying the portable toilet facilities required for the construction work force.

Little if any solid waste is expected to be generated during the operational phase of the project.

The affected state governments were requested to supply a list of necessary permits for the project. The data supplied was included in Section 1.F.4 of the Draft EIS.

306. Comment: The Niobrara County well field would consist of five monitoring wells and approximately 40 to 45 production wells. These monitoring wells are not marked on the EIS Map A-53. The location of these wells is imperative in measuring the drawdown in South Dakota." (Commenter ED-14.)

Response: The five monitoring wells mentioned on page 1-15 of the Draft EIS for the Niobrara County well field are primarily observation wells. Normally all of the wells in a well field are not in continuous operation. At this well field, it is assumed that about five of the total number of wells would be shut down at any time for maintenance or repairs. These five wells could then be used for monitoring or observation purposes by ETSI.

The monitoring program discussed in Chapter 4 of the Draft EIS identified several wells that are recommended as official monitoring wells (see Map 4-5). Two proposed wells in the Niobrara County well field (OW-7 and OW-8) are recommended for this monitoring program and are not to be confused with the five observation-type wells that would also be in the well field as explained above. All appropriate wells were considered in the model.

307. Comment: "The need for ponds or holding tanks along the route needs further investigation. If holding ponds are to be used, there appears to be no analysis of evaporation replacement rates." (Commenter OK-1.)

Response: There would be a water storage pond at each pump station.

Evaporation makeup water, if required, would be supplied from a local well. The quantity of makeup water required for each pump station was shown on Table 1-3 of the Draft EIS and on Figure 1-4 (and similar figures for each alternative) of the Project Description Technical Report (WCC 1980a).

308. Comment: "The Draft EIS does not identify the location of the proposed emergency ponds other than to state that they will be associated with various pumping stations. The map shows a pumping station within the immediate vicinity of the Buttes. This proposed site may be a poor location for a pumping station and an unacceptable location for an emergency pond because of the potential value of the area as a national landmark." (Commenter 219.)

Response: The locations of the proposed emergency slurry storage ponds are discussed on page 1-101 of the Project Description Technical Report. Two locations would be required, at the mainline pump station at Jacobs Ranch and at mainline pump station P-2.

Pump station C-4, the station near Pawnee Buttes on the Colorado Alternative, would not have an emergency slurry storage pond. A discussion of the visual impacts of this pump station on the Pawnee Buttes area has been added to Section 4.D.9 of the Final EIS.

309. Comment (in reference to the Project Description Technical Report): "The so-called 'dump ponds' at each pump station present some credibility problems which might require special attention in the permitting stipulations. ETSI has indicated publicly over the past two years that dump stations were not needed along the entire length of the route. This caused no little consternation among residents along the proposed route. The EIS seems to require a stronger analysis of the need, design, and capacity of these stations." (Commenter 122.)

Response: The Project Description Technical Report (WCC 1980a) stated on page 1-80 that "emergency slurry storage ponds would be provided at the first mainline pump station (at Jacobs Ranch) and at pump station P-2." Those ponds are shown on Figure 1-16, Conceptual Layout of Jacobs Ranch Coal Slurry Preparation Plant, and Figure 1-12, Plot Plan of Pump Station P-2. The remaining 19 mainline pump stations would not include "slurry storage" ponds or "slurry recovery" ponds. (See Figure 1-11, Layout of Typical Main-Line Pump Station.) Operation of the ponds is described in Section 1.1.7 on page 1-101 of the Project Description Technical Report (WCC 1980a).

The practical function of the agitated slurry storage tanks (page 1-17 of the Draft EIS) at downstream pump stations would be to collect slurry displaced from station piping during maintenance and operating procedures. In this project, the displaced slurry is received in agitated slurry storage tanks then reinjected into the pipeline.

The pump stations are described on pages 1-17 through 1-21 of the Draft EIS and pages 1-77 through 1-81 of the Project Description Technical Report (WCC 1980a). These descriptions were more than sufficient to assess the potential environmental impacts at the pump station sites.

310. Comment: "Another thing that has surfaced, both at this meeting and in the last ten days from the Corporation Commission, Mr. Lock, and from the electric utilities. They are now talking about delivery of coal in Kansas on this line. Mr. Lock says there is going to be a power plant in western Kansas. I think that needs to be taken into consideration and whether the design of this line will be designed in such a way as to secure this land or will it have water taken from Kansas to recharge the line at a later date when the power plant is build." (Commenter KS-2.)

Response: The potential ETSI market for coal totals 37.4 million tons (the system's capacity), none of which would be delivered to power plants in Kansas (see Draft EIS page 1-4 (Map 1-1) and page 1-5 Table 1-1).

311. Comment: Page 1-6, fig. 1-3. The capacities indicated in this figure do not agree with the capacity described in the permit letters on p. D-42, app. D. (Commenter 231.)

Response: As stated on page 1-25 (under Wyoming, item 1) of the Draft EIS, if the project is approved, ETSI will have to submit a revised application to the Wyoming Department of Environmental Quality to update the project component capacities to agree with those shown in Figure 1-3.

312. Comment: "The DEIS states that local roads will be used wherever possible, Page 1-14. The DEIS does not address the responsibility for these roads and or any procedures for maintenance of such roads." (Commenter WY-13.)

Response: Use of roads is governed by state and local government regulations. If ETSI would exceed these regulations (for instance, weight limits), the company would have to obtain permits from the governmental entity responsible for that road. Those permits would provide the conditions under which ETSI would have to operate.

313. Comment: Water Resource Impact Using Data From EIS. Even though the data utilized in the EIS is seriously flawed, the rest of this paper will address the critical deficiencies in the EIS itself even assuming that the technical data contained in the EIS is correct. It must also be noted that the data contained in the EIS is based upon a fifty year project life, that is based upon pumping for a period of fifty years only. This fifty year life is, however, the minimum design life of the project (EIS 1-6) and should the coal slurry pipeline continue operating after fifty years, the adverse impacts on drawdowns and spring flow would continue to occur in an increasing manner (see figure 4-1 at EIS 4-9). (NOTE: The physical life of the

pipeline itself will be as long as 100 years. ETSI Publication 7)." (Commenter ED-8.)

Response: The stated project life is 50 years. To try to predict at this time whether the project would extend beyond 50 years would be unsupported speculation.

314. Comment: "It seems that the feasibility of constructing a coal slurry pipeline has been based upon comparison of the proposed project with the one existing similar project, the Black Mesa Pipeline. Assumptions have been based upon a 273 mile pipeline, built in the desert where the terrain is unchanging and the climate is predicable on an annual basis. The Black Mesa Pipeline is 18" in diameter, less than half the proposed size of ETSI's pipeline. The Black Mesa Pipeline crosses no rivers, is in conjunction with no other mineral pipelines and crosses no privately-held land intended for specific purposes, such as agriculture. We feel that the Basis for Comparison is irrelevent. (Commenter 220.)

Response: The Black Mesa pipeline is a commercially successful demonstration of coal transportation in a slurry pipeline. As such, it provides an example of solutions to some of the technical, engineering, and operating problems that would be faced by ETSI.

Although the Black Mesa pipeline was cited on page 1-22 of the Draft EIS and pages 1-81, 1-97, and 4-40 of the Project Description Technical Report (WCC 1980a), the impact assessment of the ETSI project was developed from basic engineering information on topographic and climatic conditions, land usage and ownership, and coal quality and throughput requirements rather than comparison or extrapolation from the Black Mesa system.

The Black Mesa pipeline traverses northern Arizona from the northeast to the west central, parallel to and south of the Grand Canyon. The pipeline route starts at 6400 feet and ends at 700 feet. The terrain is markedly more severe than the proposed ETSI routes. Although further south, Black Mesa experiences on its eastern end the same general weather patterns as found on the western end of the proposed ETSI line. More low temperature days would be expected in Wyoming and higher temperature extremes in Arizona.

Black Mesa pipeline crosses the Little Colorado River near milepost 73 and the Colorado River near milepost 271, both buried under the river bed.

Northern Arizona has a number of other major cross-country pipelines running generally in parallel and frequently crossing the Black Mesa line. They include the two 30" Transwestern Pipeline Co. natural gas lines, the 24", 30" and 34" El Paso Natural Gas Co. system, and the 16" Four Corners Pipe Line Co. crude oil line. The majority of the Black Mesa pipeline route is on private land. The line mostly crosses grazing land.

315. Comment: "Similar problems exist in the Technical Report on Ruptures and Spills, WCC 1980j.

While the data presented may well be perfectly valid, it depends greatly on the integrity of the surface water analysis. Furthermore, most of the data here, and in other Technical Reports, was provided by Bechtel, Inc., which has a financial interest in the proposed pipeline. Again, the experiences and adaptations in technology by the Black Mesa project cannot figure too heavily into the analysis. Black Mesa officials have stated publicly that Bechtel design of their equipment was seriously deficient. Modifications were designed and patented by Black Mesa itself so that this information is largely outside the expertise of Bechtel. Without a more precise analysis of coal/-water combinations, engineering design, nonroutine operations, etc., the State and local permitting authorities are greatly disadvantaged in their ability to determine prudent stipulations for the project. Because many of the critical environmental standards are established by the Federal government but enforced locally, inadequacy in any key area of BLM analysis poses a great burden at local levels." (Commenter 122.)

Response: Bechtel provided engineering design information for the descriptions of the proposed action and the coal slurry alternatives included in Chapter 1 of the EIS. Bechtel did not participate in the analysis of impacts in the EIS or any of the technical reports. Information supplied by Bechtel has been more than adequate to determine environmental impacts of a coal slurry system. Most of the initial problems encountered with the Black Mesa system were of a technical nature (e.g. the optimum percent of coal to water ratio) and did not contribute to any significant environmental impacts or hinder development of stipulations.

316. Comment: "Kansas has a very particularly unique situation not analyzed by the EIS. The state is traversed in a southwesterly-to-northeast pattern with over 200 natural gas pipelines from the Hugoton fields. Because of their age, most of these pipelines have been worn and been overlaid with additional pipeline network (without ripping out the originals). The ETSI pipeline must cross this pipeline field in a northwesterly-to-southeast corridor. Kansas state law says that the new pipeline routes must cross under the existing network. The EIS does not consider that engineering steps might be necessary to maintain the grade under this pipeline field, nor does it examine the unique erosion patterns which might result." (Commenter OK-1.)

Response: Installation of buried pipeline in areas crossed by older subsurface pipelines is a routine matter often experienced in mainline construction. The most common technique employed would be to trench to both sides of the existing pipe, break through the soil beneath the pipe, using hand tools, and drag the section of the new pipe through the opening. Under special circumstances, boring tools may be used from the newly trenched area to provide access beneath the existing pipeline. The slight change in grade, if any, would not affect slurry system operation. No unique erosion problems are anticipated. (See also response to Project Description Comment 314.)

317. Comment: "The statement is made that stream crossing construction is scheduled to occur during low flow to minimize the likelihood of flooding during construction. Figure 1-2 depicts assumed construction schedules and shows stream crossing construction occurring in all four quarters. The FES should address this discrepancy." (Commenter 72.)

Response: Figure 1-2 of the Draft EIS shows the construction period for river crossings to cover the last quarter of 1983 and the first three quarters of 1984. During this 12-month period those rivers that could flood during construction of pipeline crossings would be crossed during periods of low flow. Others may be crossed at any time during the year, depending upon the river and stream hydrology. Therefore, there is no discrepancy that needs clarification.

318. Comment: "Page 1-6, sec. 1.F.1 states that construction schedules are subject to change. Page 1-21, sec. 1.F.2 stipulates stream crossings are to be done during low flow or timed to avoid fish migration or spawning. Page 4-47, sec. 4.A.5 also specifies construction times. Scheduling of construction should be more accurately detailed." (Commenter 231.)

Response: The construction schedule shown in Figure 1-2 of the Draft EIS is ETSI's best estimate at this time. Construction of specific components that could have a significant impact on the environment, such as a river crossing, would be scheduled within the time periods shown. It is premature for ETSI to present a detailed schedule at this time. That phase of project design occurs later in the formulation of detailed work and operations plans, which would have to be approved by the appropriate federal agency, if the right-of-way is granted.

319. Comment: "Page C-3, col. 2. Cofferdams are discussed under Trenching and Preservation of Topsoil. Cofferdams and other diversionary techniques involving the placement of fill material may be subject to regulation pursuant to Section 404 of the Clean Water Act. This should be discussed on p. 1-17, sec. 1.F.2., Slurry Pipelines and Pump Stations, in the paragraph on stream crossings." (Commenter 231.)

Response: The requirements for Corps of Engineers permit actions were described in Section 1.F.4 and Appendix D-7.

320. Comment (in reference to the Project Description Technical Report): "Project Description (PD, 1-72): 'The pipeline would be buried in a trench across each of these rivers (those requiring special permits).' Will other streams be crossed in a similar fashion or treated in some other way? The final EIS should be corrected to refer to all rivers

and streams. It should specify what type of stream would not be crossed in the manner generally described in the draft EIS, and elaborate on the construction procedures to be used on these streams." (Commenter 215 also, 150.)

Response: All impacts at river and stream crossings were assessed assuming the trenching technique described on page 1-72 of the Project Description Technical Report (WCC 1980a). The actual crossing technique would depend on site-specific factors and would be in accordance with Corps of Engineers requirements. The trenching technique was used in the analysis as the "worst-case" technique in terms of environmental impacts. Other techniques that may actually be selected for some crossings (such as boring under stream channels) would result in fewer environmental impacts at crossing sites. Section 1.F.2, Slurry Pipelines and Pump Stations, of the Final EIS has been revised to explain that the trenching technique was assumed for impact assessment purposes.

321. Comment: "It appears that the pipeline route traverses some environmentally sensitive areas in Arkansas and creates multiple stream crossings which could be avoided with slightly altered routes. These alternatives were not addressed. Also, there is no explanation as to why routes along the Okla-Ark segment north of the Arkansas River are planned, thus requiring two crossings of the river and potential interference with I-40 in Arkansas. A route south of the river from Muskogee would appear practical since only 1 crossing of smaller dimensions would be necessary for access to the Independence Delivery Terminals. This southerly route would result in a shortening of the overall distance of the main trunk." (Commenter 231.)

Response: The routes north of the Arkansas River are necessary in order to serve the Oologah and/or Pryor delivery terminals (see Map A-1 in Appendix A, the map volume of the Draft EIS).

322. Comment: "But not addresed in the EIS is the amount of monetary insurance needed by ETSI in the event of bankruptcy and/or water drawdown requiring alternative sources of water for the people of the City of Edgement, Fall River County and elsewhere affected." (Commenter ED-13.)

Response: The subject of monetary insurance in the event of backruptcy of the applicant is not an appropriate subject for an EIS. ETSI has offered drawdown compensation agreements to the city of Edgemont and the state of South Dakota. In the Final EIS these are mentioned in Section 1.F.2, Water Supply System, and reprinted in Appendix C-7 and C-8.

323. Comment: "I saw no discussion of the interruption of service and how long it would take to repair that kind of interruption, and what would happen to the power plants in the meantime, how they would stockpile coal." (Commenter WY-10.)

Response: The environmental assessment of the proposed project does not include the power plant operation; however, power plants do normally have large stockpiles of coal in case of interrupted supply from such unknowns as strikes. It is not anticipated that a slurry pipeline problem would require a repair interruption of the magnitude suggested.

324. Comment: "The BLM assumes that no treatment would be necessary if the residual water was used in a power plant but fails to address how that water could be utilized in a steam generating plant or otherwise without removing the contaminants from the water at some stage of the steam generating process." (Commenter ED-8; also 231.)

Response: The use of water from the slurry pipeline for power plant cooling would be a decision of the utility involved. The treatment necessary would be based on individual plant needs and operation.

325. Comment: Several commenters questioned whether the operation of the coal slurry system would require the construction of new power plants to provide the necessary power for operation. (46, ED-4, ED-23, WY-4.)

Response: Page 1-21 of the Draft EIS stated that electrical power would be obtained of extending existing power supply lines. The largest amounts of power would be required by the slurry preparation plants and the well field in Wyoming. These power needs would be supplied by Tri-County REA and Niobrara Electric Association.

As determined in a power supply survey conducted by Bechtel (1981), these companies indicated they could supply the needed electrical demand with only 24- and 30-month lead times. These lead times are not sufficient to construct new power plants; therefore, they would be supplying the demand from existing facilities. These lead times are only those required to construct the required transmission lines and substations which were identified and analyzed in the EIS. These lead times were also the amount of time that were indicated as a requirement for any utility along the entire coal slurry system. The ETSI project is proposed to be on-line within this time span.

There is a high probability that a new power plant will be required at some time in the future in eastern Wyoming to supply the growing demand being generated by the expanding mineral industry and associated population. The ETSI project would be only a small fraction of the total increase in demand in this region and would not be the triggering action requiring new power plant construction. Any new power plant would require its own permitting and environmental process and would be a separate, non-related decision by the appropriate authority.

6.E.12 AUTHORIZING ACTIONS

326. Comment: "Appendix D-1 refers to other agency authorizing actions. Permits for highway crossings from the Federal Highway Administration and the state highway agencies of Wyoming, Oklahoma, Arkansas, and Louisiana should be added in this section." (Commenter 211.)

Response: An explanation of the Federal Highway Administration authorizing actions has been added to Section 1.F.4 of the Final EIS. In addition, state highway agency actions have been added to the discussions of state authorizing action in that same section.

327. Comment: "The applicant indicates an awareness of the need for certain regulatory permits (Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act). The Corps cannot concur that a single permit for all stream crossings by the pipeline is desirable. Each Corps District may determine its own permit approach." (Commenter 231.)

Response: The statement that a single permit could be obtained for all stream crossings has been deleted from Section 1.F.4 of the Final EIS. Throughout the development of the EIS, the Corps Districts which may require a permit have been contacted regarding U.S. Department of the Army permitting procedures.

328. Comment: "As you may know, the Department of the Army is in the process of amending its existing permit regulations. A copy is enclosed for your information (enclosure 2). This amendment, among other things, proposes changes to the existing nationwide permits. Changes of potential interest are described at 330.4(a), 330.5(a)(7), 330.5(a)(12), 330.5(a)(18), 330.5(a)(19), and 330.5(a)(24)." (Commenter 5.)

Response: In the Final EIS, Appendix D-7 has been revised to include the key provisions from the proposed Department of the Army regulations. Only general provisions are included in Appendix D-7; any specific stipulations for COE permits would be addressed at the time of permit application to the various COE District Offices.

329. Comment (in reference to the Surface Water Quality Technical Report): "We note that in the report appendix, certain pipeline crossings are acknowledged to require Department of the Army permits. A brief review of the appendix suggests that many of these crossings may be covered by nationwide permits (for Section 404) under existing regulations enclosed for your information (enclosure 1). These permits, described at 323.4-2(a)(1) and 323.4-3(a)(1) are subject to conditions found at 323.4-2(b) (1-4) and 323.4-3(b) (1-7), respectively. There are additional management practices at 323.4(b) (1-8) which should be followed." (Commenter 5.)

Response: The Surface Water Quality Technical Report addresses potential significant effects upon surface water quality which could result from construction or operation of the proposed and alternative pipeline systems, not authorizing actions. Authorizing actions related to waterway crossings were discussed in the Draft EIS (Section 1.F.4). Appendix D-6 of the Draft EIS was provided to identify those rivers and stream crossings which would likely require individual Section 10 or Section 404 permits. This input was provided to the BLM by the various COE District Offices.

It is possible that some of the rivers and streams listed in Appendix D-6 could be covered under the nationwide permit, rather than an individual permit. This will be determined by individual COE Districts, based on a review of the permit applications that will be filed if the project is approved. The permit conditions cited in the comment were included in Appendix D-7 of the Draft EIS.

330. Comment: Wetland crossings may be eligible for a nationwide permit provided they meet certain conditions (enclosed as part of the comment letter).

Information specifying whether these conditions would be met should be made available. Crossings not meeting these conditions could require individual permits. However, construction in wetland areas should be avoided to the extent possible and the effects of proposed construction activities should be discussed. (Commenter 231.)

Response: The various conditions identified in the comment have been included in Appendix D-7 of the Final EIS. Reference to these conditions also has been added to Section 1.F.4, U.S. Army Corps of Engineers. Until the route is actually surveyed and detailed engineering studies are completed, it is not possible to know if these conditions can be met, or even what specific wetland areas would be crossed. If conditions could not be met, appropriate permits would be applied for.

331. Comment: "We have no major concerns with the stream crossings outlined in Appendix D-6 providing that mitigation measures are strictly carried out. We request that the Final EIS make the distinction between those crossings which may be performed under the Nationwide 404 Permit and those which will require individual permits. Mitigation measures should also be required for all wetland crossings in accordance with EPA's Section 404(b)(1) guidelines published December 24, 1980 in the Federal Register." (Commenter 226.)

Response: The rivers and streams listed in Appendix D-6 of the Draft EIS are those that would likely require individual Section 10 or individual Section 404 permits based on COE District Office input. At the time of application and based on further input from ETSI, it is possible that some of the rivers and streams listed in Appendix D-6 would not fall under the individual permit, but be covered under the nationwide permit. In the Final EIS, Appendix D-7 has been revised to include the general conditions required for the nationwide permit when the pipeline crosses wetland areas. Mitigation measures would be the responsibility of the Corps office issuing the permit.

Regarding the enforcement of mitigation measures, the applicable COE District Compliance Officer would be responsible for making sure that these measures are being strictly adhered to.

332. Comment: "Page D-28 to D-37. The list of streams requiring CE permits is not clear. The streams should be listed by those requiring Section 10 permits, those under the Nationwide 404 permit for pipelines and those which require separate Section 404 permits.

The list is also incomplete. For example, in Kansas there are only two streams listed under the Proposed Route which the preparer states would require a Section 404 permit. There are at least eight additional streams which require a Section 404 permit. These are the South Fork Solomon River, Saline River, Smokey Hill River, Rattlesnake Creek, North Fork Ninnescah, Silver Creek, South Fork Ninnescah, and the Chikaskia River. The same holds true for the Market Alternative and the Pipeline-barge Alternative." (Commenter 140; also, 36.)

Response: Pages D-28 to D-37 of the Draft EIS were intended to identify those rivers and stream crossings that would likely require individual Section 10 or Section 404 permits. At time of application to the various Corps District Offices, it may be that some of these rivers and streams would be more appropriately covered under the nationwide permit. However, this listing (pages D-28 to D-37) was compiled through written correspondence with each affected Corps District Office.

Through further follow-up, the Corps Kansas City District has recommended that the South Fork Solomon River, Saline River, and Smokey Hill River be added to Tables D-1, D-2, and D-3 of the Final EIS. According to the Corps Tulsa District, the remaining five rivers would be covered by the nationwide permit.

333. Comment: "Page D-32, Table D-2. The Market Alternative would cross Lee Creek (Little and Big Lee Creek) in Oklahoma rather than in Arkansas. It also should be designated as a scenic river." (Commenter 140.)

Response: The suggested changes have been included in Tables D-1, D-2, and D-3 of Appendix D-6 in the Final EIS.

334. Comment: "The document does not discuss the permitting requirements or impact mitigation measures associated with highway and rail crossings. Should the Colorado alternative be selected, this will need to be addressed. We have previously supplied a list of permits which this Department would require for the proposed pipeline." (Commenter 89.)

Response: As explained in the introductory paragraph of Section 1.F.4 of the Draft EIS, the authorizing action section only discusses those actions required to implement the proposed action. Because the authorizing actions for the alternatives, such as the Colorado alternative, would be essentially the same as those for the proposed action, a list specific to each alternative has not been included in the EIS. However, the lists of permits submitted by the Colorado Department of Highways is on file at the Bureau of Land Management and will be consulted should the Colorado alternative be approved.

335. Comment: "There appear to be two types of facilities for which ETSI will be required to obtain Permits to Construct from the Department through the Water Quality Division. These types of facilities are as follows:

1) Septic systems located at pump stations for disposal of sanitary wastewater, and

2) Any pond, located at a pump station or elsewhere, which will store or dispose of coal slurry or water separated from coal slurry." (Commenter 72.)

Response: These two permits have been added to the list of Wyoming authorizing actions included in Section 1.F.4 of the Final EIS. Under the proposed action, no water that has been separated from coal slurry would be stored or disposed in Wyoming.

336. Comment: "Page 1-22, sec. 1.F.4 The Authorizing documents provided by BLM, Forest Service and other party agencies should include provisions for review and alteration of easements, or other instruments should the need arise during the life of the project." (Commenter 231.)

Response: The primary purpose of the Authorizing Action section of the statement is to identify the various federal, state, and county and local permits, grants, easements, licenses, etc., required to implement the proposed action. Compliance with permit stipulations or any necessary minor alteration of the easement during the life of the project is not a factor to be described in the EIS. This is left up to the office(s) assigned compliance responsibilities.

Provisions for a review of the various permits have been purposely left out of the Authorizing Actions section. This section is concerned only with actions required to implement the proposed project. Provisions for review of a particular action are generally part of the standard operating procedures of a granting agency and are routinely taken prior to the granting or renewal of a particular permit.

337. Comment: "Page 1-23 Authorizing Action. Authorizing action lists certain lands owned by Bureau of Land Management, Forest Service, and others on which a 50 foot right-of-way is being proposed. This proposed 50-foot right-of-way appears to be used in prairies, but not forested land. From Table 4-16 it appears that the right-of-way through forested areas is 100 feet, al-

though it is not stated as such. We feel strongly that a 50-foot right-of-way be used for the entire project route except at steam crossing." (Commenter 218.)

Response: The Federal Authorizing Actions section of the Draft EIS only pertains to federal agency actions. Under this section, the BLM would grant a long-term 50-foot right-of-way to cross Public Lands and a temporary use permit up to 50 feet for construction needs on Public Lands. The FS would issue a long term 50-foot right-of-way to cross National Forest System Lands. In the Final EIS, Section 1.F.4 has been revised to state that the width of a temporary special-use permit (for construction) would be determined at the discretion of the FS.

ETSI has stated that a 100-foot long-term right-of-way would be sought for private and state lands proposed for crossing. This private and state land is out of the jurisdiction of the federal agencies, so right-of-way widths cannot be specified. Table 4-16 of the Draft EIS reflects the 50-foot long-term right-of-way needs on federal lands administered by the BLM and FS and the 100-foot long-term right-of-way for private and state lands. The 100-foot figure will continue to be used as an average for impact analysis, because the actual width cannot be determined prior to the actual right-of-way granting.

338. Comment: "Page 1-23. The Bureau of Land Management (BLM) and Forest Service (FS) permits need further explanation. The BLM permits are for a 50-foot temporary use permit. The FS permits are for a 50-foot special use permit. How each of these permits relate to the total project cross sectional area should be diagrammed on Figure 1-5." (Commenter 140.)

Response: Both the BLM and FS permits are for a 50-foot-wide right-of-way for operation and maintenance of pipelines and for an additional (maximum) 50-foot-wide temporary or special use permit during construction. Thus, the 100-foot-wide construction right-of-way shown in Figure 1-5 is correct.

339. Comment: "Authorizing Actions, (p. 1-25). Two necessary permits within the state of Wyoming have been overlooked. These are: a) A permit from the Wyoming State Engineer to appropriate the final 5,000 acre-feet from the Madison Formation, and b) Approval from the Public Service Commission to operate the pipeline." (Commenter 46.)

Response: These two permits have been added to the list of Wyoming authorizing actions included in Section 1.F.4 of the Final EIS. However, the permit from the Wyoming State Engineer would not be required to implement the project; it would be needed at some later point in the life of the project.

340. Comment: "No discharge should be allowed without valid, approved discharge permits required by Oklahoma and the US EPA. The draft Environmental Impact Statement (EIS) erroneously omits Oklahoma from the list of states

requiring permits to protect water and air quality." (Commenter 210; also, 231).

Response: The discharge permits that would be required by EPA were discussed in Section 1.M of the Draft EIS. The permits that would be required by Oklahoma have been added to Section 1.F.4 of the Final EIS.

341. Comment: "In light of the mention of 'Prime Agricultural Farmland if irrigated,' there is a need for discussion of the most beneficial use of Madison and Minnelusa aquifer water so the public may accurately judge the merits of comparative uses of the water. This matter could be important if, as seems likely in Wyoming and Kansas, ETSI will have to appear before the Public Service Commissions (PSCs) of some states for permission to operate based on beneficial use to the public criterion. If this is the case, the EIS should outline the additional permits required." (Commenter 141.)

Response: The comment is unclear as to the deficiency in the EIS. The relationship of prime farmland to permits is unclear, because permits are not required to site facilities on prime farmland. The Draft EIS identified all the known permits at the time of its publication. The Final EIS includes additional permits that were identified during the public comment period.

342. Comment: "The EIS fails to mention that the Crook County source requires formal action by a state authority before it can be used as do the West River Aqueduct and the Niobrara well field." (Commenter 138.)

Response: The Draft EIS, on page 1-52, under the Crook County Alternative Water Supply System states, "Implementation of this alternative would require ETSI to obtain new well permits from the Wyoming State Engineer."

6.E.13 ALTERNATIVES TO THE PROPOSED ACTION

Comments and responses related to alternatives to the proposed action are grouped in the following categories: Cypress Bend pipeline-barge alternative, Colorado alternative, new well field alternative, Oahe alternative, treated wastewater alternative, slurry pipeline water discharge alternative, recycle alternative, no-action alternative, agency's preferred alternative, and general.

Cypress Bend Pipeline-Barge Alternative

343. Comment: "The discussion of alternates is unclear whether any of the proposed alternatives will utilize barges on the Kerr-McClellan River Project between Tulsa, Oklahoma and Fort Smith, Arkansas. If this assumption is correct, we suggest that the feasibility of such an alternate be developed and studied." (Commenter 45.)

Response: The feasibility of this alternative was described in the Draft EIS on page 1-70 under Barges heading.

Colorado Alternative

344. Comment: "Information contained in the EIS lacked sufficient detail to determine the impact in Colorado. Should the "Colorado route" be selected, even though a market alternative route, the same study detail as was completed for other routes would be necessary before any substantive comments could be provided." (Commenter 83.)

Response: The comment does not provide specific examples of deficiencies in the impact analysis. The analysis of the Colorado alternative was prepared at the same level as the proposed action and other alternatives. The impacts are summarized in the Summary and compared in Chapter 2. As stated in the introduction to the Colorado Alternative, "Only impacts associated with the Colorado alternative segment (MP C-1 to C-602) are discussed here. The impacts to cultural resources, air quality, or transportation would be similar to those described for the proposed action."

New Well Field Alternative

345. Comment "Second, the Environmental Impact Statement includes a discussion of an alternative well field at Crook County. The EIS should also include a discussion of a well field in the center of the Powder River Basin near the City of Gillette." (Commenter ED-3.)

Response: An infinite number of well fields could have been selected and assessed; however, the Niobrara and Crook county sites assessed in the Draft EIS along with the combined well field source assessed in the Final EIS provide a reasonable geographic range of sites and potential impacts that could result from pumping up to 20,200 acre-feet of water per year from the Madison Formation. In addition, the U.S. Geological Survey 1981 report, "Potential Favorable Areas for Large Yield Wells in the Red River Formation and Madison Limestone in Parts of Montana, North Dakota, South Dakota and Wyoming by McCary, Cushing, and Brown, identifies areas in the vicinity of the Crook well field as best suited for development of this water resource.

Oahe Alternative

346. Comment: "One of the alternative water supplies is water from Oahe Reservoir. The EIS states that the use of such water would not produce impacts on groundwater. The EIS does not address all of the impacts which could be produced by the use of Oahe Reservoir water on other factors. (Summary P. 3 and Chapter 1, P. 52)." (Commenter 72.)

Response: The comment does not identify what "other factors" were overlooked in the Oahe Reservoir impact analysis. All known significant impacts of the Oahe alternative water supply system were discussed in detail in Section 4.G (pages 4-104 to 4-119) of the Draft EIS. The Oahe alternative was not discussed in detail in the Summary, because no significant impacts were identified with this alternative.

347. Comment: "We believe that both the West River Pipeline and the WET system alternatives are not adequately addressed in the Draft EIS." (Commenter RC-3.)

Response: The comment fails to provide any specific information as to what was lacking in the analysis of the Oahe alternative. The use of treated wastewater has been reevaluated and additional analysis is included in Section 1.N, 3.I, and 4.I of the Final EIS.

348. Comment: "The West River Aqueduct Study ·(Technical Report) showed in figure IX-4 that an aqueduct as planned bringing water to the coal fields would cost with interest almost four billion dollars, and one could only conclude that this would be a staggering investment to sell three and a half million dollars worth of water annually. Should these economics be part and parcel of determining efficiency in water and energy systems?" (Commenter 8.)

Response: The costs of a project do not enter into the consideration of its efficiency. Efficiency is related only to the energy that would be required to operate the system versus the amount of product that would be delivered.

349. Comment: "I can't tell you the page number, Mr. Traylor, but one place your Oahe alternative is in bad shape in your EIS. There's a list of ocmmunities served, and you left out Rapid City." (Commenter ED-17.)

Response: The list of towns and communities for the Oahe alternative (Table 1-22, page 155, of the Draft EIS) was developed from the CH_2 M Hill West River Aqueduct report (CH_2 M Hill, Inc. and Francis-Meador-Gellhaus, Inc. 1980) and from the unissued Draft EIS prepared by the state of South Dakota (1980). Neither of these documents specifically listed Rapid City. There are several alternatives to the proposed West River Aqueduct that could supply water to Rapid City. However, the system analyzed in this EIS corresponds to the one proposed by the state of South Dakota in their most recent Draft EIS.

350. Comment: "In addition, the Oahe Reservoir pipeline would provide an ample supply of high quality water for many towns, communities, rural water systems, and individual ranches along its route. This would result in substantial benefits which were not addressed in the EIS." (Commenter ED-8; also, ED-4, ED-5, 74.)

Response: The scope of the EIS is to assess the impact of the proposal and reasonable alternatives. The primary purpose of the Oahe alternative is to supply water for the ETSI pipeline. Municipal supply would be the responsibility of the state or local water districts. They would be responsible for obtaining the necessary permits and constructing the facilities. The only action ETSI would take would be to size the pipeline to carry the additional water. Therefore, detailed analysis of water supply to these towns is not included in the EIS. The fact that this alternative would make this possible was identified in the Draft EIS, page 1-52.

351. Comment: "Page 1-54, Column 1, Paragraph 2. The description of the intake structure is inadequate. A closeup diagram should be presented. In a memorandum dated August 8, 1980, we recommended that the intake structure should be moved some 12,000 feet west to avoid the West Shore Boat Launch Public Use and Wildlife Management Area and the emergency spillway. The entire discussion of the Oahe Alternative has received only minor attention; however, since this should be the water source, more discussion should be presented." (Commenter 140.)

Response: The detailed design of the Oahe alternative water supply system would consider requirements of the pertinent permitting agencies in order to minimize impact to the environment. The detailed design for the intake structure would not be completed unless this alternative was selected.

The origination point of the Oahe water pipeline was incorrectly shown on Map A-55 of the Draft EIS Map Volume, Appendix A. The preferred location is approximately 7 miles west of the Oahe Dam (CH_2M Hill, Inc. and Francis-Meador-Gellhaus, Inc. 1980). The initial pumping station would also be located at that point. This has been clarified in Section 1.M.1 of the Final EIS.

352. Comment: The portion of the DEIS that discusses the Oahe Alternative is very poor and clarifies the fact that the EIS was written to justify the ETSI slurry line using the Niobrara well field. The route that is shown on the maps indicates several sensitive areas that should be avoided. Some of these areas are at Oahe Dam, where the pipe is located in a recreation area, at Hayes Lake and at Bear Butte State Park. (Commenter 74; also, 140.)

Response: The state of South Dakota Draft (unissued) Environmental Impact on the West River Aqueduct (1980) identifies a "Highline route." The Highline route coincides with the Oahe alternative route shown on Maps A-55 through A-59 of the Draft EIS.

Telephone conversations with the South Dakota Department of Water and Natural Resources and CH_2M Hill Consultants, who prepared the West River Aqueduct Draft EIS for South Dakota, confirm the following:

1. Oahe Reservoir: The proposed pump station location along the Oahe Reservoir is situated approximately 7 miles upstream from the Oahe Dam, along the south bank of the reservoir. Due to the limited recreational access to the proposed pump station location and basic lack of recreation (fishing and boating primarily) taking place in this area, no significant impacts to recreational experiences would be

anticipated. Most of the recreation use is along the northshore (e.g., Spring and Cow Creeks), or in the general vicinity of the dam.

2. Hayes Lake: Review of 7-1/2 minute topographic maps identifies the Highline route (and hence the Oahe route) as being south of Hayes Lake, thereby avoiding any significant impacts to grouse and duck hunting and fishing experiences.

3. Bear Butte State Park: Review of 7-1/2 minute topographic maps identifies the Highline route (and hence the Oahe route) as being outside the park boundary, southwest of the park. Thus, no significant impacts would be anticipated to recreational experiences at the park.

353. Comment: "If the Oahe option is selected, would alternate water sources be available during years of low pool elevation? What would be the lost benefits of the diverted water in terms of hydroelectric or recreation potential throughout the mainstem system?" (Commenter 231.)

Response: As discussed in Section 4.G.1 of the Draft EIS, drawdown effects on the Oahe Reservoir, even during drought conditions, would be negligible. No alternate water sources are envisioned as part of this alternative. No potential recreation effects are anticipated due to the negligible drawdown effects. The only observable effect would be the loss of hydroelectric power, approximately 0.1% reduction from existing production of 2,604,000,000 Kwh per year (Carlson, N. 1980).

354. Comment: "We believe that the Oahe Reservoir water supply alternative is the environmentally preferable alternative... Other alternatives that might be considered include water supplies from the Fort Peck and Pathfinder Reservoirs and the use of wastewater effluent as a transport medium." (Commenter 226.)

Response: A number of alternative sources of water were considered in the Draft EIS. The only reservoirs other than the Oahe that could satisfactorily provide the required amount of water are those on the Missouri River, downstream from the Oahe Reservoir. These sources would offer the same water as that in the Oahe, and because they are at lower elevations would require more energy for delivery to the coal slurry preparation plants.

The use of treated wastewater as transport medium has been further evaluated and is discussed as an alternative in the Final EIS, Sections 1.N, 3.I, 4.I.

Treated Wastewater Alternative

355. Comment: Many commenters raised the question as to why treated wastewater or industrial wastewater (e.g., coal-mine water) from Wyoming and South Dakota was not analyzed as an alternative water source. (Commenters 138, ED-8, ED-9, ED-15, ED-16, RC-2.)

Response: The use of treated wastewater from Wyoming was considered in the Draft EIS and eliminated from detailed analysis (see Section 1.O.4). Wastewater from Gillette has already been contracted for by Pacific Power and Light for use in their Wyodak power plant. Use of mine wastewater is not feasible, because it is not an assured supply and would require numerous collection lines and large areas of environmental disturbance. Analysis of the South Dakota WET system has been included in the Final EIS in sections 1.N, 3.I, and 4.I.

Slurry Pipeline Water Discharge Alternative

356. Comment: "The Technical Report on Surface Water Quality, 1980c, is insufficient in its analysis of slurry filtrate water quality. It suggests on page 14 that coal/water combinations in the proposed project have not been analyzed, yet considerable data on the nature of the slurry water is used to support findings in other sections of the EIS. This suggests that lacking analysis of the coal/water combination, those findings are actually insupportable." (Commenter 122; also, 231.)

Response: The discussion in paragraph 1, page 14, of the Surface Water Quality Technical Report (WCC 1980c) refers to the data that is available in the literature from tests on slurry transport water. As stated, this body of literature data pertains to coal/water combinations different from the proposed project. Therefore, literature data was not used to estimate the expected characteristics of the proposed dewatering plant effluent. Instead, project-specific laboratory investigations (simulated coal slurry transport) were designed and conducted using proposed project coal and water sources, as stated on page 14, paragraph 2 of the technical report (WCC 1980c). It was the results of those project-specific simulation studies that were used to estimate dewatering plant effluent quality. The text of Section 1.E of the Final Surface Water Quality Technical Report (WCC 1981c) has been reworded to avoid confusion regarding this point.

357. Comment: "Page 4-111, paragraph 2-5, and page 4-113, tab. 4-37. The rationale for estimating the allowable discharge quality levels for TDS, Cl and SO_4 is questionable. The procedure used assumes that the dilution capacity of the receiving streams may be used to allow discharge of constituents at levels considerably in excess of ambient concentrations. There is no assurance that this will be the case when best available technology standards are established which control slurry effluent discharges. Further, it is questionable that the total constituent load, which could be discharged without violating instream water quality standards, would be allocated to one single industry." (Commenter 231; also, 151.)

Response: The estimation of allowable discharge levels for TDS, Cl, and SO_4 was based on existing state receiving water standards, as presented on Table

1-11 of the Surface Water Quality Technical Report (WCC 1980c) and Table 4-35 of the Draft EIS. Technology-based limitations have not yet been established and cannot be predicted. The analysis of effects considered only existing promulgated standards that are enforceable. Meetings were held with the applicable regulatory agencies of each state to discuss permit requirements as they relate to the proposed dewatering plant effluent discharge (Plummer 1980). In Oklahoma, an official policy on assimilative capacity has not been formulated. It would be handled on a case-by-case basis; if a permit appears to use all, or nearly all, of the remaining assimilative capacity, this could become an issue (Plummer 1981). It is possible that additional treatment or controlled release of effluent could be required. Similarly, in Arkansas and Louisiana, no stated policy exists to govern the allotment of remaining assimilative capacity to permit applicants.

358. Comment: "The draft EIS has identified that TDS, SO_4, and Cl levels in the effluent have been determined to meet applicable State water quality standards. The EIS should address whether a mass balance approach was used in this analysis. If so, the measured background stream levels of the above constituents, along with the stream's critical low flows, should be identified." (Commenter 226; also, 139.)

Response: Section 1.F of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised to clarify that a mass balance was used to calculate the allowable concentrations of TDS, Cl, and SO_4 in the dewatering plant effluent discharge. Background design low flows and stream quality at the design low flows are given in Table 1-17 of the same report.

359. Comment: "Many of the salts and metals present in the slurry water (e.g. SO_4) to be dumped in the Arkansas and White rivers require tertiary treatment to be removed. Please specificially address the question of how the removal or reduction of these salts and metals will be accomplished at dewatering plants. If it is to be done by dilution, how will efforts to clean up large rivers be affected?" (Commenter 215.)

Response: Reduction of the metals present in the dewatering plant effluent discharge would not be accomplished solely by dilution with receiving waters. Secondary treatment would be required to reduce the biochemical oxygen demand (BOD_5) in effluent to be discharged into either the White or Arkansas rivers. A reduction of metals present in the effluent would be associated with this type of treatment, as discussed in Section 1.H of the Final Surface Water Quality Technical Report (WCC 1981c). Based upon analyses completed to date (Tables 1-15 through 1-20 and Section 1.F of the Final Surface Water Quality Technical Report), no additional treatment would be necessary to reduce the levels of dissolved minerals (e.g., SO_4) for discharge of the dewatering plant effluent into either the White or

Arkansas rivers in the state of Arkansas. These analyses considered the level of discharge necessary to meet existing Arkansas State Standards and protect designated beneficial uses at the point of discharge (Table 1-15, Final Surface Water Quality Technical Report and Table 4-41, Final EIS). Therefore, efforts to clean up large rivers are not expected to be affected, because the designated beneficial uses would have to be protected.

360. Comment: "No mention is made in the EIS of the heavy metals concentrations in the discharges from the dewatering plants. This is especially critical for those facilities which will discharge into Public Water Supplies (e.g., Oologah and Pryor). Analyses of metals contents (e.g., cadmium, chromium, nickel, lead, etc.) should be made before discharge permits are issued." (Commenter 210.)

Response: A discussion of heavy metals and other "priority pollutants" appeared in Sections 1.E and 1.G of the Surface Water Quality Technical Report (WCC 1980c) and Section 4.H.1 of the Draft EIS. Additional data and analysis appears in Sections 1.F, 1.G, and 1.H of the Final Surface Water Quality Technical Report (WCC 1981c) and Section 4.J.1 of the Final EIS.

361. Comment: "In the discussion of the potential effects of coal slurry filtrate effluent upon the water quality of the receiving streams, the final EIS should address whether organics and their related compounds could be leached into the carrier water from the coal. The technical report supplementing the draft EIS states there is no data available to evaluate organic parameters which could be potentially toxic. Therefore, we believe that the EIS should address this concern by identifying the organics that are believed to be harmful and have the potential to cause significant adverse effects upon the receiving waters. If further studies are warranted, the final EIS should identify that need." (Commenter 226.)

Response: Page 10, paragraph 3, of the Surface Water Quality Technical Report (WCC 1980c) refers to the fact that the UCLA/SAI (1978) investigations do not provide data on specific organic parameters that may be toxic. For this reason, simulated coal slurry transport studies were performed to evaluate these parameters, as pointed out on page 14 of the Surface Water Quality Technical Report (WCC 1980c). These test results were discussed in Section 1.E and 1.G of the technical report. Additional test results and discussion, including tests of organic constituents, have also been included in the Final Surface Water Quality Technical Report (WCC 1981c), Sections 1.G and 1.H.

362. Comment: "The DEIS neglects to consider the quality of the dewatering plant waste water as it relates to its proposed end use and eventual disposal. Considerable amounts of contaminants, including radioactive elements and toxic organic and inorganic

compounds, will be leached from the pulverized coal. At minimum the DEIS should have provided a list of potential contaminants and given worst case estimates for the expected water quality of the waste water. Without these data, assurances that industry can use this water and that its disposal will present no environmental problems are not credible. The final EIS should correct this over-sight and provide specifics on the safe containment and treatment of the waste water, particularly with respect to radioactive elements and toxic compounds." (Commenter 151; also 141.)

Response: The coal slurry simulation studies that have been performed to determine radioactivity levels in the dewatering plant effluent have indicated that no reduction of radioactivity would be required to satisfy the various state receiving-water standards. A discussion of these results and potential means of treatment for radioactivity should elevated levels ever occur is given in Section 1.H of the Final Surface Water Quality Technical Report.

See also responses to Water Discharge Comments 359, 360, and 361 for a discussion of treatment of organic and inorganic compounds.

363. Comment: "EPA believes that the EIS should contain more information regarding the quality and treatment of dewatering plant effluent. For example, no information is given on pretreatment of the slurry water prior to combination with the coal and its impact on the dewatering plant effluent." (Commenter 226.)

Response: There are no plans to pretreat the slurry carrier water prior to combination with the coal.

Additional information regarding the slurry simulations test data and projected dewatering plant effluent quality is presented in the Final Surface Water Quality Technical Report, Sections 1.E and 1.F, and the Final EIS, Sections 1.G and 4.J.1. Additional details of proposed treatment facilities necessary to improved dewatering plant effluent quality to acceptable levels appears in Section 1.H of the Final Surface Water Quality Technical Report and Section 1.O of the Final EIS.

364. Comment: "Even though there are remarks about coal characteristics, slurry water characteristics, and coal slurry interaction as simulated in lab experiments, there is a need to look at how the effluent would be treated. Little is said about the corrosive effects of coal slurry water on the pipeline, or on the cooling water system of the receiving power plants, or of how coal slurry water can scale cooling systems." (Commenter 141.)

Response: Proposed treatment facilities to reduce dewatering plant effluent to acceptable levels is discussed in the Final Surface Water Quality Technical Report (WCC 1981c), Section 1.H, and the Final EIS, Section 1.O.

The project as proposed is a coal transportation system made up of four components: coal slurry preparation plants, water supply system, slurry pipelines and pump stations, and coal slurry dewatering plants. The eventual use of the coal or water to be transported is not part of the proposed action. Therefore, impacts related to power-plant use of the dewatering plant effluent is beyond the scope of this impact analysis and is the responsibility of the involved power plants.

The coal slurry pipeline would be cathodically protected for its entire length, significantly reducing the likelihood of corrosion.

365. Comment: "We question the assumption that power plants receiving the slurried coal will accept slurry water effluent for use in the plant. The slurry water will have high Total Dissolved Solids (TDS). Power plant usage, through a cooling system will not serve to treat BOD, TDS, SO_4, or Cl. The treatment technology for these dissolved materials is advanced and of questionable reliability. In light of these concerns, the impact of this effluent on the receiving water needs further discussion and should be considered in the BLM's decision making process." (Commenter 226.)

Response: Further discussion of the proposed treatment technology necessary to improve dewatering plant effluent quality to acceptable levels is given in Section 1.H of the Final Surface Water Quality Technical Report and Section 1.O of the Final EIS.

366. Comment: "The question should be the treatment of water at the power plants. If chemical precipitation is part of the process of dewatering the coal, how would those chemicals be treated, what would they be?" (Commenter 141.)

Response: The proposed treatment of the dewatering plant effluent is discussed in Section 1.H of the Final Surface Water Qaulity Technical Report (WCC 1981c) and Section 1.O of the Final EIS. At the dewatering plant, polymer-type or natural guar-type flocculants would be used to enhance centrifugation and clariflocculation; these additives would adhere to the coal and would not be discharged with the effluent.

367. Comment: "In regard to water quality, we believe the impacts of dewatering plants were not properly addressed. We think a list of probable contaminants and their concentrations should be included. The statement that the effluent would meet appropriate standards is not sufficient." (Commenter 78; also, 141, 235.)

Response: The water quality impacts associated with the dewatering plant effluent were discussed in the Surface Water Quality Technical Report (WCC 1980c) and the Draft EIS. Additional information appears in Section 1.E, 1.F, 1.G, and 1.H of the Final Surface Water Quality Technical Report (WCC 1981c) and Section 4.J.1 of the Final EIS.

The Environmental Protection Agency (EPA) has recently issued draft effluent limitation guidelines and standards of performance for coal mining and related process facilities (Federal Register January 13, 1981). The development of the draft standards included laboratory analyses for conventional pollutants, as well as the 129 designated "priority pollutants" at several mines, preparation plants, and associated areas. Of the priority pollutants, all of the potentially toxic organics were excluded by the EPA, because these constituents were either below EPA's nominal detection limit, were only present due to sampling or analytical errors, or were present in amounts too low to be effectively reduced by known technologies (Federal Register January 13, 1981). Several trace metals were detected in runoff generated from preparation plant areas (EPA 1981). These metals are found in treated effluents at such low concentrations that best practicable treatment technology effectively controls these metals when present in wastewater (Federal Register January 13, 1981).

Drainage from the proposed ETSI preparation and dewatering plants would fall under the category "coal preparation plant-associated areas" and would be regulated under the New Source Performance Standards for this category (Federal Register January 13, 1981). These effluent limitations are shown on Table 6-10.

To meet these levels, treatment facilities for drainage or runoff (e.g., aeration, sedimentation and neutralization) would be included at preparation plant and dewatering plant sites. These types of treatment facilities are presently used throughout the coal mining industry and are expected to reduce drainage discharge to acceptable levels.

Under the coal cleaning alternative, the process (coal cleaning) water used at the preparation plants would be regulated under the New Source Performance Standards for the "coal preparation plant" category (Federal Register January 13, 1981), which specifies no discharge whatsoever (zero discharge) to surface waters for this type of effluent. The proposed ETSI preparation plant cleaning process water would be incorporated into the slurry makeup water. Therefore, coal cleaning process water would meet this zero discharge requirement.

The discharge of the dewatering plant effluent (e.g., water removed from the slurry) would require a separate NPDES permit and was evaluated in the Draft EIS, Section 4.H.1, and the Surface Water Quality Technical Report, Chapter 1.

368. Comment: "The permit requirements necessary for slurry water discharge to meet established water quality standards need to be ascertained in detail. The EIS should then address the plans for treating and handling slurry water at the terminals based on these known permit requirements." (Commenter 113.)

Response: State and federal permit requirements necessary for dewatering plant effluent discharge were described in detail in Section 1.F and 1.G of the

TABLE 6-10

EFFLUENT LIMITATIONS FOR COAL SLURRY PREPARATION PLANTS AND DEWATERING PLANTS[a]

Pollutants	Maximum for 1 Day ($\mu g/l$)	Average of Daily Values for 30 Consecutive Days ($\mu g/l$)
Iron, total	7.0	3.5
Manganese	4.0	2.0
TSS	70	35
pH	within the range of 6.0 to 9.0 at all times	

[a] Based on New Source Performance Standards (Federal Register January 13, 1981).

Surface Water Quality Technical Report (WCC 1980c) and Section 1.O of the Final EIS.

369. Comment (in reference to the Surface Water Quality Technical Report): "The technical report, in Chapters 1 and 3 acknowledges the need for National Pollution Discharge Elimination System (NPDES) permits for point source discharges of dewatering plant effluent and hydrostatic test water, respectively. Chapter 2, describing construction effects of the pipeline at stream crossings, does not mention the possible need for Department of the Army permits (under Section 10 of the River and Harbor Act of 1899, and Section 404 of the Clean Water Act of 1977) for such crossings. A section should be added to Chapter 2 covering these requirements. In addition, Department of the Army permits may be required for the discharge structures mentioned in Chapters 1 and 3." (Commenter 5.)

Response: The requirements for Section 10 and 404 permits for stream crossings were described in detail in Appendix D-7 of the Draft EIS. Department of Army permits for dewatering plant effluent discharge structures would be included in NPDES permit applications as described in Plummer (1980), Chapter V.

370. Comment: "This points to a very serious environmental hazard which, as noted, we do not feel is adequately explored within the EIS. It is not enough to say that compliance with federal, state, and local water quality standards will be achieved. The draft EIS clearly states that no analysis has been made of pollutants these localities might be expected to receive and suggests that ETSI itself suffers insufficient knowledge on which to base its abatement and treatment design. We would suggest that no permits be issued until ETSI has satisfacorily demonstrated its expertise on the specific pollutants it will deliver at the terminal and its ability and intent to install appropriate technology to meet water quality standards." (Commenter 122.)

Response: As stated in the Draft EIS (page 1-54), NPDES permits would have to be obtained before slurry effluent could be discharged. These permits would not be issued unless ETSI could demonstrate that water quality standards would be met. The issuance of these permits would be the responsibility of each involved state and the EPA.

371. Comment: "The pumping of water for the pipeline will cause a measurable descrease in the water quality in the area. It appears that there is insufficient analysis of the effects of ruptures and terminal disposal of the treated slurry water. While the EIS lists various potential markets, it is impossible to ascertain specific terminal disposal effects until those markets are finalized." (Commenter OK-1.)

Response: Ground-water quality alterations caused by ground-water withdrawals were discussed in Section 4.A.1 of the Draft

EIS. Additional discussion of surface-water quality effects appears in Chapter 4 of the Final Surface Water Quality Technical Report (WCC 1981c) and Section 4.J.1 of the Final EIS.

Discussion of ruptures and spills appeared in Section 4.A.3 of the Draft EIS and the Ruptures and Spills Technical Report (WCC 1980j). Additional analyses of treated slurry water (dewatering plant effluent) appears in Chapter 1 of the Final Surface Water Quality Technical Report (WCC 1981j) and Section 4.J.1 of the Final EIS.

372. Comment (in reference to the Surface Water Quality Technical Report): "Notice in Table 1-3 that water becomes most acidic, lowest in oxygen, in fact, completely devoid of oxygen, highest in total dissolved solids by the time it reaches Lake Charles. Will it by then have the highest amounts of heavy metals, the priority pollutants and those organic parameters that may be potentially toxic but for which data is unavailable?" (Commenter LA-1.)

Response: Site-specific data needed to make this comparison is unavailable for the background levels of the priority pollutants at each discharge site. However, National Pollutant Discharge System (NPDES) permits would be required. All water quality standards would have to be met before these permits would be granted.

373. Comment (in reference to the Surface Water Quality Technical Report): "Occasional high mercury levels in Oahe Reservoir in combination with mercury contributed by the coal in the slurry may result in effluent levels which periodically exceed the EPA recommendations and state water quality standards. This problem should be addressed." (Commenter 231.)

Response: As part of the coal slurry simulation studies, a sample of Oahe Reservoir water was slurried with a Gillette, Wyoming, coal sample. The initial concentration of mercury in the raw water was $<4 \mu g/l$. After simulated slurry transport, the concentration in the filtrate (e.g., representing the dewatering plant effluent) was reduced to $< 2 \mu g/l$. Based upon the single analysis, a significant increase in the concentration of mercury is not expected. Due to sampling variability, however, occasional higher levels of mercury may occur in the raw water. It has not been shown that coal slurry transport could significantly increase these levels. However, treatment facilities would be included at each dewatering plant. As discussed in Section 1.H, and Table 1-25, of the Final Surface Water Quality Technical Report (WCC 1981c), projected mercury levels after treatment (based on the highest reported level in all statistically significant simulation results) would result in levels of $<1 \mu g/l$ for aeration lagoon treatment and up to $4 \mu g/l$ for activated sludge treatment. This compares to the existing "end-of-tap" drinking water standard of $2 \mu g/l$. Actual instream levels, following dilutions, would be less. As part of the NPDES permit, mercury levels would be monitored in the dewatering plant effluent to ensure compliance with receiving water standards.

374. Comment: "Chemical analyses were performed on dissolved fractions of the effluent water samples. Since most wastewater treatment effluent allows for up to a 30 mg/l suspended solids, this level of suspended solids should be included in the analyses of the effluent." (Commenter 231.)

Response: A level of 30 mg/l suspended solids would be permitted in the dewatering plant effluent discharge. However, EPA approved methods of chemical analysis (EPA 1979b) require that the sample be filtered to remove the suspended fraction prior to chemical analysis. This sampling procedure would also be used to monitor the dewatering plant effluent to ensure compliance with receiving water standards. It would be in violation of EPA-approved sampling methods, therefore, to perform chemical analyses on a sample containing 30 mg/l suspended solids.

375. Comment (in reference to the Surface Water Quality Technical Report, Table 1-11): "Under Receiving Water, Beneficial Uses, Calcasieu River. Calcasieu River is listed only as being of beneficial use in Category C, G and H. The state should have told you that the following uses already exist and have for many years, although some of them are suffering. Those are D, F, I, J, K and L." (Commenter LA-1.)

Response: The designated beneficial uses of the Calcasieu River are presented in the Louisiana Water Quality Criteria (Louisiana Stream Control Commission Regulations, adopted August 14, 1973, amended May 26, 1977, and approved by the Environmental Protection Agency, October 3, 1977). The uses identified in the Surface Water Quality Technical Report are consistent with these designations. While other undesignated uses may exist, the existing discharge standards would be based on the protection of existing, designated uses only. A petition for redesignation could, however, be initiated at any time.

376. Comment: "A comparison of tables 4-36 and 4-37 in Volume 1 of the EIS and Table 18 in the Surface Water Quality Technical Report indicates that the following treatment would be required:

Pryor -	Cl
Oologah -	TDS and SO_4
Lake Charles -	TDS, Cl, and SO_4
Boyce -	SO_4

The treatment technology for these dissolved materials is advanced and should not be underestimated from either a technology or cost standpoint. In light of these concerns, we request that the final EIS specifically accounts for the unique technology and cost problems and, accordingly, revise the estimated impacts to water quality, aquatic plant and animal life within each receiving stream to be affected. Compliance with the Section 208

Water Quality Management Plans should be assured." (Commenter 226.)

Response: The relationship of dewatering plant effluent quality to drinking water standards was shown on Table 1-10 and discussed in Section 1.G of the Surface Water Quality Technical Report (WCC 1980c). Additional information appears on Table 1-14, 1-16, 1-24, and 1-25 and Sections 1.G and 1.H of the Final Surface Water Quality Technical Report (WCC 1981c) and Section 4.J.1 of the Final EIS. Please also refer to the response to Water Discharge Comment 361, regarding organics in the effluent.

377. Comment: "The second and major weakness that we see is an obvious lack of consideration of existing local public health and environmental problems, and how the project components can add to those problems. Let me give you some examples.

First, the New Orleans drinking water supply has known problems. The addition of any pollutants into the Mississippi River upstream of the archaic water treatment plants could definitely or would definitely increase the risk for all of the inhabitants of New Orleans.

RESTORE believes that this should be mentioned in the Environmental Impact Statement, especially since on Page 10 of the Technical Report it says "Data are generally unavailable, however, with which to evaluate specific organic parameters that may be potentially toxic"." (Commenter LA-1.)

Response: See response to Water Discharge Comment 376. The relationship of dewatering plant effluent quality to drinking water standards was shown on Table 1-14 and discussed in Section 1.G of the Surface Water Quality Technical Report (WCC 1980c). Additional information appears on Tables 1-14, 1-16, 1-24 and 1-25 and Section 1.G and 1.H of the Final Surface Water Quality Technical Report and Section 4.J.1 of the Final EIS.

378. Comment: (in reference to the Surface Water Quality Technical Report): "Throughout the report, the presence of methylene chloride (EPA primary pollutant) and alkyl substituted napthalenes or any other toxic organics are denied or omitted. This is done throughout Volume I and on page "i" of the Technical Report. Only in the text of the technical report are these substances identified as being present in detectable quantities. All real, as well as potential toxics should be discussed, since actual analyses are limited and of unknown reliability." (Commenter 231.)

Response: At the time the Draft EIS was published, criteria for priority pollutants had been issued in draft form by the US EPA (Federal Register March 15, July 25, and October 1, 1979).

These criteria have recently been finalized (Federal Register November 28, 1980). Therefore, the criteria presented in the Draft EIS have been updated in the Final EIS.

Table 1-26 of the Final Surface Water Quality Technical Report has been revised to incorporate the final US EPA Section 304 criteria for toxic pollutants. These criteria are not enforceable as receiving water standards at this time. Further discussion of the relationship of dewatering plant effluent to these final criteria is given in Section 1.G and 1.H of the Final Surface Water Quality Technical Report and Section 4.J.1 of the Final EIS.

The final criteria for arsenic is 440 μg/l to protect freshwater aquatic life (maximum level). According to the criteria: "For the maximum protection of human health from the potential carcinogenic effects due to exposure of arsenic through ingestion of contaminated water and contaminated aquatic organisms, the ambient water concentration should be zero, based on the non-threshold assumption for this chemical. However, zero level may not be attainable at the present time" (U.S. EPA 1980. Water Quality Criteria, Federal Register November 28, 1980).

The final water quality criteria include estimated concentrations representing different risk levels to human health, but these are presented for information purposes only and do not represent an EPA judgment on an "acceptable" risk level.

The work on the experimental slurry (slurry simulation studies) did include an evaluation of potentially toxic organic constituents, as described in Section 1.E of the Final Surface Water Quality Techical Report.

As described in the Surface Water Quality Technical Report (WCC 1980c), analyses for the 114 organic "priority pollutants" were completed on two separate simulation tests. Results indicated levels below the detection limits for all parameters except methylene chloride and bis (2-ethylhexyl) phthalate. These two parameters were measured in trace levels, which were below receiving water criteria concentrations. As shown by the EPA (Federal Register December 3, 1979), the presence of methylene chloride and bis (2-ethylhexyl) phthalate may be likely due to unavoidable sampling and analytical contamination.

All analysis procedures were in conformance with EPA guidelines establishing test procedures for the analysis of pollutants (Federal Register December 3 and December 18, 1979). These guidelines specify the necessary gas chromatography/mass spectrometry procedures for all applicable parameters.

379. Comment (in reference to the Surface Water Quality Technical Report): "Page 1, paragraph 2 "Simulation studies...and sulfates (SO_4) would significantly increase increase by 400 - 100 mg/l and 300 - 600 mg/1, respectively, in the dewatering plant effluent (slurry filtrate).

Use of the actual numbers will serve to define better the expected increase. The relative significance of the increase increases as the source water quality improves. (<>means delete; underlined portions should be added.)" (Commenter 139.)

Response: The Summary of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised.

380. Comment (in reference to the Surface Water Quality Technical Report): "Page 1, Paragraph 3 Add 'The maximum concentrations, shown in Table 1-3, normally occur during low stream flow periods; and minimum concentrations occur during flood flows. The maximum concentrations at minimum flows are of most significance when evaluating the potential impacts of a discharge on a stream.', as the third and fourth sentences to the paragraph (should follow 'Table 1-3 presents...period 1970 - 78.)'

The minimum and maximum concentrations represent extreme conditions, as do critical and flood flows, and not typical variability within a stream. The above sentence should be added in order to clarify conditions signified by minimum and maximum concentrations.

Insert 'and' in the first sentence after 'site to site' and before 'seasonally at individual sites.'

Receiving water characteristics vary not only from site to site, but also with the seasons at individual sites." (Commenter 139.)

Response: Section 1.B of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised.

381. Comment (in reference to the Surface Water Quality Technical Report): "Page 11, Paragraph 2 Insert '(1% solids concentration)' after '10,000 mg/l' and before 'at distances of 50 feet...' The value of 10,000 mg/l may appear more significant than it actually is unless viewed relative to the fact that it only represents a 1% solids concentration." (Commenter 139.)

Response: Suspended solids concentrations are measured and recorded by the U.S. Geological Survey and other investigators in the units of milligrams per liter. Recording concentrations by weight percent, e.g., as percent solids concentration, is not a generally recognized standard of reference, and therefore was not used.

382. Comment (in reference to the Surface Water Quality Technical Report): "Page 14, Paragraph 5 'The ETSI coal slurry...coal processing procedures (i.e., source mine, coal storage conditions and time), quantities of substances...a given well field.' The coal processing procedures listed as examples will vary and may affect final wastewater quality significantly, while the actual slurry processing procedures will remain relatively constant." (Commenter 139.)

Response: Section 1.E of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised.

383. Comment (in reference to the Surface Water Quality Technical Report): "Page 15, Table 1-8 'Preliminary Projections of Chemical Characteristics of Proposed Project Coal Slurry Simulation Filtrate Dewatering Plant Effluent.' Change (delete words enclosed by<>) to avoid confusion and remain consistent with later tables." (Commenter 139.)

Response: Table 1-8 summarized the range in chemical concentration as observed directly from the simulation tests completed to date. Therefore, it would be misleading to title the table as projections of the dewatering plant effluent. The projections appeared in a separate table (Table 1-9, page 16) of the Surface Water Quality Technical Report (WCC 1980c).

384. Comment (in reference to the Surface Water Quality Technical Report): "Page 15, Table 1-8 Footnotes should read [a]For the ranges shown, the maximum value reflects the sum of the highest concentrations of constituents in the carrier water and the maximum leachate concentrations.'

These concentrations are not representative of any measured filtrate concentration. Values were calculated using the maximum concentrations measured or predicted in the slurry transport water and the maximum concentration increases for the parameters listed for all the simulation runs." (Commenter 139.)

Response: Table 1-12 of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised.

385. Comment (in reference to the Surface Water Quality Technical Report): "Page 17, Paragraph 1 Insert as the third and fourth (next to last) sentences in the paragraph, 'The 'worst case' is determined by combining the highest concentration of coal leachate from all the simulation runs with the highest measured and projected concentrations of constituents found in the individual monitoring wells. As such, the probability of occurrence of the worst case condition should be considered small.'

The 'worst case' has not been reproduced in the simulation tests. It represents a combination of two extreme conditions: the highest concentration of constituents leached in any of the simulation runs, and the highest measured and projected concentrations of constituents in any of the individual monitoring wells." (Commenter 139.)

Response: Section 1.E of the Final Surface Water Quality Technical Report Technical Report (WCC 1981c) has been revised.

386. Comment (in reference to the Surface Water Quality Technical Report): "Page 17, Paragraph 2 'Chemical analyses...on the filtrate resulting from <(two)> (five) separate slurry simulation tests.' Additional simulation tests results are now available. (Delete word marked by<>)." (Commenter 139.)

Response: Tables 1-9 through 1-13 and Section 1.E of the Final Surface Water Quality Technical Report (WCC 1981c) have been revised.

387. Comment (in reference to the Surface Water Quality Technical Report): "Page 19, Paragraph 1 As shown, these...criteria (total dissolved solids, sulfate, and chloride) on the basis of natural background condition,... such as dissolved oxygen, pH, and turbidity.

Add the above statement to clarify the wide range of values given for the various states' mineral criteria and to indicate the rationale for these based on natural conditions rather than strenuous environmental laws." (Commeter 139.)

Response: Section 1.F of the Final Surface Water Quality Technical Report (WCC 1981c) has been revised.

388. Comment (in reference to the Surface Water Quality Technical Report): "Oklahoma was omitted from tables 2-4 and 2-5, pages 43 and 45, respectively." (Commenter 231.)

Response: No data were available from the state of Oklahoma to include in Tables 2-4 and 2-5 of the Surface Water Quality Technical Report (WCC 1981c).

389. Comment: "Page 4-111, par. 5. Biological treatment requirements may differ from equivalent secondary level of treatment. Discharge levels will be required to meet best conventional pollution control technology by 1 July 1984." (Commenter 231.)

Response: At this time, uniform federal requirements governing biological treatment for coal slurry effluents have not been established. The selection of the type of control technology would be made as part of NPDES applications, in consultation with applicable state and federal regulatory agencies.

Recycle Alternative

390. Comment: "Why is the possibility of a closed water system not explored? It would reduce waste of badly needed Wyoming water and pollution of rivers by dewatering plant effluent. Please address these points in the final EIS." (Commenter 215; also, 153.)

Response: A closed water system has been analyzed in the Final EIS, Section 1.R.5, Complete Recycle Alternative.

391. Comment: "The reasons given for eliminating a return water line from detailed consideration are inadequate. The added energy cost of constructing and operating a return line should be directly compared to the cost of constructing and operating the various well-field and water-pipeline alternatives. Note that this return water pipeline alternative, even with its additional energy requirements, is more efficient than the coal cleaning alternative, which was given detailed consideration in the EIS. Moreover, the requirement for 1090 additional acres for construction of the return line is insignificant compared to the total acreage disturbed by the project, and should not be adduced as a reason for eliminating this alternative from consideration. Considering the fact that the return water line could

undoubtedly be laid right along side the slurry pipeline in the same trench, it is not felt that this estimated acreage (even if correct) should have entered seriously in the rejection of the recycling alternative. (Commenters 46, 72, ED-8, ED-14, WY-3, WY-6, WY-8, NE-9.)

Response: Costs are not considered in the Department of the Interior's EIS process. The purpose of the EIS is to assess the environmental impacts of a proposed action and alternatives. Costs are considered in the decision process through the preparation of separate documents. CEQ regulations do not require an exhaustive examination of all possible alternatives, but rather an analysis of all reasonable alternatives (CEQ 1502.13 a).

The return water line discussed in the DEIS, page 1-71, was not a recycle line. It was a line to obtain water from the closest point on the Mississippi River. The alternative has been renamed Mississippi River alternative to avoid the impression it is a recycle line (see Section 1.R.4 of the Final EIS). Because of engineering constraints, maintenance and repair procedures, it is not feasible to lay any return water line in the same trench as the slurry line. It would be laid adjacent to the slurry line and would require some extra surface disturbance.

An analysis of a complete recycle line has been included in Section 1.R.5 of the Final EIS. This alternative would treat and recycle water from all of the market locations.

No-Action Alternative

392. Comment: "Page 1-61. The term 'special high power locomotive' is used. Most railroads use standard SD-40 3000 hp locomotives for coal unit trains. The only special item on these locomotives would be the gear ratio, a creep control device and the paint job. The term 'special high power locomotive' is not correct." (Commenter OK-1.)

Response: The term "special high power locomotive" was contained in the railroad-approved description of the no-action alternative. It has also been used in other general description of unit coal train operations (McGraw 1979, page 51).

393. Comment: "The statement 'Depending on capacity requirements, portions of the track will be 136 lb/yd continuous welded rail' is not correct. The weight of rail has little influence on line capacity. Weight of rail has more to do with economic life of rail in relationship to maintenance of way cost." (Commenter OK-1.)

Response: The 136 lb/yd continuous welded rail is preferred when anticipated hauls are heavy. Lighter rail deteriorates more rapidly under such conditions. Section 1.Q.1 of the Final EIS and Section II.6 of the Final No-Action Technical Report (WCC 1981i) have been revised to clarify this point.

394. Comment: "The statement 'portions of the route will be double tracked, which permits operation of trains in both directions at the same time' implies that the

railroads cannot operate trains in both directions on a single track line segment. The implication regarding a single track line segment is incorrect." (Commenter OK-1.)

Response: Significant capacity increases can be realized through construction of appropriately placed sidings that allow operation of trains in both directions on a single track. Double tracking further expands capacity. Section 1.Q.1 of the Final EIS and Section II.6 of the Final No-Action Technical Report (WCC 1981i) have been revised accordingly.

395. Comment (in reference to the No Action Technical Report): "Page 9, Paragraph 2, Last Sentence 'Schedules for all aspects of train operation - train loading, volume transported, time of mine departure, plant arrival time - would be predetermined.' This is incorrect. Rail schedules are, at best, approximations. Schedules from affected mines are subject to change due to weather and derailments. This can be verified by mine operators." (Commenter 139.)

Response: The referenced statement is part of the operating description of the no-action alternative as provided by the railroads. As with all schedules, unusual circumstances do necessitate changes. The statement concerning predetermined operations is meant to convey the regularity and planned nature of the movement of unit coal trains. As opposed to a shipment made on demand or as needed (requiring special orders and communications between the shipper and receiver), unit coal train operations from a mine to a market are accomplished according to a regular schedule based on standing orders. The quoted statement is an accurate general description of unit train operation.

396. Comment: "Railroad-related Employment. Several errors and inconsistencies crop up in the discussion of employment under the no-action alternative. On pages 1-62 and 1-72 crew members needed for all rail operations are numbered at 2470, with an unexplained, parenthetical 1290 workers on page 1-72. On page 2-7 all 2500 rail workers are shown under Wyoming employment and an additional 3200 support workers are added to their force for a total of 5700 workes within Wyoming.

Finally, on page 4-11, it is noted that these 5700 workers will be distributed over the entire rail system. However, in this discussion the support staff workers are numbered at 2500 rather than the previously noted 3200. Clearly, this entire subject requires some reworking." (Commenter 46.)

Response: The number of crew members needed for all rail operations on page 1-72 should read 5,800, not 2,470. The 1,290 workers in parentheses refer to rail-barge operations, as explained in footnote a.

On page 2-7, these figures should not appear under "Wyoming Region." This table has been revised in the Final EIS.

On page 2-11 (incorrectly referred to as 4-11 in the comment), the 2,500 figure is correct; the 3,200 figure should read 3,300.

397. Comment: Table E-7, Page E-20 of the DEIS gives incorrect mileages. They are at variance with the data supplied in the technical report for the no-action alternative. For example, in the case of Jacobs Ranch to White Bluff, the round-trip distance by rail is declared at 2,730 miles through Orin in ICC Docket No. 36719, dated October 23, 1978 (Page 4).

This gives a one-way mileage of 1,365 miles and agrees with Page 25 of the No-Action Alternative Technical Report, rather than the 1,137 miles used in Table E-7. If other mileages are corrected according to Table II-5 of the technical report on the no-action alternative, the net ton-miles would increase to 49,814 ton-miles. The energy consumption in the no-action all-rail alternative would therefore rise to 615,533 Btu/ton instead of 534,000 Btu/ton in Table E-7 or 570,000 on Page 2-2 in Table 2-1 and Page 5. (Commenter 139.)

Response: Mileage and other related changes have been made in Table E-7 and E-8 of Appendix E of the Final EIS and Table II-5 of the Final No-Action Alternative Technical Report.

398. Comment: That same table (Table 4-4) shows a clear double counting of all the coal movements going to ETSI destinations. That Peat, Marwick, Mitchell study I referred to earlier makes it clear all tonnages were included in the train movement estimates which were developed. Furthermore, every single one of the power plants listed as users of coal by the proposed ETSI pipeline is either presently receiving coal by rail or has made plans for future coal delivery by rail. Obviously they would have to switch to slurry if they chose to do that. The important thing is all of this tonnage has been included in Burlington Northern's projections and certainly is included in DOE's coal production forecasts, which do not discriminate between coal which will be transported by different models." (Commenter WY-1.)

Response: Appropriate revisions have been made in the Final EIS to correctly reflect train movement.

399. Comment: "Also omitted under socioeconomic impacts, particularly for the southern Black Hills, is a consideration of the difference between the short-term jobs for pipeline alternatives and the long-term jobs for railroad alternatives. This is a key consideration for the Edgemont area, where recent expansion of Burlington Northern facilities has taken place. More jobs in relation to those facilities would provide long-term work, while pipeline construction would provide only short-term work. This difference is mentioned briefly (page 2-12), but a thorough consideration of what the difference means to the local economy, social life, and facilities should be included in the Final EIS." (Commenter 33; also, ED-4.)

Response: Map A-1 of the map volume and Map 1-1 of the Draft EIS showed the railroad route incorrectly. The correct route (shown on Map II-1, page 10, of the No-Action Alternative Technical Report (WCC 1980i)) does not pass through Edgemont. This error has been corrected in the Final EIS.

In addition, with the level of detail available, it is impossible to predict the specific impact on any one community. This was explained in the Draft EIS on page 4-111, under Employment.

400. Comment: "There appears to be a discrepancy between the DEIS text and maps concerning the proposed pipeline and alternative routes. Maps A-1 and 1-1 show the all-rail alternative as being routed through Edgemont, South Dakota, while the text (Sections 3.I.1 and 4.I.1) indicates a southerly route through Guernsey and Torrington, Wyoming. Clarification of this discrepancy is recommended and, if the all-rail alternative is indeed proposed to pass through Edgemont, an assessment of socieonomic and other potential impacts to the town should be included in the final EIS." (Commenter 7; also, ED-6.)

Response: Although a Burlington Northern rail line does pass through Edgemont, this route is not the one that would be used by the no-action alternative. Burlington Northern would use the southern route through Guernsey and Torrington. Maps A-1 and 1-1 have been corrected in the Final EIS.

401. Comment: "Reference is now made to the portion of the above mentioned handout (public hearing handout) relating to railroad grade crossing accidents. I doubt if the figure given, 17 accidents per year, reflects the fact that rail/highway grade separation projects are being planned. Even now, in Littleton, Colorado, construction has already begun to place a coal hauling railroad line is a subway in order to eliminate grade cross ings. In the east, such projects have been commonplace since the turn of the century. They now will become so in the west." (Commenter 169.)

Response: The accident calculations indeed represent an assumption of current conditions. The efforts of railroads and communities alike to provide overpasses and track reroutings were noted in Section 4.I.1, Community Disruption, of the Draft EIS and Section III.5 of the No-Action Technical Report (WCC 1980i).

402. Comment: "On page 4-117, Rail Accidents, the discussion on this issue concludes that 17 fatalities per year, noted as accidents in this paragraph, occur as a result of the movement of 37.4 million tons of coal for the proposed route by rail as small and insignificant. For the final environmental impact statement, 'accidents' should be listed as fatalities, and this should be considered as significant rather than as a 'small and insignificant' feature.... Also, secondary

fatalities associated with unit-train traffic, not directly caused at grade crossings or by collisions, are not assessed; that is, when a fire engine, ambulance, medical rescue unit, police car, etc., are prevented from getting from their side of the track to the emergency site due to the unit train passing the crossing." (Commenter CO-1; also 139, NE-1.)

Response: Section 4.L.1 of the Final EIS has been revised to incorporate changes in the calculation of fatalities. Additional information on grade crossing delays to emergency vehicles has been qualitatively addressed in response to No-Action Comment 413. The questions of fatalities directly due to the delay of emergency vehicles is one for which insufficient data exists to support a quantitative answer.

403. Comment: "On page 4-117, the EIS states that the rail accidents attributable to the all-rail alternate would be small and insignificant compared to pipeline transportation. Documentation from the National Transportation Safety Board and the United States Department of Transportation Office of Pipeline Safety does not agree with this statement. (Documentation to support statement supplied by commenter.)" (Commenter KS-1.)

Response: The statement on page 4-117 of the Draft EIS was not meant to compare rail-related accidents to pipeline-related accidents as implied in the comment. This statement has been revised in the Final EIS.

404. Comment: "Page 4-111, Para. 4.I.1 of the DEIS states that 'train derailments.... are not considered (Boyce 1980).'

Does this mean that all impacts of derailments:

- Injuries
- Destroyed equipment
- Fuel to fix the derailment
- Replacement steel and fuel to make steel
- Evacuation of people

should not be considered because a railroad proponent said so? This is biased in favor of the No Action Alternative." (Commenter 139.)

Response: Section III.4 of the No-Action Alternative Technical Report discusses the problem of derailments. They are not discussed in the Draft EIS, because they accounted for only a small number of rail-related accidents. Specifically, derailments were responsible for 0.68% of all railroad non-fatal casualties occurring from 1977 through 1979, and for 1.24% of all railroad fatalities during those same years. Casualties were primarily railroad employees (DOT 1978, 1979b, 1980a).

As far as damaged equipment is concerned, this is mostly a financial problem for the railroad company itself. Derailments are usually not a problem for the public (Boyce 1980).
Public evacuation normally occurs when a toxic substance is involved in a derailment. Coal is not considered toxic under such circumstances.

The accident rate for Burlington Northern coal trains is one-third the rate for other Burlington Northern trains (DOT 1977, 1978;

Public evacuation normally occurs when a toxic substance is involved in a derailment. Coal is not considered toxic under such circumstances.

The accident rate for Burlington Northern coal trains is one-third the rate for other Burlington Northern trains (DOT 1977, 1978; Boyce 1981a).

From 1976 to 1980, BN coal trains were involved in 7.5% of all BN train accidents which caused damage to nonrailroad property. These accidents involved 4.6% of the total damage cost caused by BN accidents to nonrailroad property (Boyce 1981).

Of a total of 88 BN coal train accidents in 1980, 66 involved loaded coal trains, for a total coal loss of 53,012 tons, valued at $424,100.00. This amounts to about 803 lost tons per each involved train, or an average loss of about 8 percent of the load per involved train (Boyce 1981b).

Spilled coal is buried in pits on the railroad's right-of-way and covered. If coal is spilled in a town or community, it is hauled away by truck and buried to the satisfaction of local authorities. Spilled coal is not salvaged, because power companies generally refuse to take it, claiming it is contaminated. No private salvagers have indicated an interest in it (Boyce 1981b).

For further details on railroad accidents, please see the response No-Action Comment 402.

405. Comment (in reference to the No Action Alternative Technical Report): "Pages 55-59 These pages discuss a predictive model on rail accident rates, but fail to relate it to the routes in the DEIS. A more accurate assessment of loss of human life could be made by displaying a table of estimates calculated by the different procedures." (Commenter 139.)

Response: The Schopper-Hoyt model was presented in order to bring to light the set of conditions governing grade-crossing safety at any given grade crossing. This information can be readily extracted by the reader without a real-life example. In order to use the model to predict accidents over the proposed route, data would be needed on over two thousand grade crossings.

The accident predictions chosen provided meaningful results with reasonable data requirements. (Please also see further discussion on accidents in the response to No-Action Comment 402.)

406. Comment: "As stated in the November 30, '77 report by Department of Energy, and I give the reference, 'A decision to move all the western coal on the railroads will, in effect, condemn to death over the next 30 years several thousand people who would otherwise survive.' Moreover, the EIS is silent on the cost of injuries and equipment in the frequent nonfatal accidents." (Commenter WY-5.)

Response: All the western coal would not be moved by the no-action alternative. The alternative is sized to carry the amount of coal that would be carried by the pipeline.

According to our predictions, expected fatalities from increase rail traffic due to the shipment of the 37.4 MMTA of coal would amount to a figure far below "several thousand" after a thirty year period. See response to No-Action Comment 402.

407. Comment: "Page 6, Para. 5 'No significant impacts on wildlife would be expected from the no-action alternative.' Page 4-111, Para. 6 'No major impacts on other resources...Thus no discussion is presented for... wildlife...for the no-action alternative.' Recommend changing these statements to show impacts on wildlife resulting from a predicted 29% increase in rail traffic in Wyoming and Nebraska." (Commenter 139.)

Response: Section 4.L.2 of the Final EIS has been revised to include a discussion of impacts to wildlife.

408. Comment: "Page 5 and Page 4-119 omit mention of coal car derailments as one impact of the No-Action Alternative. The impact of coal car derailments should be noted to correct this inadequacy." (Commenter 139.)

Response: The effect of coal car derailment on aquatic biology has been added to Section 4.L.3 of the Final EIS.

409. Comment: "The reader should be referred to the report done by the Office of Technology Assessment in January 1975, which report is much more concise and covered a broader spectrum of impacts, such as train noise, right-of-way fires, locomotive diesel emissions, fugitive coal dust, impact on wildlife, and energy/materials use.

Page 146 of the OTA Report shows for the nearest example, Wyoming to Texas, to the Proposed Action of the DEIS that the total energy required for rail is 25% greater than by pipeline." (Commenter 139.)

Response: Impacts of the no-action alternative on noise, locomotive emissions, and fugitive coal dust were presented in Section 4.I.3 of the Draft EIS. The analysis of energy use was discussed in detail in Appendix E of the Draft EIS. Additional information on impacts to wildlife has been added to the Final EIS (Section 4.K.2). A discussion of right-of-way fires has been added to Section 4.K.1.

The OTA report does not cover the same action or area as the proposed ETSI pipeline project; therefore, use of its figures in this EIS is inappropriate. However, the report was considered in the development of the Draft EIS as indicated in Section 4.I.3 and Appendix E, among others.

410. Comment: "On page 4-117 of the EIS, reference is made to the fact that rerouting would eliminate these impacts, but the

assumption in the last paragraph under "Community Disruption" appears contradictory. It is also presented in such a way to have the reader feel it represents the conclusion from this section. I feel greater emphasis has to be given to the more realistic result - construction of rerouting track. I recognize that this type of action is not within the jurisdiction of DOI, but is consistent with CEQ regulations." (Commenter 217.)

Response: In Section 4.L.1 of the Final EIS, the sentence has been revised to indicate that any community disruption would be a result of all railroad traffic growth.

411. Comment: "Second example, EIS Page 4-117, same page, 'Precise estimates of the impacts due to the 37.4 MMTA related traffic are further complicated by the fact that the railroads have been working extensively with individual towns to relieve perceived or anticipated problems'. I take strong exception to this statement. Something as simple and cheap as a decent railroad crossing takes years of work and pressure on the railroad." (Commenter NE-1.)

Response: The present wording of the text does not indicate that the railroads have been working with all towns. There are, of course, exceptions, as the commenter indicated.

412. Comment: I submit that all rail alternative does have an impact on certain of our small communities. The draft statement seems to me to say that it does not have an impact, or, at least, a very minimal one.

If I may, I would like to cite an example of a town in eastern Kansas at which I am working, a town of about 4,100 persons. It is divided almost in equal parts by the railroad, by the Missouri Pacific. On one side is housing and on the other side is the industry, the main part of town, the city hall, the fire equipment, police.

This town has the major intersection or switching point on the Missouri Pacific. They currently have some 40 trains per day. These trains are moving at a speed of less than 30 miles an hour. As a matter of fact, our study shows that over a one-week period it averages that they are moving more like eight or nine miles per hour.

By the year 2,000, the Missouri Pacific Railroad anticipates there will be over 100 trains per day. Each of those trains have an average of 85 units. The coal trains that we counted have an average of 100 to 115 units. So you can see that when the coal trains increase two to three times what they are today, by the year 2,000, you have a real problem of access in this town.

This National Transportation Study Commission forecasts that this town will be a major access point on the Missouri Pacific to which unit coal trains moving to the south and southeast connecting with Pueblo, Colorado, to the west and to Kansas City, Missouri, on the northeast. This, in turn, ties with the Union Pacific Railroad and, of course, to the great northwest great plains coal fields.

They have further forecast that 5.1 million tons of western coal by 1985 and 20.5 million tons of western coal by the year 2,000 will be moving through this point.

The current rail traffic in this town is causing major occurrences. The 1980 rail traffic is causing major street traffic delays at some six crossings.

During our survey, the main street crossing was blocked 20 to 25 percent of the time. I am not talking about 20 or 25 times, but out of a 24 hour period, we are talking about five or six hours of time that those streets were blocked. You can see that when you multiply this by two or three times, it is going to be almost impossible. It is estimated that the delays are costing the city and its residents $175,000 annually. With the advent of the rail traffic increasing, the city's going to have to spend more than $1 million for some bridges. (Commenter KS-3.)

Response: Regarding the question of community impacts, please see the response to No-Action Comment 410. The EIS does not indicate the incremental increase of 37.4 MMTA of coal by itself to be potentially disruptive to affected communities at a significant level. The EIS estimation of community impacts is based on those rail traffic predictions that appear within the EIS.

For additional information on crossing delays, please see the response to No-Action Comment 413.

413. Comment: "Page 4-117, Paragraph 3, community disruption is due largely to the presence of at grade crossing, which when occupied by a train results in passenger vehicle delay, as well as possibly an emergency vehicle delay. We'd like to make this comment. We feel this sentence understates the matter in the Draft EIS. It's covered more thoroughly in the technical report on the no-action alternative. I would suggest, so everybody can see the matter clearly when it comes to comparisions, this paragraph be added to the final EIS. 'Alan Boyce of the Burlington Northern notes that in the February, 1980, issue of Western Planner, five adverse impacts were noted, including emergency vehicle delay, vehicle delay in general, safety hazards, inefficiency in community growth and economic variability, and severance of community services. In the same publication the list was expanded by Mayor Michael Enzi of Gillette to include noise and dust pollution. An area within two thousand feet from the tracks would be exposed to noise above 55 decibels. In Torrington, which receives no economic benefits from rail traffic increases, the community facilities, including churches,

library, and a home for juveniles, sit within five hundred feet of the track center line.' This additional information shows that community disruption does extend beyond the immediate area of grade crossings." (Commenter RC-1; also, CO-1, 139, 211.)

Response: Community disruption was discussed at length in the No Action Technical Report (WCC 1980i), Section III.5. The Draft EIS does not attempt to understate the magnitude of the potential impacts to communities due to increased unit train operations. Problems concerning rail-related accidents and vehicle delay were discussed on page 4-117 of the Draft EIS; noise problems were discussed on page 4-119.

414. Comment: "The DES addresses the problems experienced by towns divided by railroad tracks such as delays for emergency equipment. The FES should give an estimate of the length of these delays." (Commenter 72; also, OK-1.)

Response: Section 4.L.1 of the Final EIS has been revised to reflect the potential delays that could occur.

415. Comment: "We did find, however, that the document understates the impacts of the no-action alternative. If the no-action alternative is selected, impacts to the areas could be greater than those constructing the pipeline. These impacts would include all impacts associated with transport of coal by rail or possibly those from burning the coal in Wyoming. Water use population increases, and wildlife habitat losses of the no-action alternative could be much greater without the pipeline." (Commenter 72.)

Response: The no-action alternative would not result in the burning of coal in Wyoming, so no impacts were assessed. As stated in the analysis of the no-action alternative, Draft EIS Section 4.I.1, no significant population increases would be expected at any one locale for the no-action alternative. Also as stated in the Draft EIS, Section 1.N.1, no additional acreage would be required, so additional habitat impacts would not occur. In the Final EIS, Section 4.L has been revised to include impacts from the no-action alternative on terrestrial fauna.

416. Comment: "Also, you did a splendid job of addressing the adverse social impacts of the no-action or railroad alternative, but nowhere did you address the positive economic impacts creating 2,500 permanent railroad jobs might have on our depressed economy. What are the benefits? Can you prove that railroad employment created domestic violence, alcoholism, drug abuse in our rural railroad towns as referred to on Page 3-125 and also 4-117?" (Commenter ED-12.)

Response: Alcoholism, child abuse, and drug abuse are well documented as problems associated with rapid population growth, particularly in what is termed boom town conditions (University of Wyoming 1979). Perhaps the most often referred to is Rock Springs, Wyoming, where rapid population increases occurred as a result of energy development. The statement concerning conditions in rural railroad towns, specifically Alliance, is not a reflection on railroad workers, but rather a statement of what can happen if a town grows too fast.

Twenty-five-hundred jobs is an upper bound on the number of jobs that would be created by the movement of 37.4 MMTA of coal by rail. It would more likely be less due to industry overemployment and the closing down of other lines or route segments. Because any new employment would likely be widely dispersed, it would be individually significant, but it was not felt that it would greatly impact any one community, either positively or negatively.

417. Comment: "The DEIS recognizes that the most important planned project affecting the all-rail (no-action) alternative is the Chicago and North Western (C&NW) Coal Line Project. The Interstate Commerce Commission (ICC) has made an initial decision to approve C&NW's entry in the Powder River Basin (October 7, 1980) partly on the basis of the proposed final EIS issued May 1980. Government support for the financing of this project is still under consideration by the Federal Railroad Administration (FRA). The FRA has not yet released its final EIS on the C&NW application. The final EIS for the coal slurry pipeline project should include reference to the ICC environmental document." (Commenter 211.)

Response: The Final EIS (Section 1.Q.1) and the Final No-Action Technical Report (Section II.7) have been revised to include the current status of the Coal Line Project EIS.

418. Comment: "In making this evaluation, however, the Draft Statement seriously erred in erroneously limiting its considerations essentially to the railroad route of the Burlington Northern and its connections and failing to recognize the alternate availability of the railroad route of the Union Pacific and its connections for the same transportation service proposed by ETSI. The failure to consider the alternate availability of the Union Pacific route, in turn, prevented a recognition of the fact that a dispersal of the coal traffic over several alternate rail routes would materially lessen the potential socioeconomic impact on communities and would thus make rail service a far more reasonable alternative to the coal slurry pipeline proposal." (Commenter 137.)

Response: The analysis was limited to the BN route, because it is thought to be the only existing route capable of handline 37.4 MMTA. The status of C&NW-UP route was noted as a possible future additional rail alternative. The current status of the route is documented in the Final EIS (Section 1.Q).

Impacts of the BN route will be distributed across other systems to the extent that future traffic may change to the C&NW-UP route. Substantial interconnection of traffic between BN and UP at Northport was not considered a feasible alternative for the routine handling of unit coal trains carrying 37.4 MMTA of coal. Such an interconnection would reduce rail efficiency per increases in switching time, travel time, and operation complexities. Additionally, use of two railroad lines where one can achieve the same results is counterproductive from a railroad management, profit-making perspective.

419. Comment: "Page 2-11, Para. 5 of the DEIS states, 'There would be no construction required for the all-rail alternatives.' This statement conflicts with the current effort of the C&NW and the UP to build a new rail connector line from Van Tassel, Wyoming to Joyce, Nebraska. The route of the line through agricultural land has generated opposition to the project even though it would help bring competition to the BNRR. A typical news item is attached.... In addition, change the statement about no impacts on other resources. Impacts will be experienced on wildlife, agriculture, visual resources, recreation and air quality for the new line above. Dust churned up by trains affects air quality. It contributes to dust pneumonia as it falls on foliage eaten by livestock and wildlife. Some disturbance of the immediate ecology, as well as some loss of production, may result from the periodic application of herbicides necessary for railroads to maintain their rights-of-way." (Commenter 139.)

Response: The no-action all-rail alternative is an existing route and one used for unit coal-train traffic. For this reason, it was stated that no construction would be required to allow movement of 37.4 MMTA of coal should the ETSI pipeline not be built. It is correct that the C&NW, UP rail line would require construction prior to its use for coal delivery; however, this is not the alternative assessed in this EIS. The impacts of this construction are covered in the Coal Line Project EIS (DOT 1980). See also the response to No-Action Comment 418.

420. Comment: "South Dakota taxes its citizens on gross purchases to purchase and ultimately operate railroads. This EIS is inadequate in that it does not recommend the Chicago and Northwestern Railroad build a line of approximately 60 miles in length southwest from their existing railhead at Bentonite Spur, Wyoming, which is northwest of Belle Fourche, South Dakota, to the Gillette coal fields, and start hauling coal into and through South Dakota, which business the Chicago and Northwestern needs to stay solvent, and which rail traffic would guarantee the continuance of railroad service in western South Dakota. Some of this coal could be railroaded to the Missouri

River and barged south. All of this would add to the economy of South Dakota." (Commenter ED-7.)

Response: It is not the function of this EIS to recommend one railroad over another, because the subject of this EIS is not a railroad project. Taxes generated by the proposed C&NW connector line are covered in the Coal Line Project EIS published in 1980 by the Federal Railroad Administration.

421. Comment: "The DEIS concludes that if ETSI is not built, the Burlington Northern, Inc. (BN) could handle the 37.4 MMTA without any capacity improvements beyond those included in their current investment plans (see p. 1-57). Based on the BN's five year plans for improvements to coal lines, by 1985 BN will be able to move approximately 150 million tons annually from the Powder River Coal Region. As long as total coal transportation demand does not exceed 150 million by 1985, (including the 37.4 MMTA that would otherwise move on ETSI), the DEIS is probably correct in its assessment of rail capacity.

The assumptions behind this conclusion deserve close scrutiny, however. According to some sources (including the Department of Interior), coal production in the Powder River Region could reach levels substantially above 150 million tons in the next decade. Under these circumstances, the all-rail alternative would require expansion or rail capacity, either through additional improvements to the BN, or through the addition of another carrier. The addition of capacity by the BN to handle additional traffic demands beyond its existing plans depends on the BN's future business decisions. Such decisions would be based on an assessment of the value of investments to the company." (Commenter 211.)

Response: Regarding railroad ability to carry future coal loads, assumptions used in formulating EIS conclusions are based on the following points: BN itself has indicated (p. 1-57, Draft EIS) that it could handle the 37.4 MMTA of coal; BN's traffic projections for 1986 include the 37.4 MMTA. As indicated in the response to Section 6.E.2, Pipeline Effects on Railroads Comment 166, several estimates have been made for the demand (and subsequent production) of Powder River Basin coal. It is generally agreed that the demand will not exceed the lower bound estimates of 140-150 MMTA by 1985; this is largely due to energy conservation measures and construction delays which have transpired.

For information concerning possible loss of business by the railroads, see Section 6.E.2, Pipeline Effects on Railroads, the response to Comment 166.

422. Comment: "The Alliance story is the epitomy, but it is indicative enough that I would ask everybody here at this meeting to consider my belief that this study on the socio-economic

impact is not, if not the entire study, contains impertinence, unscientific approach, and lack of study, to make it unreliable and invalid." (Commenter NE-2.)

Response: The assessment of impacts, socioeconomic and environmental, was done consistent with NEPA guidelines and followed accepted analytical procedures. Unfortunately, the Draft EIS omitted a reference documenting some of the information regarding Alliance. The Final EIS description of Alliance in Section 3.L.1 has been revised.

423. Comment: "The DEIS partly justifies the ETSI project on the basis of its independence from petroleum based on energy. Although the rail mode is recognized in the DEIS as more energy efficient than the proposed pipeline, the DEIS observes that the source of power for the slurry pipeline system would be electricity produced by coal-fired power plants, whereas an all railroad system would require the use of 2.8 million barrels of diesel fuel annually. The EIS does not place this use in the context only 1 1/2 percent of the nation's petroleum and only 17 percent of the petroleum used for freight transportation. The 2.8 million barrels represent .07 percent of the fuel used by all the railroads in 1979.

Moreover, rail dependence on petroleum based fuel may change over the next decade. The FRA has proposed a project to electrify major freight rail lines in the United States, and the railroad industry is working with FRA to study and develop such a program. Many of the rail lines most heavily used in the movement of coal unit-trains would be among the first to be electrified, whether under an FRA-sponsored program or otherwise. Once electrified, railroads, like the proposed slurry pipeline, would not be dependent on diesel fuel for power since the electric generation would be powered by coal." (Commenter 211.)

Response: Section 1.C of the Final EIS has been revised. A discussion of rail electrification has been added to Section 1.R.4 of the Final EIS.

424. Comment: The EIS states that the railroads depend on diesel fuel. This is not necessarily the case. The railroads are looking into other sources of power such as rail electrification (with the benefit of regenerative braking) fluidized bed technology, and coal-fired locomotives. The mention of oil-derived diesel and undeveloped coal-based fuels should not end the discussion of railroad fuels, as renewable fuels are available: specifically alcohol and vegetable oils. Both, being renewable and produced in the United States, are safe fuel supplies bringing economic benefits to this country. The Final EIS should include study of these alternatives in detail, both as to current feasibility and as to feasibility within the next fifty years. (Commenters 33, CO-3, NE-7, WY-10.)

Response: Refer to Section 1.R.4 of the Final EIS for information on electrifying the rail line and coal-fired locomotives.

At present there is no indication that the railroads would be using fluidized beds to power trains by 1985 when ETSI proposes to transport the 37.4 MMTA of coal. The railroads have not indicated that alcohol- or vegetable-oil-fueled locomotives will be in operation by 1985 to begin transporting the 37.4 MMTA of coal.

Agency's Preferred Alternative

425. Comment: "As far as the Draft EIS is concerned, I'd be interested in knowing who made the decision to pick the proposal that was picked by the Draft. Was that decision made by the EIS team and BLM and its companion organizations, or was it Woodward Clyde that made that decision or the management hierarchy in Washington, D.C., that decided this Draft EIS came out with the proposal it made? I think that is quite significant and trust in some point in time that question can be answered so the public has an idea." (Commenter ED-16)

Response: The comment is not clear in what is being referred to as the proposal. The proposed action as defined and described in Chapter 1 was proposed by Energy Transportation Systems Inc. The company applied for a right-of-way across federal land (see page 1-1, paragraph 2, of the Draft EIS). BLM, in order to act on the right-of-way request was required to prepare the EIS in compliance with the National Environmental Policy Act.

If the comment is referring to who picked the agency-preferred alternative that was identified on page 8 of the EIS, it was selected by Bureau of Land Management (BLM) and Department of the Interior officials after consultation and coordination with BLM offices and the state of Wyoming.

426. Comment: "The FES should elaborate on the fact that the agency preferred alternative for use of the Niobrara well field exceeds the criteria used to determine if the impact is significant." (Commenter 72.)

Response: The impact significance described in the introduction to Chapter 4 was developed to aid in determining whether impacts were significant. The impacts of the proposal and all alternatives were judged based on these criteria. These criteria were considered; however, the agency-preferred alternative is not required to be the environmentally preferred alternative.

427. Comment: "The EIS fails to properly, under the NEPA, to state the criteria which is used to pick its alternative. When picking what the EIS determines to be the best alternative, there is the obligation, I believe, to set forth the criteria used to pick that alternative, and also to specifically identify why the other systems and the criteria used with them were not chosen." (Commenter ED-16; also, 72,122, ED-8.)

Response: Council on Environmental Quality (CEQ) regulations do not require the identification of the criteria used in determining the agency-preferred alternative. All factors were considered by the responsible officials prior to the identification.

428. Comment: "We believe that the DEIS does not meet the intent and purpose of an EIS required by the Countil of Environmental Quality (CEQ) in the final rules and regulations (Fed. Reg. Vol. 43, No. 230) for implementing the National Environmental Policy Act (NEPA). The DEIS on page 8 and 9 states that it is the Energy preferred alternative to select the proposed route and that water for the ETSI pipline would be supplied by the Niobrara Well Field. This is contrary to the intent of NEPA, Section 1502.2 (f), that states that Agencies shall not commit resources prejudicing selection of alternatives. The fact that well field permits have been obtained should not limit the full development of, nor preclude the thorough investigation of all reasonable alternatives." (Commenter 74; also ED-10.)

Response: The Draft EIS did not identify an energy-preferred alternative. Page 8 of the Draft identified the agency-preferred alternative. The agency has not committed any resources to the project; therefore, no prejudicing of alternatives has occurred. The CEQ regulations and Department of the Interior procedures require the identification of an agency-preferred alternative in the Draft EIS. This does not prejudice the final decision which will be made by the Secretary of the Interior. The Draft EIS analyzed all known, reasonable alternatives. The Final EIS contains revisions of these alternatives as well as several new water source alternatives.

429. Comment: "In addition, the EIS gives only cursory consideration to the alternatives of recycling, the West River Aqueduct, and the all-rail alternative, without in any instance fully discussing the reasons for the rejection of those alternatives." (Commenter ED-8; also ED-5.)

Response: The only alternatives "rejected" by the Draft EIS are detailed on pages 1-70 and 1-71. These alternatives were examined but eliminated from further detailed studies for the reasons provided on these pages. This list does not include the Oahe, Crook County well field, or all-rail alternatives.

The Crook County, Oahe, and all-rail alternatives were fully analyzed in the Draft EIS, Chapter 4, pages 4-94 to 4-119. These alternatives have not been "rejected" and will be considered in the decision process.

430. Comment: "Based upon the analyses presented in the DEIS, it is not readily apparent that the preferred Niobrara County, Wyoming, well field location is the most energy efficient or environmentally sound water supply alternative for the ETSI coal slurry operation. We believe, therefore, that the final statement should consider alternative water supply systems (i.e., recycling options, alternative well field locations, etc.)." (Commenter 7.)

Response: There is no requirement that the agency-preferred alternative be the environmentaly preferred alternative. The Draft EIS considered alternative water supply systems (Crook County Alternative Water Supply System, page 4-94, and Oahe Reservoir Alternative Water

Supply System, page 4-104). A return water line alternative was examined but eliminated from detailed analysis, page 1-71.

Additional water supply alternatives have been examined and added to the Final EIS (see Sections 1.L, 1.N, 1.R.5, 3.G, 3.I, 4.G, and 4.I of the Final EIS.

431. Comment: "Page 2-1 through 2-12. The no action alternative is the most energy efficient transportation system analyzed and the least damaging environmental alternative; however, preference is given the proposed action because railroads would utilize diesel fuel with its possible dependency on foreign sources of oil. This assumes that railroads are irreversibly committed to use diesel fuel for the next 50 years, which may or may not be the case." (Commenter 231.)

Response: As required by Council on Environmental Quality (CEQ) regulations, the preferred alternative is an agency-preferred alternative. There is no requirement that the preferred alternative be the environmentally preferred alternative. It may be true that railroad technology will change within the next 50 years. However, there is no change in technology predicted to occur within the timeframe of this specific project that would meet the stated purpose of and need for its implementation.

432. Comment: "As the energy efficiency comparison now stands, the preferred alternative is less energy efficient than an all-rail mode which would utilize an existing infrastructure. Delivering energy to consumers in the most energy efficient manner should be favored as it is generally the least costly. It must emphasized that the preferred alternative selected in the Draft EIS substitutes a less energy efficient system of delivery under the guise of national security. This trade-off must be recognized." (Commenter 89.)

Response: The energy requirements of the proposed action and alternatives were shown on Tables 2-1 and 2-2 (pages 2-2 and 2-3) of the Draft EIS. The relative energy efficiencies were discussed in the comparative analyses included in Section 2.A.1 and Section 2.B of the Draft EIS. The comparison between the proposed action and all-rail mode was located on page 2-12 of the Draft. The energy trade-off involved in implementing the proposed action was identified on page 5-15 of the Draft: "Energy would also be consumed during operation at the rate of 4.0 percent of the total energy transported."

General

433. Comment: "The reason for Fort Smith's opposition to the location of the proposed coal slurry pipeline is that we are presently developing plans for a water impoundment in the lower portion of the drainage basin of Lee's Creek. Enclosed with this cover you will find an area map indicating the boundaries of the proposed impoundment, a property ownership map which also indicates the boundaries of the

proposed impoundment, and a copy of the resolution passed by the Fort Smith Board of Directors authorizing the design of the dam for the impoundment. You will note that the resolution indicates a 10 MGD impoundment. This will be the first phase of this project and will be expanded as Fort Smith and surrounding area water demand increases." (Commenter 114; also, 229.)

Response: See Section 1.P, 3.K, and 4.K of the Final EIS for discussion of minor route variation and associated impacts to avoid this proposed water impoundment.

434. Comment: "The DEIS does not include a complete analysis of all alternative methods to move the coal. The alternatives we feel are not adequately explored are the all rail alternative, the Crook County Water Supply, the Oahe Alternative and the addition of an alternative to use processed sewage water as a water source. Another site for the well field should also be considered. It would be more appropriate to restrict the impacts from aquifer drawdown to the state that has legal control over well field permits." (Commenter 74.)

Response: The comment fails to identify the inadequacies of the impact analysis for the all-rail, Crook County well field, and Oahe alternatives. Each of these alternatives were assessed in detail in the Draft EIS. The Final EIS has been revised to include analysis of the use of treated waste (sewage) water.

The recent U.S. Geological Survey report, "Potential Favorable Areas for Large Yield Wells in the Red River Formation and Madison Limestone in Parts of Montana, North Dakota, South Dakota and Wyoming" by L.M. McCary, E.M. Cushing, and D.L. Brown, was reviewed for other possible well-field locations. This report did not identify any favorable locations in the Gillette area or any areas that would confine all potential impacts to Wyoming. Therefore, no additional well fields were analyzed.

435. Comment: "There are other dams in South Dakota that were not even mentioned as sources of water and alternative sources of slurry that do not require this precious resource. Why were these not discussed in the EIS? Also the pipe size---is it available in the states or do we have to import it?" (Commenter 99.)

Response: Refer to Section 6.E.13, Oahe Alternative Comment 354 for response to comment about use of other South Dakota dams. Alternative media for slurry makeup other than water were considered in the Draft EIS in Section 1.O.2.

All pipe for the system is within the manufacturing capability of the United States industry.

436. Comment: "Buying up land containing 20,000 acre-feet of water rights along the Platte River in Wyoming and then taking the 20,000 acre-feet of hot water

from the Dave Johnston Generating Plant at Glenrock, Wyoming, is not addressed as a water source. The money that would be spent on the Niobrara well field would more than buy this land and ETSI would own the land." (Commenter ED-6.)

Response: Water in the Platte River is presently used for agricultural purposes downstream of the generating plant and would result in impacts to these users if withdrawn by ETSI. In addition, the Dave Johnston Generating plant discharges considerably less than 20,000 acre-feet of water per year.

437. Comment: "The EIS makes much about the energy to be consumed by the various alternatives, but does not mention locating the well field in Fall River County, South Dakota, where the Madison is shallower, and the cost of drilling and pumping would be less." (Commenter ED-7.)

Response: There are an infinite number of locations where a well field could be located. If the ETSI Niobrara County well field were moved north and east, toward the Black Hills, the Madison would be shallower, and drilling costs and pumping costs would be less. However, impacts on Madison wells (such as those at Edgemont), Inyan Kara wells (such as those along the Cheyenne River), and Madison springs in the southern Black Hills, would be greater. Therefore, there would be no environmental advantage in analyzing a well field in this location.

438. Comment: "I noticed in the Impact Statement when you talked about your alternative means to coal slurry pipelines in 2-11, Page 2-11 section of your statement, that you talk about railroads and barge solutions, but you didn't address burning instate coal with surface instate water and the related power lines and related problems that go along with it." (Commenter WY-15.)

Response: A discussion of alternative modes of energy generation and transmission is beyond the scope of the Draft EIS. Since the power plants to be served by the proposed coal slurry system own the coal to be mined, alternatives for consideration must be limited to satisfying this need, the transfer of coal to these plants.

439. Comment: "The Draft EIS has ignored the Council on Environmental Quality's Guidelines pertaining to the preparation of Environmental Impact Statements, specifically those which require a study of alternatives to the proposed action including those which could significantly conserve energy. (Council on Environmental Quality, Preparation of Environmental Impact Statements: Guidelines, 40 CFR 1502, 43 Federal Register 55994 and 44 Federal Register 873.) OEC feels that this is a significant deficiency of the DEIS. The consideration of the role that energy conservation and use of renewable resources can play in meeting the energy demands of the area to be served by the proposed

slurry project must be a major component of the EIS." (Commenter 89.)

Response: A study of the energy demand of the area to be served by the slurry pipeline and the effect of energy conservation on that demand is beyond the scope of this EIS. The slurry pipeline project has been proposed as and has been studied as an alternative method of coal transportation. However, as outlined in Section 1.C of the Draft EIS (page 1-2), the most recently projected coal demand figures available to the Federal Energy Regulatory Commission were used to determine that the coal proposed to be carried by slurr- pipeline would be transported to the mid-South power plants, regardless of whether the pipeline was built. See also Section 6.E.2, Pipeline Effects on Railroads, response to Comment 175.

440. Comment: "The EIS Fails to Consider All Reasonable Alternatives. The EIS does not even mention the most obvious reasonable alternatives, let alone discuss them in detail. Those other reasonable alternatives would include a well field in or near Gillette and the utilization of mine dewatering or wastewater as an adjunct to the water supply from some other source. In addition, several of the alternatives that were mentioned were dismissed in cursory fashion with no semblance of a full and complete discussion. For example, the West River Aqueduct was never fully discussed or its environmental impact evaluated, nor was the recycling alternative." (Commenter ED-8; also, ED-16.)

Response: The Draft EIS addressed all reasonable alternatives that data was available to support. Wastewater was looked at but eliminated based on the data available at that time. The analysis of the wastewater alternative has been expanded in the Final EIS. The return water line (called recycling in the comment) alternative was evaluated and eliminated from detailed study for the reasons given in the Draft EIS, page 1-71. An analysis of a complete recycle line has been added to Section 1.P.4 of the Final EIS. The West River Aqueduct (titled Oahe alternative) was fully evaluated and analyzed in the Draft EIS Sections 1.L, 3.G, and 4.G). The Final EIS includes an alternative dealing with a combined well field alternative (Section 1.L, 3.G, 4.G) and water derived from mine dewatering (Section 1.R.5), as well as revision to several others.

441. Comment: "The EIS does not address an alternate source of water that would be necessary if in fact the actual drawdown is more than what is speculated. The EIS does not show any requirement of ETSI to stop pumping in case of detrimental drawdown." (Commenter 160.)

Response: The Draft EIS addressed the Oahe Reservoir as an alternative water source. The Final EIS has been revised to address a second Oahe Reservoir alternative as well as a treated wastewater alternative. ETSI has offered the same protection to South Dakota water users as is included in the Wyoming state law (Appendix C-7 and C-8).

442. Comment: "The justification for this pipeline (Section 1-C) is presented as if coal is the only alternative to natural gas and oil in generation of electrical energy. Consequently, the DEIS fails to consider certain "no-action alternatives". The final EIS should address the energy savings generated by equivalent capital expenditure in solar heating or conservation projects and should reassess the need for this project in light of these savings. Also, the recent discoveries of significant "deep gas" reserves may reduce the need for coal in the states that this pipeline will serve. The final EIS should consider whether new deep gas supplies would render the coal slurry pipeline unnecessary." (Commenter 151.)

Response: The ETSI coal slurry transportation project was proposed as an alternative method for transporting coal to mid-South power plants. As discussed in Section 1.C of the Draft EIS, transportation of this coal is not dependent on construction of the slurry pipeline. If the pipeline were not built, the coal would still be transported to these plants, probably by the railroads. Thus, the purpose of this EIS is to analyze alternative methods of transporting coal; the use of other forms of energy is outside the scope of the statement.

6.E.14 MITIGATION

443. Comment: A number of commenters felt the EIS did not include "appropriate mitigation" as required by Council on Environmental Quality regulations (Section 1502.14 f). Examples of questions raised include: How will impacts to South Dakota and Nebraska be mitigated? How will adverse socioeconomic impacts to Lusk and other northeast Wyoming towns and counties be mitigated? Impacts to surface waters due to reduced flow rates? Who will pay for the addition of treatment expenses? What will be done to ensure adequate drinking water for the City of Edgemont? What measure will be taken to ensure adequate irrigation water for the Angostura Irrigation District? What measures will be taken to ensure domestic and livestock water for ranchers and farmers? How will the potential drawdown impact on the Gillette well field be mitigated? (Commenters 72, 138, 178
ED-9; ED-10; ED-14; ED-RC-2.)

Response: There is no indication that the measures included in an EIS have to be an inclusive list of all possible measures with no assurance that they would be carried out. Unless a specific law, such as the Endangered Species Act or the Archaeological Resources Act, provides authorization, mitigation on private land cannot be required or enforced by BLM or FS.

Therefore, the measures included in the EIS are of two types: 1) those that can be required and enforced by BLM or FS; and 2) those that the applicant (ETSI) has committed itself to carry out. Even those measures that the applicant has stated it would carry out cannot be enforced by BLM or the FS on private land. The Final EIS Mitigation section in Chapter 4 has clarified this point. Many types of measures were submitted to the applicant for approval and commitment; those that were agreed to are included in that section of the Final EIS.

The Draft EIS included the general measures that would be required by BLM and FS on the federal lands to be crossed by the project. It also contained specific measures designed to protect and mitigate possible impacts on threatened and endangered species and cultural resources. Draft agreements that ETSI has proposed to the city of Edgemont, South Dakota, and to the state of South Dakota to mitigate drawdown impacts are discussed in Section 1.F.2, Water Supply System, and are reprinted in Appendix C-10 and C-11.

444. Comment: "The DEIS does not provide any discussion of or means to mitigate damages caused to fish and wildife." (Commenter 74; also 138.)

Response: In the Draft EIS, mitigation measures related to fish and wildife impacts were discussed on pages 4-120 and 4-121 and Appendices D-2, D-4, and D-5. Also refer to the response to Mitigation Comment 443, above.

445. Comment: "Some elemental mitigating measures are common to the construction of pipelines through communities and are normally a part of the Secretarial or permitting-agency stipulations associated with these projects. Those that we are suggesting are by no means a comprehensive list of necessary steps to protect local communities, but are set forth for your own consideration as well as at the request of community leaders who specifically requested that we address this issue:

1. Prohibit construction activity at night as appropriate in order to keep noise at tolerable levels in residential areas.

2. Require prepayment of property taxes in order to eliminate local budget deficits associated with increased demand for services during construction period. Prepayment should be arranged for the life of the project where local service agencies determine that project operation places a burden on the budget structure.

3. Reroute pipeline as necessary to follow gentler slopes and avoid environmentally sensitive areas.

4. Require bussing and carpooling of construction workers to reduce, as necessary, traffic congestion.

5. Require payment of incremental electrical power costs to prevent increased electrical power costs to other customers which would be caused by the project.

6. Implement a road management program by local road authorities which would

446. Comment: "Page 4-63, Paragraph 5 Referring to the last sentence in this paragraph and possible adverse effects on recreation values of the inventoried rivers segments. ETSI would be willing to add a mitigating measure of replanting native vegetation in order to reduce bank erosion and improve esthetics (Page 4-120). Reference memo to W.A. Hale from W.B. Harris, subject HCRS interagency consultation to avoid or mitigate adverse effects on rivers in nationwide inventory.

Measure:

Reduce bank erosion and improve esthetics of bank zones disturbed by stream and river crossings by replanting native vegetation.

Effectiveness:

These actions would eliminate the disturbance of banks that might otherwise constitute more than temporary adverse impacts on streams and rivers." (Commenter 139.)

Response: This measure has been added to the Mitigation section in Chapter 4 of the Final EIS.

447. Comment: "It seems to me ETSI has offered this kind of protection (legal protection for existing Madison Formation water users), and if that offer still stands, and I am not here to interpret what Mr. Odasz said this afternoon, but that kind of discussion should be included in the Environmental Impact Statement." (Commenter RC-2.)

Response: ETSI's proposed agreements with Edgemont and with the state of South Dakota for protection against drawdown impacts are included in Appendix C-7 and Appendix C-8 of the Final EIS. However, these are draft, unsigned agreements that only have been offered to the respective parties by ETSI.

448. Comment: "It appears the only relief for any South Dakota people would be a well ETSI would drill for the City of Edgemont. Unfortunately, this drawdown would affect much more than the City of Edgemont. I am afraid that even this promise of a well is not mentioned in the EIS, and it should have been." (Comment ED-14.)

Response: The well that ETSI is committed to drill for Edgemont was discussed in the Draft EIS in Appendix C-6, page C-29. ETSI has offered to extend protection to existing Madison ground-water users in South Dakota as explained in Section 1.F.2, Water Supply System, of the Final EIS. The unsigned draft agreement is included in Appendix C-8 of the Final EIS.

449. Comment: "Not also addressed is where an additional water supply would come from. One additional well to serve only Edgemont does not protect the rest of Fall River County. In fact, it would not compensate Edgemont if the wells would require pumping. This financial aspect needs to be addressed in the Environmental Impact Statement." (Commenter ED-13.)

monitor road use and require reimbursement for costs of road repair.

7. Restrict construction around seasonal recreation facilities and agricultural areas in which the growing season and/or harvest might be adversely affected.

8. Establish public relations and coordination program to control labor supply in order to reduce an influx of unemployed job seekers.

9. Use stronger pipe in unstable and potentially unstable areas to absorb stress caused by slope failure and prevent pipe rupture.

10. The project calls for periodic sampling of drawdown at the well supply area. Similar sampling should be provided along the pipeline route and at the terminals to provide early warning of contaminated water.

11. Schedule construction activities to avoid periods of sensitivity which could reduce wildlife populations.

12. Water sprinkle disturbed soils in rural areas during construction to eliminate to the extent possible soil losses from fugitive dust.

13. Clear flood debris from streams at stream crossings; divert flow around construction area to reduce sediment concentration and siltation; and require barge or onshore storage of streambed spoils.

14. Revegetate corridor with plant species beneficial to wildlife, particularly in areas where valuable summer or winter food species would be removed; as appropriate, revegetate to control erosion. Vegetative screen may be useful in eliminating visual intrusion of right-of-way and facilities where the route crosses trails and scenic travelways.

15. Reroute pipeline to avoid subsurface drain tile in agricultural areas or modify existing drainage systems encountered to insure proper drainage. Existing pipeline fields, especially in Kansas, will require particular measures to protect the integrity of agricultural and other use.

16. Require use of aerial, cable, or other special equipment and methods to transport material and equipment in areas where extensive road construction would be undesirable.

17. Require that construction activity be coordinated with other major construction efforts in the area.

18. Provide field medical personnel during construction to reduce demands on local medical personnel.

19. Remove waste rock from construction area to appropriate dump site, subject to approval of local authorities.

20. Avoid use of herbicides for corridor maintenance to the extent possible to eliminate impact on agricultural activities and human health.

21. Establish construction work hours to avoid established traffic congestion hours on access roads.

22. Maintain a buffer zone of one mile around bird nesting areas." (Commenter 122.)

Response: Please refer to the response for Mitigation Comment 443. In addition, each point raised in the comment is discussed below:

1. There was no identified impact that would require this measure. There is no indication that construction would be taking place at night or in residential areas.

2. The only area of possible impact of this nature occurs in Wyoming. BLM and FS have no authority to require this type of measure.

3. This procedure is already covered in the Draft EIS, pages C-1 and C-2.

4. No impacts of this nature were identified. Worker transportation would be the responsibility of the individual contractors hired to construct the line. This cannot be required or enforced by BLM or FS.

5. No impacts of this nature were determined to occur, and there is no reason to believe that they would occur. If the power companies do not have the power to sell, they would not sell it. Rates are established by either state public utility commissions or the Federal Energy Regulatory Commission.

6. Any problems of this type that might develop would be handled by the state or local authorities who require and enforce road use and weight limits.

7. Problems of this nature would be handled by the procedures already detailed in the Draft EIS in Appendix C-1, page C-2.

8. The need for workers would be governed by the individual contractors and labor unions. This cannot be required by BLM or FS.

9. Problems of this nature would be handled by the procedures already detailed in the Draft EIS in Appendix C-1, page C-1, first paragraph.

10. The purpose of sampling along the route is unclear. There were no potential impacts to ground water identified along the pipeline route. As stated in the Draft EIS, discharge from the dewatering facilities would require a NPDES permit and would be controlled by either the state or EPA.

11. This procedure is already covered in the Draft EIS, Appendix C-1, page C-2, under Construction.

12. This procedure is already covered in the Draft EIS, Appendix C-1, page C-2, under Construction.

13. As stated in the Draft EIS, permits from the Corps of Engineers would be required for stream and river crossings. Appendix D-7, page D-38, detailed the requirements that have to be met for these permits.

14. These procedures were already covered in the Draft EIS in Appendix C-1, page C-4, item 5 under Revegetation (Reseeding and Planting). Requirements on private lands cannot be enforced. However, the applicant, as covered in the Draft EIS, stated these procedures would be implemented on private land, subject to landowner approval.

15. The procedures already detailed in the Draft EIS, Appendix C, page C-3, Backfilling and Cleanup, cover this problem.

16. No areas were identified that would cause this problem to occur. If it did, procedures already detailed in the Draft EIS, Appendix C-1, page C-1, second paragraph, would cover the situation.

17. There is no authority that can require this measure. Any possible cumulative impacts from other projects were assessed in the Draft EIS, page 5-1.

18. No impact of this nature was identified to require this measure.

19. This problem was covered in the Draft EIS, Appendix C-1, page C-4, second paragraph.

20. Use of biochemicals was covered in the Draft EIS, Appendix C-1, page C-5, first column, last paragraph.

21. See Item 4, above.

22. Measures to protect endangered and threatened species were covered in Appendix D-4 of the Draft EIS. There is no requirement to protect other species, especially on private land.

Response: Financial and cost aspects of the proposed action and alternatives are not appropriate subjects for consideration in an EIS (see response to Section 6.E.19, Economic Cost Comment 478). ETSI has offered drawdown compensation agreements to the city of Edgemont and the state of South Dakota. In the Final EIS, these are mentioned in Section 1.F.2, Water Supply System, and reprinted in Appendix C-7 and C-8. The Fall River County Commissioners' comments on ETSI's proposal to the city of Edgemont are reprinted in Appendix C-9.

450. Comment: "It is recommended that ETSI, at a minimum, propose a mitigation measure for increasing the housing stock of the City (Gillette) by at least 428 additional dwelling units. This could be accomplished by loan guarantees, or by some other mechanism which would generate additional housing units in the City. It is vitally important that a substantive mitigating measure be implemented which would increase the City's housing stock." (Commenter 178.)

Response: As stated in Measure 7 in the Final EIS Mitigation section of Chapter 4, ETSI has made a commitment to work with Gillette city officials (among others) to assess the potential problem.

451. Comment: Installation of automatic valves (or similar devices) at key locations should be required. Examples of key locations include the Saline River, Illinois Bayou, Mulberry River, and Big Piney Creek (Arkansas) and any streams that flow year round. It seems the addition of these types of valves would be a wise investment. The extra cost could be offset, to some degree, by minimizing the amount of slurry escaping from a rupture. Cleanup costs and environmental losses might be kept to a minimum. (Commenters 215, 226, 227.)

Response: Please refer to Mitigation Commenter 443, regarding mitigation. ETSI was requested to review these suggestions and commit to installing valves in the suggested locations. Cut-off valves can drastically reduce spill volumes but are generally considered weak points in the system. They are subject to slurry abrasion, leakage, malfunction, and operation error, which will increase the probability of a spill occurring. The measure that ETSI committed to implementing has been added to the Chapter 4 Mitigation section of the Final EIS. The company is committed to installing valves or using the best available rupture prevention technology for all river crossings of state or federal interest.

452. Comment: "Page 3-105, Para. 5 'However, in Kansas the Colorado alternative would pass approximately seven miles north of Cheyenne Bottoms State Waterfowl Refuge, which is critical habitat for the whooping crane.' Page 4-89, Para. 4 'In addition, a spill at Deception Creek ...stream crossing.' Page 4-92, Para. 3 'A major rupture in

Deception Creek could cause a reduction in suitable whooping crane habitat in Cheyenne Bottoms.'

Suggest adding a mitigating measure to section on Mitigation, page 4-120, to read: "In order to reduce possible rupture and spill problems on Deception Creek upstream from the Cheyenne Bottoms State Wildlife Refuge, install valves on either side of creek crossing. Effectiveness: This action would reduce potential effects on whooping crane habitat." (Commenter 139.)

Response: Although this measure was originally suggested by ETSI, the company would not commit itself to implementing it. Rather, ETSI agreed to implement a more general measure, which is included in the Mitigation section of Chapter 4 of the Final EIS. (See also Mitigation Comment 444.)

453. Comment: "Mitigation and monitoring descriptions appear to contain no provisions for mandatory and effective cleanup of spills into wetlands, streams or onto the ground. Provisions for insuring restoration of environmental values degraded by spills should be described in the FEIS." (Commenter 231.)

Response: There is no legal requirement for mandatory cleanup of spills. Department of Transportation rules and regulations do not pertain to coal slurry pipelines. Since there is no law requiring mandatory cleanup, BLM cannot require the applicant to carry out cleanup on private land. This could possibly be made a condition of any Corps of Engineers permit for river crossings. Appendix C-11 has been added to the Final EIS to describe the actions that ETSI would take in case of a spill. An additional measure also has been added to Appendix D-2 and D-5 to cover this requirement on federal land. ETSI has stated the company will carry out spill cleanup on private land in accordance with the procedures described in Appendix C-11.

454. Comment: "According to the DES an evaluation was made on the impacts that could result if a rupture or spill should occur. It was determined that the impacts could range from insignificant to significant. The DES did not include a discussion of what mitigating measures ETSI should take if a spill occurred (e.g., clean up, restocking of fish, etc.). The FES should include a discussion on these measures." (Commenter 72.)

Response: Refer to the response to Mitigation Comment 443, on inclusion of mitigation in the EIS. ETSI has developed a set of the general procedures the company would use in case of a spill. These are included in Appendix C-11 of the Final EIS.

455. Comment: "Page 4-2, par.1. Indicates that if revegetation of disturbed areas is unsuccessful, the impact would be significant. Page 4-59, col. 2, par. 3 does not indicate how revegetation is to be assured, merely that it is

assumed the Erosion Control & Revegetation Plan will be fully implemented by ETSI. There is no indication of bonding to assure continuing successful completion of the plan." (Commenter 231.)

Response: The implementation of the reclamation and revegetation plan would be required on federally administered land. It cannot be enforced or required on private land, since there is no law specifically requiring this. This would usurp the private landowners' right to determine conditions for granting an easement across their land to the company. ETSI has stated the company would implement the reclamation and revegetation plan on all private land, subject to the landowners' approval. Thus, this plan was included as part of the proposed action in the Draft EIS.

456. Comment: "We recommend that the following measures be used to reduce adverse effects to fish and wildlife resources:

1. The proposed right-of-way should be limited to smallest width practicable.

2. All surface areas should be restored to preconstruction contours.

3. Erosion control measures should be used at all construction sites. These measures could include construction of sediment traps or basins as necessary. Annual grasses and mulches could be used in all areas denuded of vegetative cover for temporary erosion control, but the use of sodding and seeding with perennial grasses, and planting shrubs and trees suitable to the local environment is recommended for permanent vegetative stabilization." (Commenter 235.)

Response: Refer to Appendix C-1 in Draft EIS. Item 1 is discussed in Right-of-way and Site Clearing section, page C-2, paragraph 1, "Land grading would be done only on the area required for construction." Item 2 is discussed in the Backfilling and Clean-up section, page C-3, paragraph 3, "The contour of the ground would be restored to permit normal surface drainage" and paragraph 6, "The surface would be graded to conform to the existing surface of the adjoining areas except for a slight crown to compensate for natural subsidence." Comments regarding erosion control measures, sediment control and revegetation at construction sites (Item 3) are discussed throughout the Erosion Control and Revegetation section of Appendix C-1, by stage of construction, restoration, and revegetation process.

The width of the right-of-way would be controlled on federal land. However, the width on private land would be subject to negotiation between ETSI and the private landowner and could not be controlled by any federal agency.

457. Comment: "What provision will ETSI make to reimburse the owner for the cost of whatever alternative action must be taken to

restore his lost domestic water supply? Will ETSI provide a temporary supply of water until the new source is established? What procedures must the owner take to obtain assistance and cost reimbursement from ETSI?" (Commenter 32.)

Response: The Third Party Beneficiary Agreement Between the Office of Wyoming State Engineer and ETSI, included as Appendix C-3 of the Draft EIS, addresses the action ETSI is obligated to take to protect existing users of Madison Formation water. Section 4, Convenant of ETSI to Protect Beneficial Uses, most directly addresses the questions raised in the comment. Essentially, if the Wyoming tate Engineer receives a valid complaint that ETSI pumping has affected an existing user of Madison Formation water, the State Engineer shall determine what procedures ETSI must take to correct the situation. ETSI would be required to pay the cost of any investigation or arbitration, plus the cost of any corrective action, such as drilling a new well, deepening an old well, providing new pumps, and/or pumping from a lower depth, as requied by the State Engineer. This protection is only afforded to Wyoming users. However, ETSI has extended somewhat similar protection to Madison Formation water users in the state of South Dakota and the city of Edgemont, South Dakota (see Appendix C-7 and C-8 of the Final EIS). These two agreements have not been signed, however.

458. Comment: "The ETSI coal slurry pipeline will provide only a fraction of the coal needed in Arkansas, Oklahoma, and Louisiana by 1985. The pipeline wil not eliminate the need for coal trains and will establish a precedent for additional coal slurry pipelines in this area. A clear discussion of the cumulative impacts among competing transportation alternatives should be provided in the final EIS." (Commenter 226.)

Response: The precedent that this project could establish to transport more coal by pipeline than by railroad in the future was discussed in Section 5.B of the Draft EIS. The coal would be transported by either rail or pipeline and the impacts associated with both means of transport were discussed in the Draft EIS. The competitive aspect was discussed briefly in Section 1.C. of the Draft EIS.

The impacts created by railroad transportation and coal slurry transportation were analyzed in Chapter 4 of the Draft EIS. They are not cumulative, as they do not overlap in space or time. There is no more need to discuss cumulative impacts of different transportation modes in this EIS than there is in discussing cumulative impacts of constructing a highway along with other people movers (e.g. railroads and planes).

6.E.15 CUMULATIVE IMPACTS

459. Comment: The ETSI draft environmental impact statement is very deficient insofar as long term, cumulative resource commitment and impact analysis. For example, it appears that the closed loop system alternative was rejected because of energy cost consideration. However,

when these energy costs are properly balanced against the opportunity costs associated with the annual export of 20,000 acre feet of Wyoming water, the closed loop system appears as cost effective, if not more. The annual energy cost differential between the closed loop system and the proposed alternative must be compared to the annual opportunity costs of the proposed water withdrawal. Rough calculations indicate that the energy cost differential does not offset the loss to the state of the opportunity to utilize this water for different purposes. Considering the fact that municipal and industrial water in the semi arid West is becoming an increasingly rare and valuable commodity, it is imperative that the long-term benefits and costs of in-state use of that water be analyzed and that the EIS address the question of better future use of the water. (Commenter 72.)

Response: It is beyond the scope of the EIS to attempt to develop and analyze numerous different scenarios of possible uses of Wyoming ground water within the next 50 years. Any analysis of this type would be highly speculative and of little use to the decision maker. Numerous studies have been prepared, assessing the availability of water in this region for various energy uses (see response to Section 6.E.1, Regional Water Study Comment 95). The ground water is a state resource and its use is governed by the state in which it is located. It is not the federal government's role to attempt to plan for the use of the water. The state of Wyoming made its descision on the use of the water needed for the project when it issued the well field permits.

In the Final EIS, Section 5.D on commitment of resources has been modified to reflect the long-term commitment of the water resource to the project and the fact that it would be unavailable for other uses during this period.

460. Comment: "Section 5.A.1 does not include all known planned developments of Madison formation water. The proposed Panhandle Eastern Pipeline Company's Coal Gasification Plan would have access to about 4000 acre-feet/year from a well field in the Madison Aquifer. Also, that project's coal mine in Campbell County, according to the 1974 Environmental Assessment, would normally need another 1200 acre-feet/year. Would that water come from the Madison Aquifer? Further, several other mines are up for approval and initiation in the Campbell/Converse Counties area within the next year; and numerous other mines are expected in the future. What water sources would be needed for those projects: Cumulative impacts have not been thoroughly addressed." (Commenter 231; also, 43, WY-12.)

Response: Existing and proposed coal mines in Campbell and Converse County use and will likely use water from Tertiary aquifers, not the Madison aquifer. Ground-water levels in these aquifers are not calculated to be impacted by the proposed ETSI withdrawals.

Ground-water impacts which could occur as a result of Madison ground-water withdrawals by WyCoal Gas, a proposed synfuels plant near Douglas, Wyoming, are not calculated to occur in the same region as ETSI's ground-water impacts. The WyCoal project is expected to use a much smaller amount of Madison ground water (no more than 8,000 acre-feet per year, and probably only about 2,000 to 3,000 acre-feet per year maximum). Preliminary studies (unpublished) by Woodward Clyde Consultants suggest that there would be no cumulative impact on Madison ground-water levels. Impacts caused by the WyCoal Gas project would not overlap those calculated to be caused by ETSI.

461. Comment: "Table 1-7 does not accurately reflect the number of construction projects currently planned for Campbell and Converse Counties between 1983 and 1990. Projects which should be included in Table 1-7 and in the cumulative impact assessments are listed below:

PROJECT/COMPANY

Coal
Rawhide Expansion/Carter
East Gillette/Kerr-McGee
Rojo Caballo/Mobil
North Antelope/Peabody
Rochelle/Peabody
Wymo/Wymo Fuels
Belle Ayre/Amax
Eagle Butte/Amax
Black Thunder/ARCO

Uranium
North Butte/Cleveland Cliffs
Sand Rock Project/Conoco

Synfuels
WyCoal Gas/Panhandle Eastern" (Commenter 72.)

Response: Table 1-7 has been revised in the Final EIS.

462. Comment: "Four, the Environmental Impact Statement did not take into account the Department of Interior's proposal to lease in excess of seven hundred fifty million tons of coal in the Powder River Basin in 1981. This information has been available since June of 1979. Once again, the water demands have been inadequately addressed." (Commenter WY-12.)

Response: The proposed water withdrawals are not predicted to affect the ground-water resources in the coal-bearing Fort Union Formation, so there would not be any cumulative impact as a result of the ETSI project.

463. Comment: "It is also not clear whether this modeling effort has included all of the major existing uses of Madison water within the Powder River Basin, not to mention impacts from projects in the planning stages. For instance, AMOCO Corporation is currently pumping 8-10 mgd from the Madison aquifer near Midwest, Wyoming for the flooding of its Salt Creek oil field. The effect of this pumping on the Niobrara well field will depend on the regional aquifer parameters. If the results of the USGS preliminary model were somewhat realis-

tic, the pumping at Midwest would show a substantial effect on drawdowns between Midwest and Niobrara. Additional discussion is needed on the cumulative impact of other large users in the basin. It is especially important to try and quantify the potential water quality impacts associated with having several large pumping centers within the basin." (Commenter 226.)

Response: Al' known existing or proposed ground-water withdrawals from the Madison aquifer that may affect water levels in the project area have been included in the cumulative impact analyses. Water-level declines caused by Midwest's (AMOCO's) pumping are restricted to the southwestern part of the Powder River Basin, which is not part of the area that would be affected by ETSI pumping (see Map 3-4 of the Draft EIS or Map 3-4 of the Well Field Hydrology Technical Report).

464. Comment: "The Tennessee Valley Authority (TVA) is currently preparing an EIS on a proposed uranium mining project in Fall River County. This project will require dewatering activities in the Inyan Kara Group. How will the combined effects of the TVA and ETSI projects impact water users in southwest South Dakota? (It should be noted that the issue of a water right for TVA has not and will not be considered until the TVA EIS is completed and impacts are known.)" (Commenter 138; also, 74, RC-3.)

Response: The Final EIS, section 5.A.1 has been revised to reflect the proposed TVA project.

465. Comment: "My main concern is if you are going to pump out 20,000 acre feet a year and the power plant (Tri-State) pumps out 30,000 acre-feet, where is this water going to come from. When you are looking then at the base and so on, you begin to get also a little bit concerned. Our county isn't worth the ground that is there if you start taking away all of the water." (Commenter NE-6.)

Response: The water that would be pumped from the Madison aquifer system by these or other large industrial water users would come from a relatively large, regional aquifer system. Water withdrawn from this aquifer system would basically come from (1) the expansion of water and compression of the aquifer skeleton where the aquifer is under confined (artesian) conditions, and (2) from the dewatering of pore spaces or other secondary porosity and permeability features where the aquifer is under unconfined (water-table) conditions in the outcrop area. Given a long period of time, water may also be contributed from recharge (outcrop) areas.

The amount of water which is proposed to be or is being withdrawn from the Madison aquifer system is relatively small when compared to the amount of water potentially available in the aquifer system. Thus, all of the water will not be removed as is implied in the comment.

6.E.16 MISCELLANEOUS

The comments and responses in this section are grouped in the following categories: EIS regulations, need for project, economic costs, and general miscellaneous.

EIS Regulations

466. Comment: "In order to assist a determination that a "systematic interdisciplinary approach" has (Page 1) been used in preparation of the EIS, the list of preparers should include qualifications for each person listed, as required by 40 CFR Section 1502.17." (Commenter 137; also, ED-17.)

Response: The list of preparers has been revised in the Final EIS.

467. Comment: "First, the scope and adequacy of the DEIS are seriously flawed by the lack of consideration of the effects the alternatives would have on the Black Hills, particularly on the southern Black Hills. Although we hope this was just an oversight, the omissions begin with the Cover Sheet (page iii). Fall River and Custer Counties are not listed as areas that "Could Be Directly Affected" by the projects. Considering the drastic effects listed elsewhere in the DEIS (page 2, 2-8, 2-9, 3-2 - 3-29, 3-51 - 3-52, 3-60, 3-75, 4-4 - 4-17, 4-57, 4-122 - 4-123, 4-125 -4-126, 5-1 - 5-3, 5-8, 5-11 -5-12, 5-15), this was a major omission." (Commenter 33; also, 160, ED-10, ED-12.)

Response: According to Council on Environmental Quality regulations, Section 1502.11(b), the cover sheet must include "the state(s) and county(ies) (or other jurisdiction if applicable) where the action is located." This was interpreted to mean where the project components would be located. However, because of the concern raised by comments such as this one, the cover sheet of the final environmental impact statement has been revised to include all counties that would experience impacts as a result of the proposed project or any of its alternatives, regardless of whether any project components would be located in a particular county.

468. Comment: "In the same light, (Section 1502), we believe that it would be more appropriate that the DEIS be developed as a planning document, that is, the DEIS should investigate all the feasible and prudent methods to move coal from Montana, Wyoming or other coal producing states and not be written to provide support for a project that may or may not be either socially or environmentally sound." (Commenter 74.)

Response: There are various levels of EISs that are prepared during different management stages. Some EISs are prepared at a program level and used as planning documents. However, that is not the scope of this particular EIS. The purpose of this EIS is to analyze the impact of a proposed action, in other words, the impact of a request for a right-of-way that would allow the construction of a coal slurry pipeline. This is a fixed site project, designed to move coal from one specific location in Wyoming to markets in Oklahoma, Arkansas, and Louisiana. Therefore, the EIS dealt only with other alternative modes to move coal between two relative fixed points, Wyoming and the identified markets. The EIS was not written to support the proposed action. It was prepared to analyze the consequences of a requested federal action, in compliance with the CEQ Regulations 1502.2(g).

469. Comment: "The EIS Was Used to Justify a Decision Already Made Rather Than Being Utilized to Reach the Decision. The law is quite clear that the EIS must be prepared for the purpose of utilizing it in reaching the best possible decision... The Ultimate Decision Reached by the BLM in the EIS was Not Supported by the Evidence." (Commenter ED-8).

Response: The EIS is not a decision document for the Department of the Interior. Economic and political data are also considered in the decision process. All of these factors are summarized in a decision document which the Secretary of the Interior will use to reach a decision on the requested right-of-way. The Draft EIS did not reach a decision, nor will the Final EIS.

470. Comment: "Because of the gross inadequacy of this EIS, I request that the BLM reissue the EIS in draft form. It will show total disregard for the NEPA EIS process if the public is not allowed an opportunity to comment on the volumes of additional information which must be added to this EIS." (Commenter ED-4; also ED-8.)

Response: The purpose of any Draft EIS is to obtain comments as to its content, scope, impact methodology, and impact analysis. The comment did not identify what the gross inadequacies in the Draft EIS were. After a review of all of the comments received on the Draft EIS, the determination was made that reissue of a revised draft was not necessary. Therefore, the Final EIS was prepared as allowed under the CEQ regulations.

471. Comment: "The draft EIS does not satisfy the requirements of the National Environmental Policy Act Regulations (CEQ Regulations) promulgated by the Council on Environmental Quality (CEQ). The draft EIS does not focus clearly or concisely enough on the most significant impacts of the proposed action, among them effects on water use. Instead, it includes masses of background data on and discussion of less significant issues, tending to obscure the important issues.

This may be corrected by two actions. First, the length of the final EIS should be reduced to 150 pages, as specified in the CEQ Regulations at 40 CFR Section 1502.7. Second, the Purpose and Need chapter (Chapter 1) should be drastically reduced in length and the Comparative Analysis Chapter (Chapter 2) expanded. If efforts are taken to make accurate and objective analysis of the most important issues, the underlying purpose of NEPA review, will be facilitated by these two actions." (Commenter 137.)

Response: The EIS places major emphasis on the impacts that could result from the use of the well fields. This was identified as a major issue during the scoping process and handled as one throughout preparation of the EIS. Less significant issues were dealt with in less detail and in a summary fashion. A detailed technical report was prepared on the hydrologic impacts of the proposal.

The EIS meets the CEQ Regulations for page length. As stated in Section 1502.7, "The text of final environmental impact statements (e.g., paragraphs (d) through (g) of 1502.10) shall normally be less than 150 pages and for proposals of unusual scope or complexity shall normally be less than 300 pages." (Emphasis added.) The ETSI project fits the unusual scope and complexity criteria of the regulations.

Chapter 1 covers more than the purpose and need. The Purpose and Need sections of the chapter are only a small portion of the entire chapter. The remainder of the chapter describes the project and the alternatives in the detail necessary to analyze the impacts. A detailed technical document was prepared to describe the proposal and only a summary was provided in the EIS. This chapter has been expanded in the Final EIS to respond to the comments received requesting additional detail and discussion on the demand for the project and to cover new alternatives that were suggested.

The comparative analysis chapter material (Chapter 2) focuses on the key issues raised during the scoping process--hydrologic impacts, socioeconomics impacts, and energy efficiency. It compares the most significant impacts identified in Chapter 4.

472. Comment: "The impetus for the EIS arose because the proposed pipeline will cross some Federal lands and has been deemed a "significant action." Pipeline construction and associated factors as they affect the Federal lands involved is within the scope of National Environmental Policy Act of 1969. However, I have a real problem with how far this Act could be interpreted to allow investigation into the water supply aspects of the proposed pipeline. The investigation into the water supply points in the direction of involvement by the Federal Government in allocation of water supplies in the State. The water supply for the proposed project is to be derived from water appropriated in accordance with Wyoming Statutes and even though there has been considerable controversy within the State over this pipeline proposal, I question whether resolution of the problem should come from Federal involvement." (Commenter 72.)

Response: The government is charged by NEPA to assess the total impact of any project which has been determined to be a "significant action." This mandate extends beyond assessing the impact on just federal lands. All impacts that would result from a federal decision that would allow a project to proceed have to be assessed and considered in the decision process. The decision maker, by law, requires all of the environmental impacts in order to make an informed decision.

473. Comment: "The EIS Fails to Discuss How the Proposed Action or the Alternatives Will or Will Not Achieve the Requirements of 101 and 102(1) of NEPA.

The BLM apparently attempts to meet this statutory requirement in summary fashion at paragraph 5.E at page 5-16 and Table 5-4. That discussion contains a conclusion totally unsupported by the EIS itself, namely, that the proposed plan 'minimizes the environmental impacts.' Furthermore, a look at table 5-4 on page 5-17 and 5-18 indicates that the proposed action will result in a "long-term impact affecting one or more generations" because of the decline in ground water levels near the well fields. The BLM makes the statement that the proposed plan meets the requirements of maximizing the recycling of depletable resources in the proposed plan wherein the water is shipped one direction only and then used for cooling at a power plant. (See item 20 on Table 5-4)." (Commenter ED-8.)

Response: The Draft EIS addressed the relationship of the proposed action and alternatives to NEPA goals on pages 5-16 through 5-18, including Table 5-4. The comment failed to provide rationale to support the statement that the addressed relationships were incorrect. However, Section 5.E of the Final EIS, Relationship of Proposal to National Environmental Policy Act Goals has been revised.

474. Comment: "Scoping hearings held by the BLM show water as the highest of all concerns all along the route where hearings were held, which was 142. Had a scoping hearing been held in Edgemont, the number of water concerns would have been 392. The EIS does not address this issue. We must be expendable." (Commenter ED-6.)

Response: The comment is unclear as to the problem with the Draft EIS. The Draft EIS placed major emphasis on the water issue concern. This concern was identified by the public as being a priority item for analysis. Therefore, the entire EIS effort revolved around this identified concern.

475. Comment: "Graphic presentation in the EIS is inadequate. Section 1502.8 in the Council on Environmental Quality Regulations related to implementing NEPA, calls for supporting data from the environmental design arts. Reviewers have been provided with little more than a road map with proposed pipeline routes superimposed upon it. The BLM should have provided a series of maps which provided agricultural, environmental and social information." (Commenter 72.)

Response: The Draft EIS presented information that was necessary to analyze and present the impacts of the proposed action and its alternative. Impact areas were identified on maps such as Map 4-1 (page 4-8) and in the text by milepost or county, which can be located on the maps in Appendix A, the map volume.

According to CEQ, an EIS is not to be encyclopedic, but present only the data necessary to understand the impact, with other material summarized, consolidated or referenced (CEQ Section 1502.2(a); 1502.15). A series of technical reports were prepared which contain detailed material and provide support for the EIS. These technical reports were referenced and made available to any reviewer who requested them.

476. Comment: "The BLM Failed to Make Clear that Necessary Information was Lacking and that Scientific Uncertainty Existed." (Commenter ED-8.)

Response: The uncertainty of hydraulic parameter estimates was discussed in Chapter 7, Reliability of Impact Predictions, in the Well Field Hydrology Technical Report (WCC 1980b). See also the response to WCC Model Comment 3 in Section 6.E.1.

Need for Project

477. Comment: Numerous commenters raised the issue as to the demand for the proposed slurry pipeline. (Commenters 8, 33, 46, 141, 220, 231, OK-1, WY-4.)

Response: Construction of the pipeline would involve a substantial amount of capital. The entire project is being financed with private capital; no federal loan or grant money is involved. Investors are not likely to expend money on the project unless it is economically feasible and a need for the project actually exists. Section 1.C of the Final EIS, which discusses the need for additional coal in the mid-South, has been revised to clarify the coal demand of this region.

Economic Costs

478. Comment: The EIS contains no information on the costs of the proposal on various alternatives, or their economic advantages. Cost estimates for all alternatives and alternative system components should be provided in the final EIS. (Commenters 72, 141, 160, 226, ED-6, NE-3, RC-2, WY-4.)

Response: The EIS contains an analysis of the environmental impacts, including socioeconomic, of the proposed action and alternatives. Within the Department of Interior, the EIS provides the environmental analysis part of the information required for a decision process. Departmental policy is to not include straight economic costs, cost comparisons, or benefit costs in the EIS. As stated in the Departmental Manual, "However, such an environmental analysis is not, in and of itself, a program proposal or the decision document, is not a justification of a proposal, and will not support or deprecate the overall merits of a proposal or its various alternatives." The economic, environmental, and political data will be summarized in a decision process. As required by CEQ regulations, a record of decision will be published. Supporting documents may be available under the Freedom of Information Act Procedures.

479. Comment: "Nowhere does the EIS address the impact of lowered water levels on the City of Edgemont. What will be the cost of installing pumps in the city's wells? What will be the cost of operating and maintaining the pumping system? The city wells were designed as flowing wells - are they adequate for pump installation, or will the city need new wells at a cost of $400,000 to $500,000 each? All of these costs will be paid by the citizens of Edgemont for the next 100 years. They must surely be considered by this EIS." (Commenter ED-4.)

Response: Costing of possible changes required by local government or water supply districts is beyond the scope of this EIS. Costs would depend on when the water decreased below the surface, the amount of need at that time, and the financial capability of the responsible entity. This impact would not occur for some time, as shown on Figure 4-1 of the Draft EIS. The Final EIS has been clarified to explain this impact and the inability to predict what the economic impact may be at that time.

480. Comment: "The BLM chooses not to discuss the cost-benefits to ETSI by locating the well field as proposed, but apparently moving the well field to some other location in Wyoming would require deeper wells." (Commenter ED-8.)

Response: The purposes of an EIS is not to discuss cost-benefits of any of the alternatives. The purpose is to assess the impacts of reasonable and available alternatives. Costs of various alternatives are weighed during the decision process.

General Miscellaneous

481. Comment: "However, although Fall River County employed a Court Reporter to record the entire proceedings, and Dr. Rahn spoke with reference to his 1979 paper on the ETSI project, neither document is listed in the reference section of the EIS starting on page R-1." (Commenter ED-7.)

Response: The reference section only lists references that were actually cited in the Draft EIS. Neither of the documents referred to in the comment were cited in the Draft EIS, so they were not listed. However, two of Dr. Rahn's papers were cited in the Well Field Hydrology Technical Report (the detailed report that supports the hydrology material included in the EIS), and they are listed in the reference section of that document.

482. Comment: "There is no examination of the potential effects that the microwave communications system for the pipeline alternatives would have on nearby people and animals. Because the Hearing Board specifically requested information on this topic, we are

including a copy of an article from Science (Att. 5) and an article from Science for the People (Att. 6). We trust that the compilers of the Final EIS will use these documents to find out more about this potential problem." (Commenter 33.)

Response: The emission levels from each microwave transmitter would be dependent upon the power output of the tower and the tower height. Since both of these variables depend upon other data items such as the distance to the next station and height of surrounding terrain, the evaluation of emissions becomes very site specific. Site-specific evaluation is not possible since final communication sites have not yet been selected.

The thrust of the articles provided was that present US standards for electromagnetic emissions are too high and should be lowered. The articles also pointed out that this is presently an area of controversy, with many scientists unable to duplicate results of tests indicating a need for standards of lower dosage. The indications are that more research in the safety levels for electromagnetic emissions should be conducted.

An EIS is written to evaluate impacts of projects; to determine whether impacts are significant, they must be compared with standards. The present US standards for electromagnetic emissions are 100 watts per square meter. Standard commercially available microwave generating and transmitting equipment would meet these standards. In addition, since power density decreases as the inverse square of the distance from the source, the probability of any person or animal being exposed to a dangerous level of radiation is infinitely small.

The Project Description Technical Report (WCC 1980a), page 1-20, states that system operations, including electromagnetic emissions presumably, will comply with all regulations. An EIS is not an appropriate document in which to attempt to cause changes in existing regulations, especially if the need for new standards are controversial.

483. Comment: "Page 1- 24, how will radio interference be mitigated for those pilots that use radio transmission or homing devices while flying at night?" (Commenter 138.)

Response: Interference by the pipeline communication system with any other existing radio transmission or navigational device would be controlled by its design as approved by the Federal Communications Commission and the Federal Aviation Administration.

484. Comment: "Major environmental impacts of the proposed action and alternatives discussed in Chapter 4 are compared somewhat narrowly in Chapter 2 (comparative analysis of the proposed action and alternatives). This chapter deals primarily with an arbitrary energy efficiency comparison which appears to be overly detailed and seems to place primary importance on the

all-rail alternative. Other economic justifications should be included in the comparisons to give a broader comparison. This could include system reliability, safety, consumer costs per ton of delivered coal, and effects on regional transportation modes. Although chapter 2 does provide a good comparison of the water supply alternatives, environmental considerations of the pipeline are not equitably discussed. Environmental comparisons could include effects on air quality, water quality, wetlands, flood plains, transportation, terrestrial and aquatic ecosystems, archeological resources, socioeconomics, land uses, noise, system reliability, safety, and national energy goals. These comparisons should not be dismissed by stating they are similar for each alternative as Table 2-3 might indicate. Chapter 4 deals more specifically and completely in these areas, but comparative analysis is lacking. A table showing all these environ mental comparisons and their relative weight would be desirable." (Commenter 231.)

Response: The comparative analysis (Draft EIS pages 2-6 through 2-12, Tables 2-3 and 2-4) compared all of the significant impacts of the proposed action and various alternatives. The energy efficiency comparison, which formed only the first part of Chapter 2, was not arbitrary, as it is based on sound methodology and past efforts. It did not place primary importance on the all-rail alternative. The all-rail alternative was determined to be the most energy efficient. It is the Department of the Interior's policy to not include economic cost comparisons in its EISs. The function of the EIS is to present environmental facts for the decision maker to consider. Other factors such as economics are evaluated in other documents that are considered by the decision maker.

Many of the other subjects mentioned in the comment (e.g., socioeconomics) were compared and shown on Table 2-3 of the Draft EIS. Other categories had only minor or insignificant impacts that did not lend themselves to comparison. This section has been revised in the Final EIS to include new data and to improve its readability.

485. Comment: "In our opinion the amount of time and method of assessment of the scope of the Madison formation are inadequate. A 50 year project with the possible impact of the coal slurry pipeline to the livelihood of all living within a radius of 3800 square miles and three states should be implemented with no less documented data time period than the life of the project." (Commenter 156.)

Response: The comment is unclear as to the time period being proposed by the commenter. The impacts were analyzed based on the projected life of the project, 50 years (see Draft EIS page 1-1, paragraph 1 and page 4-4, paragraph 3.)

486. Comment: "Page 1, par. 6. indicates withdrawal of 20,200 acre-feet of water annually over

a 50-year period. Page 1-6, col. 1, par. 2, states ..."approximately 50 years,..."Page 4-4, col. 1, par. 3, states"...50-year design life..." The design life is 50 years, what is the practical life of the project? It has been stated in various articles that the United States has sufficient coal reserves to carry us well beyond the next 100 years. Oil and natural gas reputedly exist in smaller quantities than coal. What is the future of the coal industry if the pipeline is discontinued in 50 years and the railroads do not have adequate track or cars to carry coal? Will the impact of using railroads to carry coal be any less acute in 50 years and beyond, than it is in 1981? If the pipeline is continued beyond 50 years what is the anticipated drawdown effect on the aquifer and the surrounding areas which will be impacted." (Commenter 231.)

Response: The US may have coal supplies to last over 100 years. This does not mean that the Powder River Basin area has a supply of coal that would be available for over 100 years. If coal becomes a major factor in the US energy picture within the next 50 years, all transportation modes will have to be utilized and improved. The future of the coal industry will not be affected by this one pipeline serving specific markets. Also, please refer to Section 6.E.11, Comment 313.

487. Comment: "In summary on this point, we suggest that the final EIS balance the so-called worst-case change in hydraulic lift with the conservation of economic and nonrenewable resources." (Commenter WY-5.)

Response: The problem with the EIS or the EIS change being requested is unclear in the comment. The purpose of the EIS, however, is not to balance items or analysis between alternatives. This balancing occurs in the decision process.

488. Comment: "This Division urges that the Final EIS be amended to include consideration of local master plans and regulations regarding pipelines and the preservation of agricultural lands and how these local plans and regulations would impact or be impacted upon by the Colorado portion of the proposed project." (Commenter 89.)

Response: There are no land use policies that would be affected by the proposed pipeline project within the Colorado counties of Weld, Logan, Yuma, and Washington.

489. Comment: "The question of the proposed market route is further complicated by the fact that the route seems to be improperly marked on your map (Map A-25, PM 1110-1170). When pieced together with Map A-24 and A-26, the proposed market route does not join. An addendum should be issued reflecting this fact and a new map segment produced for the final EIS." (Commenter 215; also, 17.)

Response: Map 4, A-25, has been revised and included in Appendix A Addendum of the Final EIS.

490. Comment: Several commenters expressed concern about Table 5-4 and the statements contained within the table concerning the relationship to NEPA goals. (Commenters 46, 231.)

Response: The text has been revised in Section 5.E of the Final EIS.

491. Comment: "Page 5-15, sec. 5.C. The concept of benefits and trade-offs should be defined. These categories should be distinguished from each other and from other impacts. Trade-offs should describe the losses and counter balancing benefits. Some of the 'trade-offs' listed appear to have no counter balancing benefits." (Commenter 231.)

Response: This section of the EIS was included to briefly itemize the major positive results (benefits) and negative aspects (trade-offs) that would result if the proposed action is constructed and operated for 50 years. Each item listed as a trade-off was not meant to have a corresponding balancing benefit.

492. Comment: "Power Requirements and Source Identification: Proposed Action, (Table 1-20, p. 1-87 through 1-89 in Project Description, Technical Report). This table indicates that 88 miles of new transmission lines will have to be constructed in Wyoming, and will carry 115.3 MW of electricity to the slurry line and ancillary facilities. The routing of these transmission lines is a critical issue to landowners in Campbell, Weston, and Niobrara Counties, and the impacts associated with the taking of land for right-of-ways should be evaluated. The specific routing alternatives for transmission lines need to be identified in the EIS, along with whose land the lines wil cross, how ETSI will obtain the land, and how much consideration will be given to landowner routing preferences." (Commenter 46; also, WY-4.)

Response: The transmission line routes and microwave sites (shown on the strip maps in Appendix A of the Draft EIS) were assessed to determine what impacts would occur. Few impacts were identified, since installation of microwave towers and transmission lines to carry the voltages shown on Table 1-20 of the Project Description Technical Report (WCC 1980a) generally results in very little surface disturbance. In most instances, the right-of-way is not cleared except for a small area immediately surrounding each pole. Thus, there is only a negligible disturbance of soil and subsequent impact on vegetation, wildlife habitat air quality (due to fugitive dust). The only significant impact of microwave towers and transmission lines identified during this assessment was to visual resources. These impacts were presented in the Draft EIS (see Table 4-23). Additional information on impacts resulting from these facilities has been added to Section 4.D.9 (Visual Resources) of the Final EIS.

The specific routings for the transmission lines cannot be located until the final right-of-way and pump station and preparation plant sites are selected. Final design factors, especially for the pump stations, may result in some minor shifting of sites from the locations shown on maps in Appendix A of the Draft EIS. Identification of each landowner along the routes shown is not a requirement of an EIS, because such information does not affect the assessment of impacts. It is the responsibility of the various electric supply companies listed on Table 1-20 of the Project Description Technical Report (WCC 1980a) and not ETSI to contact and negotiate with private landowners for right-of-way acquisition. Landowner routing preferences could be discussed with the electric supply company during such negotiations.

493. Comment: "Since slurry pipelines offer only an alternative method of transporting coal from one region of closely located mines to another region of closely located power plants and are vulnerable, they offer no advantages to national security. The comment found on page 1-2 should be altered to conclude that railroads are better for national security because of their versatility than are slurry pipelines." (Commenter 141.)

Response: Both transportation methods would be vulnerable to sabotage during periods of attack. The existence of two systems to haul coal would provide some security for power generation in the system was damaged during a national security crisis. The existence of a coal slurry pipeline would also allow more flexibility for the railroads to transport more non-coal related cargo.

REFERENCES

In order to help the reader locate copies of these references, symbols are used to indicate the following:

[a] Available through public libraries' loan system.

[b] Available from Bureau of Land Management (BLM), Office of Special Projects, 555 Zang Street, Third Floor East, Denver, Colorado 80228.

[c] Available for inspection at Woodward-Clyde Consultants (WCC), Three Embarcadero Center, Suite 700, San Francisco, California 94111.

[d] Available for inspection at Bureau of Land Management State Offices.

[e] Available from Energy Transportation Systems Inc., P.O. Box 7598, San Francisco, California 94120.

The appropriate symbols will appear at the end of each citation.

Adams, J.C., R. Kilambi, W. Wickizer, and A. Brown. 1976. Macrobenthos population changes in Crystal Lake, Arkansas, subsequent to cage culture of fish. Proceedings of the Arkansas Academy of Science 30:12-13.[c]

Allan, J.D. 1975. The distributional ecology and diversity of benthic insects in Cement Creek, Colorado. Ecology 56:104-153.[c]

American Peregrine Falcon Recovery Team. 1977. American peregrine falcon recovery plan (Rocky Mountain and Southwest populations). Washington, D.C.: U.S. Fish and Wildlife Service.[c]

Anderson, G. (U.S. Fish and Wildlife Service, Pierre, S.D.) Wildlife species of special concern that could occur along the Oahe alternative in South Dakota. 1980. (Personal communication.) A. Clark, WCC, San Diego. February 4, 1980.[c]

Anderson, O.L., M.B. Rogozen, L.W. Margler, P. Mankiewicz, and M.H. Axelrod. 1978. Water pollution control for coal slurry pipelines. Final report. Prepared for U.S. Department of Energy.[c]

Anonymous (employee of Veterans Administration facility). 1981. Water use at VA administration building. (Phone conversation.) M. Howland. April 6, 1981.[c]

Arkansas, State of. 1979. Ambient air quality monitoring data summaries. Unpublished.[c]

Arkansas Department of Local Services. 1977. Profile of Desha County.[c]

Arkansas Department of Planning. 1974. Arkansas natural area plan. Little Rock: Arkansas Natural Heritage Commission.[c]

Arkansas Public Utility Commission. 1981. Status of Independence and White Bluff power plants. (Phone conversation.) G. Konwinski, Bureau of Land Management, March 24, 1981.[b]

Arkansas State Highway and Transportation Department. 1979. 1979 highway map of Arkansas.[c]

Auld, A.H., and J.R. Schubel. 1978. Effects of suspended sediment on fish eggs and larvae: A laboratory assessment. Estuary and Coast Marine Science 6:153-164.[a]

Bailey, R.M., and M.O. Allum. 1962. Fishes of South Dakota. Miscellaneous Publication No. 119. Ann Arbor: Museum of Zoology, University of Michigan.[c]

Banks, W. 1977. Energy consumption in the pipeline industry, task 1. U.S. Department of Energy contract number EY-76-C-03-1171. December 31, 1977.[c]

Barber, W.E., and N.R. Kevern. 1973. Ecological factors influencing macroinvertebrate standing crop distribution. Hydrobiologia 43:53-75.[c]

Barbour, R.W., and W.B. Davis. 1968. Bats of North America. Lexington: The University Press of Kentucky.[a]

Barker, Mr. (Cajun Electric Co., Baton Rouge). 1980. Processing of coal. (Phone conversation.) August 26, 1980.[c]

Barkley, S., J. Sutherland, and M. Wood (Arkansas Fish and Game Commission, Little Rock). 1980. Habitat of sensitive species near proposed pipeline route in Arkansas. (Personal communication.) D. Olson, WCC, Clifton, N.J., and A. Clark, WCC, San Diego. May 29, 1980.[c]

Baxter, G.T., and J.R. Simon. 1970. Wyoming fishes. Wyoming Game and Fish Department Bulletin No. 4. Cheyenne.[c]

Bechtel. Undated. Miscellaneous water and analysis reports (samplings taken in 1974).[e]

Bechtel. 1981. ETSI coal slurry pipeline system power supply survey report. Job No. 14636. April 1981. (Unpublished.)[e]

Beldon, W.M. (Production Superintendent, Gary Energy Corp.). 1980. Madison water supply wells in Bell Creek oil field. (Letter.) W. Hansen, WCC, San Francisco. May 19, 1980.[c]

Bennett, N. (Atlantic Richfield). 1980. Stream crossings. (Phone conversation.) January 28, 1980.[c]

Bessinger, G. (BLM). 1980. Possible conflicts of proposed ETSI pipeline with BLM MEPs in Wyoming. (Phone conversation.) P. Fleischauer, WCC, San Francisco. September 8, 1980.[c]

Binns, A., and F. Eiserman. 1979. Quantification of fluvial trout habitat in Wyoming. Transactions of the American Fisheries Society 108(3): 215-228.[c]

Bissell, S.J., J.R. Torres, C. Smith, and D. Higgins. 1978. Endangered wildlife investigations, black-footed ferret verification and habitat inventory, June 1977 to September 1978. Project SE-3-1. Colorado Division of Wildlife.[c]

Bissell, S.J., J.R. Torres, R. Mellot, D. Lovell, and C. Loeffler. 1979. Endangered wildlife investigations, black-footed ferret verification and habitat inventory, June 1978 to September 1979. Project SE-3-2. Colorado Division of Wildlife.[c]

Bixler (Mayor, Arkansas City, Ark.). 1980. Housing inventory in Cypress Bend area. (Personal communication.) February 29, 1980.[c]

Black Hills Power and Light. 1980. (Project meeting minutes.) February 14, 1980.[b]

Bliss, Q., and S. Schainost. 1973a. Niobrara Basin stream inventory report. Lincoln: Nebraska Game and Parks Commission, Bureau of Wildlife Services, Aquatic Wildlife Division.[c]

______. 1973b. North Platte Basin stream inventory report. Lincoln: Nebraska Game and Parks Commission, Bureau of Wildlife Services, Aquatic Wildlife Division.[c]

______. 1973c. South Platte Basin stream inventory report. Lincoln: Nebraska Game and Parks Commission, Bureau of Wildlife Services, Aquatic Wildlife Division.[c]

______. 1973d. Republican Basin stream inventory report. Lincoln: Nebraska Game and Parks Commission, Bureau of Wildlife Services, Aquatic Wildlife Division.[c]

BLM - See U.S. Bureau of Land Management.

Bredehoeft, J.D., and C.E. Neuzil. 1980. Regional flow in the Dakota aquifer: A study of the role of the confining layer. EOS, Vol. 61, No. 46. November 11, 1980.[c]

Boyce, A.R. (Burlington Northern). 1979. Railroad capacity. (Meeting.) December 6, 1979.[c]

______. 1980. Train derailments. (Phone conversation.) P. Fleischauer, WCC, San Francisco. February 27, 1980.[c]

_____. 1981. (Letter.) J. Beley, WCC, San Francisco. March 12, 1981.[c]

Boyle, T.P. 1980. Effects of the aquatic herbicide 2,4-D DMA on the ecology of experimental ponds. Environmental Pollution (Series A) 21:35-49.[c]

Bredehoeft, J., and C. Neuzil. 1980. Regional flow in the Dakota aquifer: A study of the role of the confining layer. Unpublished paper presented at the American Geophysics Union Fall Meeting, December 9, 1980.[c]

Brown, D. 1978. Wrench-style deformational patterns associated with a meridianal stress axis recognized in Paleozoic rocks in parts of Montana, South Dakota, and Wyoming. Proceedings of the Williston Basin Symposium of the Montana Geological Society, p. 17.[c]

Brown, M. 1979. The effect of ETSI wells on Edgemont, South Dakota. Edgemont Madison Water Committee.[c]

Bruner, J. (Wright Sheriff's Dept.). 1980. Temporary housing availability, 1980, for likely pipeline construction spread headquarters. (Phone conversation.) WCC, San Francisco. May 16, 1980.[c]

Buchanan, T.M. 1973. Key to the fishes of Arkansas. Little Rock: Arkansas Game and Fish Commission.[c]

Burch, J.B. 1973. Biota of freshwater ecosystems, identification manual 11. Freshwater unionocean clams (Mollusca: Pelecypoda) of North America. Water Pollution Control Research Series, 18050 ELDO 3/73. Cincinnati: U.S. Environmental Protection Agency.[c]

Burlington Northern. 1980. Operating parameters for railroad delivery for markets of proposed action. (Personal communication.) P. Fleischauer, WCC, San Francisco. April 18, 1980.[c]

________. 1978b. Manual series 8400 - visual resource management. Washington, D.C.: U.S. Government Printing Office.[d]

Burnside, K.R. 1967. The effects of channelization on fish populations in Boeuf River in northeast Louisiana. Louisiana Wildlife and Fisheries Commission.[c]

Burton, D.T., P.R. Abell and T.P. Capizzi. 1979. Cold shock: Effect of rate of thermal decrease on Atlantic menhaden. Marine Pollution Bulletin 10:347-349.[c]

Butler, J. (Texas Eastern Transmission Corp.) 1980. Hydrostatic testing. (Phone conversation.) February 1, 1980.[c]

Cairns, J., Jr. 1968. Suspended solids standards for the protection of aquatic organisms. 22nd Purdue Industrial Waste Conference. Purdue University Engineering Bulletin 129:16-27.[c]

Campbell County Chamber of Commerce. 1980a. List of motels: Gillette and Campbell County. Gillette, Wyoming.[c]

______. 1980b. (Personal conversation.) C. Vaughan, WCC, San Francisco. June 25, 1980.[c]

Campbell County Planning Office. 1980. Campbell County population statistics. (Phone conversation.) S. Konkel, WCC, San Francisco. January 1980.[c]

Carley, C.J. 1979. Status summary: The red wolf (Canis rufus). Endangered species report 7. Albuquerque: U.S. Fish and Wildlife Service.[c]

Carlson, L. (U.S. Fish and Wildlife Service, Denver). 1980. Wildlife concerns along the proposed action and alternative routes. (Memorandums to R. Traylor, BLM, Denver.) May-June 1980.[b,c]

Carlson, N. (U.S. Army Corps of Engineers, Omaha Office). 1980. Oahe reservoir capacity. (Phone conversation.) June 5, 1980.[c]

Casey, O.E. 1959. The effects of placer mining (dredging) on a trout stream. Annual Progress Report, Project F34-R-1, Water Quality.[c]

Chamberlain, E. 1974. Rare and endangered birds of the southern national forests. U.S. Department of Agriculture, Forest Service, Southern Region.[c]

Chambers, S. 1980. Status of mussels. (Phone conversation.) G. Mancini, WCC. May 29, 1980.[c]

CH$_2$M Hill, Inc., and Francis-Meador-Gellhaus, Inc. 1980. Addendum to the report The West River Aqueduct: Conceptual feasibility of transporting and using Missouri River water in selected areas of western South Dakota and eastern Wyoming. December 1978.[c]

Clark, T. 1978. Current status of the black-footed ferret in Wyoming. Journal of Wildlife Management 42(1):128-134.[a]

Collins, R. (Dravo Corp.) 1981. (Personal communication.) G. Cummings, WCC, San Francisco. May 7, 1981.[c]

Colorado Division of Wildlife. 1978. Essential habitat for the threatened or endangered wildlife in Colorado. Colorado Department of Natural Resources.[c]

Conlan, K.E., and D.V. Ellis. 1979. Effects of wood waste on sand-bed benthos. Marine Pollution Bulletin 10:262-267.[c]

Conservation and Survey Division. 1979. Oil and gas location map, Nebraska panhandle, scale 1/4 inch:1 mile. Map No. VI-GH-5. Lincoln: University of Nebraska.[c]

Converse Area Planning Office. 1979. Douglas housing assistance plan. Converse County, Wyoming.[c]

Cooley, R.L., R.L. Naff, and L.K. Konikow. 1980. Application of a parameter estimation model to the Madison aquifer. EOS, Vol. 61 No. 46, November 11, 1980.[c]

Cooper, H.G. 1965. The effects of transported stream sediment on the survival of sockeye and pink salmon eggs and alevin. International Pacific Salmon Fishery Commission Bulletin XVIII.[c]

Cordone, A.J., and D.W. Kelley. 1961. The influences of inorganic sediment on the aquatic life of a stream. California Fish and Game 47:189-228.[c]

Cox, E. 1962. Preliminary report on the artesian water supplies from the Minnelusa and Pahasapa aquifers in the Spearfish-Belle Fourche areaa. South Dakota Geological Survey Special Report 19. Vermillion: Science Center, University of South Dakota.[a]

Criner, D. 1981. Energy production costs in Arkansas. (Phone conversation.) G. Konwinski, Bureau of Land Management. March 24, 1981.[b]

Cross, F.B., and J.T. Collins. 1975. Fishes in Kansas. Lawrence: University of Kansas Printing Service.[c]

Cummins, K.W., C.A. Tryon, Jr., and R.T. Hartman. 1964. Organism-substrate relationships in streams. Special Publication No. 4. Pittsburgh, Pa.: Pymatuning Laboratory of Ecology, University of Pittsburgh.[c]

Darton, N.H. 1909. Geology and water resources of the northern portion of the Black Hills and adjoining regions in South Dakota and Wyoming. U.S. Geological Survey Prof. Paper 65.[c]

Darton, N.H. 1951. Geologic map of South Dakota. South Dakota Geological Survey. (Scale 1:500,000).[a]

Davenport, J. A., and J. Davenport, III, eds. 1979. Boom towns and human services. University of Wyoming Publications, Vol. 43. Laramie: University of Wyoming Department of Social Work.[c]

Diaz-Tous, I., Electric Power Research Institute. 1981. Power plant efficiencies. (Phone conversation.) T.J. Dowd, Pipeline Systems Incorporated. February 20, 1981.[c]

Dorn, B. 1980a. Illustrated guide to special interest plants of Wyoming. U.S. Fish and Wildlife Service and Bureau of Land Management.[c]

Dorn, B. (Wyoming Department of Environmental Quality, Cheyenne.) 1980b. (Personal communication.) A. Clark, WCC. December 15, 1980.[c]

DeGolyer and McNaughton. 1974. Report on the Madison Formation aquifer in the Powder River Basin, Wyoming, as of March 1, 1974.[c]

DOT. See U.S. Department of Transportation.

Douglas, N.H. 1974. Freshwater fishes of Louisiana. Baton Rouge: Claitor's Publishing Division.[c]

Downey, J.S., and E.J. Weiss. 1980. Preliminary data set for three-dimensional digital model of the Red River and Madison aquifers. Open-file report 80-756. Denver: U.S. Geological Survey.[c]

Dunham, F. (Louisiana Department of Wildlife and Fisheries, Baton Rouge). 1980. Traversal of sensitive wildlife areas by proposed pipeline route. (Personal communication.) D. Olson, WCC, Clifton, N.J., and A. Clark, WCC, San Diego. May 28, 1980.[c]

Dutt, O. (Chief, Environmental Studies, U.S. Army Engineer District, St. Louis, Mo.). 1980. Traffic delay at lock 26 at St. Louis on the Mississippi River. P. Fleischauer, WCC, San Francisco. January 7, 1980.[c]

Ecology Consultants, Inc. 1976. Wyodak to Antelope 230 kV transmission line: Applicant's environmental analysis. Fort Collins, Colo.: Tri-County Electric Association, Inc.[c]

Economic Regulatory Administration. 1980. Powerplant and industrial fuel use act annual report. DOE/RG-0028. Washington, D.C.: U.S. Department of Energy. March 1, 1980.[c]

_____. 1981. Fuels conversion program powerplant profiles. U.S. Department of Energy. January 1981.[c]

Eickhorst, A. (U.S. Army Corps of Engineers, St. Louis, Missouri). 1980. Barge speed. (Phone conversation.) September 2, 1980.[c]

Eisen, C., K. Feathers, and G. Kerr. 1980. Report on the preliminary findings of the Madison baseline study. March 1980.[c]

Eisen, C. 1981. Hydraulic characteristics of the Madison and Minnelusa formations. (Phone conversation.) C. Andrews, WCC, San Francisco. April 2, 1981.[c]

Eiserman, F. (Energy Transportation Systems Inc.). 1980. Penton pipeline-barge alternative. (Letter.) R. Traylor, Project Leader, Bureau of Land Management. April 15, 1980.[b]

Eiserman, F. (Energy Transportation Systems Inc.) 1981. Secretarial issue document information. (Letter) R. Traylor, Project Leader, Bureau of Land Management. February 9, 1981.[b]

El-Ashry, M. T. (Director of Environmental Quality, Tennessee Valley Authority, Norris, Tenn.) 1981. Burdock Mine plan. (Letter, file no. SF/WR 68, P. 902.) C. Fricke, WCC, San Francisco. March 25, 1981.[c]

Ellis, M. 1936. Erosion silt as a factor in aquatic environments. Ecology 17:29-42.[c]

Energy Transportation Systems Inc. 1979. Prevention of Significant Deterioration permit applications for the North Antelope plant, North Rawhide plant, and Jacobs Ranch plant in Campbell County, Wyoming. Submitted to U.S. EPA, Region VIII.[e]

________ . 1980. Air emissions--Wyoming preparation plant. (Memo from H. Troy.) E. Schuert, WCC, San Francisco. March.[c,e]

______ . 1981. Secretarial Issue Document information. (Letter.) R. Traylor, Bureau of Land Management. February 9, 1981.[b]

EPA. See U.S. Environmental Protection Agency.

ETSI. See Energy Transportation Systems Inc.

Federal Power Commission. 1977. Status of coal supply contracts for new electric generating units 1976-85. Staff Report, Bureau of Power. January 19, 1977.[c]

Federal Railroad Administration. 1980. Proposed final environmental impact statement: Coal line project. U.S. Department of Transportation. May 19, 1981.[a]

Feld, W. (U.S. Army Corps of Engineers, St. Louis, Mo.). Effect on Mississippi River traffic of proposed barge transport of coal. 1980. (Phone conversation.) August 29, 1980.[c]

Fields, Mrs. (City Clerk, Dermott, Ark.). 1980. Housing inventory in Cypress Bend area. (Personal communication.) February 29, 1980.[c]

Fitzwater, P. 1980. Geochemical age dating of Madison ground water near Osage and Newcastle, Wyoming. Comment no. 136-3 on ETSI Draft Environmental Statement.[c]

_____ . 1981. Geochemical age dating of Madison ground water near Osage and Newcastle, Wyoming (Phone conversation.) C. Andrews, WCC, San Francisco. February 27, 1981.[c]

Fleischer, G.W. 1978. An assessment of the fishes and aquatic habitat in the eastern Powder River Region of Wyoming. Bureau of Land Management Contract No. YA-512-CT8-126.[c]

Foster, D. 1958. Summary of the stratigraphy of the Minnelusa Formation, Powder River Basin, Wyoming. Thirteenth annual field conference. Wyoming Geological Association Guidebook, p. 39.[c]

Foster, E. (U.S. Forest Service, Denver.) 1980. Current and projected visitor use of public recreation areas near Campbell County, Wyoming. (Personal communication.) February 1980[c].

Franks, Mr. (President, Merchants and Farmers Bank, Dumas, Ark.). 1980. Housing inventory in Cypress Bend area. (Personal communication.) WCC, San Francisco. March 3, 1980.[e]

Freeman, W. (Water Superintendent, Dumas, Ark.). 1980. Public Services in Dumas. (Personal communication.) WCC, San Francisco. June 11, 1980.[e]

Frisby, Mrs. (City Recorder, Arkansas City, Ark.). 1980. Public services in Arkansas City. (Personal communication.) WCC, San Francisco. February 29, 1980.[e]

FWS. See U.S. Fish and Wildlife Service.

Gammon, J.R. 1970. The effect of inorganic sediment on stream biota. Water Pollution Control Research Series, 18050 DWC12/70. U.S. Environmental Protection Agency.[c]

Geen, G.H., T.G. Northcote, G.F. Hartman, and C.C. Lindsey. 1966. Life histories of two species of catostomid fishes in Sixteenmile Lake, British Columbia, with particular reference to inlet stream spawning. Journal of the Fisheries Research Board of Canada 23(11):1761-1788.[c]

Gillette-Campbell County Department of Planning and Development. 1979. Gillette-Campbell County data book.[c]

________. 1979. Campbell County comprehensive plan.[c]

________. 1980. Campbell County population statistics. (Phone conversation.) S. Konkel, WCC, San Francisco. January 1980.[e]

Ginsberg, M. (Conservation and Survey Division, University of Nebraska). 1980. Water, oil, or gas wells in the Madison or Minnelusa in Sioux or Dawes counties, Nebraska. (Phone conversation.) C. Fricke, WCC, San Francisco. August 4, 1980.[e]

Glass, B.P. 1975. Mammals, reptiles, and amphibians. In Rare and endangered vertebrates and plants of Oklahoma. Stillwater: Rare and Endangered Species of Oklahoma Committee, assisted by U.S. Department of Agriculture, Soil Conservation Service.[c]

Glass, G. B., W. G. Wendall, F. K. Root, and R. M. Breckenridge. 1975. Energy resources map of Wyoming (scale 1:500,000). Laramie: The Geological Survey of Wyoming.[a]

Glover, R. 1979. Evaluation of instream flow methodologies and determination of water quantity needs for nine streams in the state of South Dakota. Report No. 80-5. Pierre: South Dakota Department of Game, Fish and Parks.[c]

Goertz, J.W., and R. Abegg. 1966. Pumas in Louisiana. Journal of Mammalogy 47:727.[a]

Gore, J.A., and L.S. Johnson. 1979. Biotic recovery of a reclaimed river channel after coal strip mining. Proceedings: Mitigation symposium, Fort Collins, Colorado, July 16-20, 1979.[c]

Gott, G., D. Wolcott, and C. Bowles. 1974. Stratigraphy of the Inyan Kara Group and localization of uranium deposits, southern Black Hills, South Dakota and Wyoming. Professional paper 763. Washington, D.C.: U.S. Geological Survey.[a]

Gries, J.D. 1980. Comment (number 39-2) on ETSI Draft Environmental Impact Statement regarding permeability of the Minnelusa formation.[b]

Gulf South Research Institute. 1976. Endangered species study of Tenas-Cocodrie area. New Iberia, La.: Gulf South Research Institute, Department of Environmental Sciences.[c]

Halepaska, J. C. 1975. Summary of the initial calibration tests on the Energy Transportation Systems Incorporated ground-water model. San Francisco: Bechtel Inc. September 12, 1975.[c]

Hall, E.R., and K.R. Kelson. 1959. The mammals of North America. New York: Ronald Press.[a]

Hanten, R., and A. Talsma. (South Dakota Department of Game, Fish and Parks, Pierre). 1981. (Personal communication.) A. Clark, WCC; R. Boyd, BLM; and L. Carlson, FWS. March 9, 1981.[c]

Harju, H. (Wyoming Game and Fish Department, Cheyenne). 1980. Effect of proposed pipeline construction schedule on sage grouse. (Personal communication.) A. Clark, WCC, San Diego.[c]

Harp, G.L., and J.D. Ricket. 1977. The dragonflies (Anisoptera) of Arkansas. Proceedings of the Arkansas Academy of Science 31:50-53.[c]

Harris, W. (ETSI). 1980. Proposed ETSI pipeline and managed recreation areas. (Phone conversation.) G. Detsis, BLM, Denver.[b]

Harvey, M.J., M.J. Kennedy, and V.R. McDaniel. 1978. Status of the Ozark big-eared bat (Plecotus Townsendii ingens) in Arkansas. Proceedings of the Arkansas Academy of Science 32:89-90.[a]

Hassler, T.J. 1970. Environmental influences on early development and year-class strength of northern pike in Lake Oahe and Sharpe, South Dakota. Transactions of the American Fisheries Society 99(2): 369-375.[c]

Hays, H.A., and D.C. Bingman. 1964. A colony of gray bats in southeastern Kansas. Journal of Mammalogy 45:150.[a]

HCRS - See U.S. Heritage Conservation and Recreation Service.

Head, W., K. Kilty, and R. Knottek. 1979. Maps showing formation temperatures and configurations of the tops of the Minnelusa Formation and the Madison Limestone, Powder River Basin, Wyoming, Montana, and adjacent areas. Map I-1159: U.S. Geological Survey.[c]

Head, W., and R. Merkel. 1976. Hydrologic characteristics of the Madison and Minnelusa formations in the Powder River Basin determined by well logging formation evaluation. Denver: U.S. Geological Survey.[a]

Hehnke, M. (U.S. Fish and Wildlife Service, Cheyenne). 1979. Ferret sightings in Wyoming. (Personal communication.) A. Clark, WCC, San Diego. September 19, 1979.[c]

Henderson, F.R., and R.L. Little. 1973. Status of the black-footed ferret and black-tailed prairie dogs in Kansas. Proceedings: Black-footed ferret and prairie dog workshop. Brookings: South Dakota State University.[c]

Henderson, F.R., P.F. Springer, and R. Adrian. 1974. The black-footed ferret in South Dakota. Technical Bulletin No. 4 (2d rev. printing). Pierre: South Dakota Department of Game, Fish and Parks.[c]

Herbert, D.W.M., and J.C. Merkens. 1961. The effect of suspended mineral solids on the survival of trout. Journal of Air and Water Pollution 5:46-55.[c]

Higler, L.W. 1975. Reactions of some caddis larvae (Trichoptera) to different types of substrate in an experimental stream. Freshwater biology 5:151-158.[c]

Hill, C. (U.S. Army Corps of Engineers, Vicksburg, Miss.). Effect on recreational use of Mississippi River by barge shipment of coal. 1980. (Phone conversation.) August 29, 1980.[c]

Hillman, C.N., and T.W. Clark. 1979. Mustela nigripes. Mammalian Species No. 132. American Society of Mammalogists.[c]

Hillman, C.N., and J.C. Sharps. 1978. Return of swift fox to northern Great Plains. Proceedings of the South Dakota Academy of Science. 57: 154-162.[a]

Hobbs, H.H., Jr. 1976. Crayfishes (Astacidae) of North and Middle America. Water Pollution Control Research Series 18050 ELD05/72. Cincinnati: U.S. Environmental Protection Agency.[c]

Hodson, W. 1974. Records of water wells, springs, oil- and gas-test holes, and chemical analyses of water for the Madison Limestone and equivalent rocks in the Powder River Basin and adjacent areas, northeastern Wyoming. Washington, D.C.: U.S. Geological Survey.[c]

Holdt, C. (Lusk town clerk). 1980. Temporary housing availability, 1980, for likely pipeline construction spread headquarters. (Phone conversation.) WCC, San Francisco. March 20, 1980.[c]

Holiday Inn (Lyn Vaughan). 1980. Motel vacancy rates. (Phone conversation.) C. Vaughan, WCC, San Francisco. March 12, 1980.[c]

Holzworth, G.C. 1972. Mixing heights, wind speeds, and potential for urban air pollution throughout the contiguous United States. AP-101. Research Triangle Park, N.C.: U.S. Environmental Protection Agency.[a]

Hopkins, W.B. 1976. Water-resources data for deep aquifers of eastern Montana. U.S. Geological Survey Water-Resources Inventory 76-40. Helena, Montana.[c]

Horton, M. 1953. Stratigraphy and structure of the Old Woman anticline, Niobrara County, Wyoming. M.S. thesis. Lincoln: University of Nebraska.[c]

Housing Services Inc. 1979. Wright, Wyoming: a planned community development. (Housing Services Inc. is a subsidiary of Atlantic Richfield Co.) July 1979.[c]

Huntoon, P., and T. Womack. 1975. Technical feasibility of the proposed Energy Transportation Systems Inc. well field, Niobrara County, Wyoming. Contributions to Geology 14:11-25.[c]

Hynes, H.B.N. 1970. The ecology of running waters. Toronto: University of Toronto Press.[c]

Interstate Commerce Commission. 1979. Draft environmental impact statement, ex parte No. 347, western coal investigation--Guidelines for railroad rate structure. October 1979.[a]

Jackson, B. (City Engineer, Dermott, Ark.) 1980. Public services in Dermott. (Personal communication.) WCC, San Francisco. February 29, 1980.[c]

James, D., and F. Burnside. 1979. A study of the red-cockaded woodpecker in Arkansas. Annual report, prepared for Arkansas Game and Fish Commission (Project E-1-2, Job 11-A). University of Arkansas, Department of Zoology.[c]

Jenkins, A. M. 1981. Burdock Mine dewatering. Draft report. Norris, Tennessee: Tennessee Valley Authority.[a]

Johnson, J.H. 1976. Effects of tow traffic on the resuspension of sediments and on dissolved oxygen concentrations in the Illinois and upper Mississippi Rivers under normal pool conditions. U.S. Army Engineer District, St. Louis.[c]

Jones, B. South Dakota Department of Water and Natural Resources. 1981. Acreage estimates of cropland irrigated per cfs of surface water diverted from streams. (Phone conversation). A. Amen, Bureau of Land Management. March 31, 1981.[b]

Kallemeyn, V. (South Dakota Department of Water and Natural Resources.) 1981. Distribution of Oahe Reservoir water. (Phone conversation.) L. Cocker, Bureau of Land Management. March 26, 1981.[b]

Kansas Agricultural Experiment Station. 1973. Soils of Kansas (map). Manhattan: Kansas State University.[c]

Kansas City Southern. 1980. Operating parameters for railroad delivery to markets of proposed action. (Personal communication.) P. Fleischauer, WCC, San Francisco. June 6, 1980.[c]

Kansas Fish and Game Commission. 1977. Black-footed ferret investigations, final report. Pittman-Robertson Project W-43-R-2.[c]

______. 1979. Saline River Basin, Kansas stream survey. Dingell-Johnson Project F-15-R-14.[c]

Kansas Forestry, Fish and Game Commission. 1972a. Upper Republican River Basin, Kansas. Preliminary stream survey.[c]

______. 1972b. Upper Arkansas River Basin, Kansas. Preliminary stream survey.[c]

______. 1977a. Upper Republican River Basin, Kansas. Stream survey.[c]

______. 1977b. Lower Arkansas River Basin, Kansas. Preliminary stream survey.[c]

Kansas Governor's Office of Policy and Research. 1980. Use of Caney River for recreation. (Phone conversation.) G. Detsis, BLM, Denver.[b]

Karr, J.R., and I.J. Schlosser. 1978. Water resources and the land-water interface. Science 201:229-234.[a]

Keefer, W. 1974. Regional topography, physiography, and geology of the northern Great Plains. Open-file report 74-50. Washington, D.C.: U.S. Geological Survey.[c]

Keene, J. 1973. Ground-water resources of the western half of Fall River County, South Dakota. Report of investigations 109. Vermillion: University of South Dakota, Department of Natural Resources Development, Geological Survey.[c]

Kelly, J. 1980a. (Phone conversation.) July 31, 1980.[c]

______. 1980b. (Telecommunication.) August 26, 1980.[c]

Kemper, A. 1964. A tower for TV: 30,000 dead birds. Audubon, March-April 1964.[c]

Kilgore, D.E. 1967. An ecological study of the swift fox in the Oklahoma panhandle. M.S. Thesis. Lawrence: University of Kansas.[c]

Kirk, J. South Dakota Department of Game, Fish and Parks. 1981. Limiting factors influencing big game and turkeys in the southern Black Hills area. (Personal conversation.) R. Boyd, Bureau of Land Management. March 12, 1981.[b]

Kleber, E. (Federal Energy Regulatory Commission). 1981. Power plant efficiencies. (Phone conversation.) T.J. Dowd, Pipeline Systems Incorporated. February 20, 1981.[c]

Konikow, L. 1976. Preliminary digital model of ground-water flow in the Madison Group, Powder River Basin and adjacent areas, Wyoming, Montana, South Dakota, North Dakota, and Nebraska. Water-resources investigations 63-75. Denver: U.S. Geological Survey.[c]

Lacy, C. (Wyoming State Engineer's Office). Carpenter, Wyoming, ground water control area. (Phone conversation.) C. Fricke, WCC, San Francisco. February 25, 1981.[c]

Langdon, C. 1981. The proposed Tennessee Valley Authority mining operation at Burdock, South Dakota. (Telecommunication.) C. Fricke, WCC, San Francisco. March 5, 1981.[c]

Larimore, R.W., et al. 1959. Destruction and re-establishment of stream fish and invertebrates affected by drought. Transactions of the American Fisheries Society 88:261-285.[c]

Lichvar, B. (Wyoming Native Conservancy, Cheyenne). 1981. (Personal communication.) A. Clark, WCC, San Francisco. January 8, 1981.[c]

Linder, R.L., and C.N. Hillman. 1973. Proceedings of the black-footed ferret and prairie dog workshop. Sponsored by South Dakota State University Department of Wildlife and Fisheries Sciences, South Dakota Cooperative Wildlife Research Unit, and Patuxent Wildlife Research Unit, U.S. Bureau of Sport Fisheries and Wildlife. September 4-6, 1973, Rapid City, S.D.[a]

Lippencott, W., Jr. Undated. Whooping cranes. Gainesville, Fla.: National Fish and Wildlife Laboratory.[c]

Lisenbee, A. 1978. Laramide structure of the Black Hills uplift, South Dakota-Wyoming-Montana. Geology Society of America Mem. 151, pp. 165-196.[c]

Litton, R.B., et al. 1971. An aesthetic overview of the role of water in the landscape. University of California, Berkeley. July 1971.[a]

Lohman, S.W. 1972. Ground-water hydraulics. U.S. Geological Survey Professional Paper 708. Washington, D.C.: U.S. Government Printing Office.[c]

Louisiana, State of. 1979. Ambient air data: Annual report, 1978. Louisiana Air Control Commission.[a]

Louisiana Public Service Commission. 1981. Status of Louisiana power plants. (Phone conversation.) G. Konwinski, Bureau of Land Management, March 26, 1981.[b]

Love, J.D., J.L. Weitz, and R.K. Hose. 1955. Geologic map of Wyoming (scale 1:500,000). U.S. Geological Survey.[a]

Lowery, G.H. 1974a. Louisiana birds. Baton Rouge: Louisiana State University Press.[a]

________. 1974b. Louisiana mammals. Baton Rouge: Louisiana State University Press.[a]

Lusk Town Planner. 1980. (Phone conversation.) WCC, San Francisco. Fall 1980.[c]

Mackay, R.J., and J. Kalff. 1969. Seasonal variation in standing crop and species diversity of insect communities in a small Quebec stream. Ecology 50:101-109.[c]

Mamminga, L. 1981. Water use at South Dakota State Veterans Home. (Phone conversation.) M. Howland. April 15, 1981.[c]

Mankus, R. (U.S. Army Corps of Engineers, St. Louis, Mo.). 1980. Rail-barge coal transshipment facilities in St. Louis region. (Phone conversation.) WCC, San Francisco. August 29, 1980.[c]

Marsh, P.C., and T.F. Waters. 1980. Effects of agricultural drainage development on benthic invertebrates in undisturbed downstream reaches. Transactions of the American Fisheries Society 109:213-223.[c]

Martin, S.J., and M.H. Schroeder. 1978. Black-footed ferret surveys on seven coal occurrence areas in south central Wyoming, June 8 to September 25, 1978. Ft. Collins, Colorado: U.S. Fish and Wildlife Service.[c]

McCabe, D. (Haliburton). 1980. Hydrostatic testing. (Phone conversation.) WCC, San Francisco. February 8, 1980.[c]

McDaniel, V.R., and J.E. Gardner. 1977. Cave fauna of Arkansas: Vertebrate taxa. Proceedings of the Arkansas Academy of Science 31:68-71.[a]

McGraw, M. 1979. The unit coal-train system. Electrical World. October 15, 1979.[a]

McMahon, Ms. (Chamber of Commerce, McGehee, Ark.). 1980. Housing inventory in Cypress Bend area. (Personal communication.) WCC, San Francisco. February 28, 1980.[c]

Meece, L. (Meece Marine Enterprises, Inc.). 1981. Mississippi river locks. (Phone conversation.) T.J. Dowd, Pipeline Systems Incorporated. February 23, 1981.[c]

Meehan, W.R., and D.N. Swanston. 1977. Effects of gravel morphology on fine sediment accumulation and survival of incubating salmon eggs. U.S. Forest Service Research Paper PNW220.[a]

Miller, D., E.L. Boeker, R.S. Thorsell, and R.R. Olendorff. 1975. Suggested practices for raptor protection on powerlines. Provo, Utah: Raptor Research Foundation, Inc.[c]

Miller, W.R., and S.A. Strausz. 1980. Preliminary map showing freshwater heads for the Mission Canyon and Lodgepole Limestones and equivalent rocks of Mississippian Age in the northern Great Plains of Montana, North and South Dakota, and Wyoming (scale 1:1,000,000). U.S. Geological Survey.[c]

Minckley, W.L., and F.B. Cross. 1959. Distribution, habitat and abundance of the Topeka shiner Notropis topeka (Gilbert) in Kansas. American Midland Naturalist 61:210-217[c]

Missouri Basin Inter-Agency Committee. 1969. The Missouri River basin comprehensive framework study, Vol. 2. Washington, D.C.: U.S. Government Printing Office.[c]

Missouri Basin Power Project. 1980. Socioeconomic Impact Monitoring Report No. 44. 4th quarter 1980.[c]

Missouri-Kansas-Texas Railroad Company. 1980. Operating parameters for railroad delivery to markets of proposed action. (Personal communication.) P. Fleischauer, WCC, San Francisco. May 1, 1980.[c]

Missouri-Pacific Railroad Company. 1980. Operating parameters for railroad delivery to markets of proposed action. (Personal communication.) P. Fleischauer, WCC, San Francisco. June 13, 1980.[c]

Missouri River Basin Commission. 1975. Platte River Basin, Nebraska. Level B study, fish and wildlife, technical paper.[c]

________ . 1976. Report on the Platte River Basin, Nebraska. Level B study.[c]

Montfort, J. 1980. Operating experience of the Black Mesa pipeline. Proceedings of the Fifth International Technical Conference on Slurry Transportation, March 26-28, 1980. Sponsored by the Slurry Transportation Association, Washington, D.C.[d]

Montgomery, James M., Consulting Engineers, Inc.[c] 1979. Preliminary design report, Gillette-Madison water project. Boise.[c]

Mood, B. (Manager of Water Sewer System and Fire Chief, McGehee, Arkansas.) 1980. Public services in McGehee. (Personal communication.) February 28, 1980.[c]

Moore, J.W. (Department of Civil Engineering, University of Arkansas). 1977. Water resources aspects of coal transportation by slurry pipeline. Prepared for presentation to Office of Water Research and Technology, U.S. Department of the Interior.[c]

Moore, W.G. 1966. Central Gulf States and the Mississippi embayment. Limnology in North America. Edited by D.G. Frey. Madison: University of Wisconsin Press.[c]

Morris, J., L. Morris, and L. Witt. 1974. The fishes of Nebraska. Lincoln: Nebraska Game and Parks Commission. (A contribution of federal aid in fish restoration. Project F-4-R, Nebraska.)[c]

Mountain West Research. 1975. Construction worker profile. Old West Regional Commission. December 1975.[c]

Muller, J. 1981. Water use at Evans Plaza. (Phone conversation.) M. Howland. April 2, 1981.[c]

Murphy, M. 1976. Northern Great Plains coal: Conflicts and options in decision making. Upper Midwest Council. April 1976.[c]

Nagel, H., C. True, S. Longfellow, J. Farney, and D. Lund. 1974. Identification and evaluation of present zoologic resources--Nebraska Mid-state Division Pick Sloan Missouri Basin Program and associated areas. Kearney, Nebraska: Kearney State College. (Prepared for U.S. Bureau of Reclamation, Lower Missouri Region, Grand Island, Nebraska.)[a]

Nebraska Game and Parks Commission. 1972a. Nebraska wildlife resource inventory. Vol. I of the Nebraska Fish and Wildlife Plan. Lincoln, Nebraska.[c]

________ . 1972b. Nebraska fishery resources inventory. Vol. II of the Nebraska Fish and Wildlife Plan. Lincoln, Nebraska.[c]

________ . 1977. Nebraska's endangered and threatened wildlife. Lincoln, Nebraska.[c]

________ . 1980. Northern swift fox. (Phone conversation.) D. Olson, WCC, Clifton, N.J.[c]

Nelson, W.R., and L.G. Beckman. 1979. Entrainment of ichthyoplankton by irrigation withdrawal systems. Report No. 79/16. U.S. Fish and Wildlife Service, Office of Biological Services.[c]

Nesbitt, A. C. (Union Pacific Railroad Company.) 1980. Union Pacific and C and NW coal handling. (Letter.) P. Fleischauer, WCC, San Francisco. August 21, 1980.[c]

Neufeld, W.R. 1981. Secretary, South Dakota Department of Water and Natural Resources. 1981. (Letter.) R. Traylor, Bureau of Land Management, Denver. April 1, 1981.[b]

Newcastle City Engineer. 1980. Commuters from Newcastle to Kerr-McGee's Jacobs Ranch mine, and future population estimates for Newcastle. (Phone conversation.) Randy Chun, WCC, San Francisco. August 1980.[c]

Nimick, J. (Wyoming Game and Fish Department, Newcastle.) 1980. Traversal by proposed Oahe alternative of mule deer range area. (Personal communication.) A. Clark, WCC, San Diego.[c]

Niobrara County Planning Commission and Tri-County Planning Office (Newcastle, Wyoming). 1977. Niobrara County land use plan. Approved December 29, 1977.[c]

Northern Tier Pipeline. 1979. Environmental statement: Crude oil transportation system.[b]

Northrup, J.D. 1939. Reconnaissance map of the Dewey area, Weston and Niobrara counties, Wyoming, and Custer and Fall River counties, South Dakota. U.S. Geological Survey.[c]

Oblinger-McCaleb. 1980. Wyoming state comprehensive outdoor recreation plan.[c]

Office of Technology Assessment. 1977. Environmental impacts of coal slurry pipelines and unit trains. Draft final report. Prepared by Science Applications Inc. Project No. C-108, SAI-1-064-03-029.[c]

Oklahoma, State of. 1979. Oklahoma 1978 annual ambient air quality report. Oklahoma State Department of Health, Environmental Health Services, Air Quality Service.[a]

Oklahoma Agricultural Experiment Station. 1959. Soil map of Oklahoma. Stillwater: Oklahoma State University.[c]

Oklahoma Community Data Sheets for Ponca City, Stillwater, Pawnee, Pryor, Muskogee, 1979.[c]

Oklahoma Gas and Electric Co. 1979. Community profile of Muskogee, Oklahoma.[c]

Oklahoma Health Department, Air Quality Services. 1981. Status of Oklahoma power plants. (Phone conversation.) G. Konwinski, Bureau of Land Management. April 23, 1981.[b]

Old West Regional Commission. 1975. Construction worker profile.[c]

________. 1976. Investigation of recharge to groundwater reservoirs of northeastern Wyoming (the Powder River Basin). Report and map. June 1976.[c]

Olsen, R. (U.S. Forest Service). 1980. Possible conflicts of proposed ETSI pipeline with Thunder Basin National Grassland. (Phone conversation.) P. Fleischauer, WCC, San Francisco. September 8, 1980.[c]

OTA. See Office of Technology Assessment.

Parmalee, P.W. 1967. The freshwater mussels of Illinois. Vol. 8, Illinois State Museum of Popular Science Service.[c]

Pasquill, F. 1961. The estimation of the dispersion of windborne materials. Meteorological Magazine 90(1063).[a]

Peat, Marwick, Mitchell, & Co. 1979. Chicago and North Western's application for federal assistance. An analysis of no-action alternatives. Prepared for the Federal Railroad Commission.[c]

Peavy, H.S., P.W. Jennings, and G.A. Murgee. 1979. Water pollution potential of coal-slurry pipelines. U.S. EPA Grant No. R-805176-01.[c]

Pennak, R.W. 1966. Rocky Mountain states. Limnology in North America. Edited by D.G. Frey. Madison: University of Wisconsin Press.[c]

________. 1978. Fresh-water invertebrates of the U.S. 2nd ed. New York: Ronald Press.[c]

Pesek, T.F. 1974. Macroinvertebrates as indicators of water quality in Salt Creek, Nebraska. M.S. thesis. University of Nebraska.[c]

Peters, J.C. 1967. Effects on a trout stream of sediment from agriculture practices. Journal of Wildlife Management 31:805-812.[c]

Peterson, J. 1978. Subsurface geology and porosity distribution, Madison Limestone and underlying formations, Powder River Basin, northeastern Wyoming and southeastern Montana, and adjacent areas. Open-file report 78-783. Denver: U.S. Geological Survey.[c]

Peterson, M. (Dumas, Arkansas, Chamber of Commerce and Election Commission). 1980. Housing inventory in Cypress Bend area. (Personal communication.) May 22, 1980.[c]

Petroleum Information Service. 1980. Structure contour map and well-log data for Powder River Basin, Wyoming and Montana. (Geological information compiled by Barlow & Haun, Inc.; map preparation by Petroleum Ownership Map Co.) Scale 1 inch = 2 miles.[c]

Pierre Area Chamber of Commerce. 1979. Pierre, South Dakota, civic information.[c]

________. 1980. (Personal communication.) C. Vaughan, WCC, San Francisco. June 25, 1980.[c]

Pirner, S. 1981. South Dakota Department of Water and Natural Resources. Wastewater Effluent Sampling. (Letter.) P. Ritter, WCC, San Francisco. May 6, 1981.[c]

Platt, D.R., F.B. Cross, D. Distler, O.S. Fent, P.R. Hall, M. Terman, J. Walstrom, and J. Zimmermann. 1974. Rare, endangered and extirpated species in Kansas. IV: Birds. Transactions of the Kansas Academy of Science 77(1):1-9.[a]

Plummer, Alan, and Associates. 1980. Interim progress report: Development of technical information for NPDES/state permits. July 21, 1980. (This material was updated by a letter to P. Ritter, WCC, San Francisco, October 3, 1980.)[c]

________. 1981. Engineering report regarding the treatment of ETSI coal dewatering plant effluent discharge. February 19, 1981; April 7, 1981; April 14, 1981. (Unpublished.)[b]

PMM. See Peat, Marwick, Mitchell, & Co.

Power Engineering. 1980. New generating plants. May 1980.[a]

Pravda, O. 1973. Uber den Einfluss der Herbizide auf einige Susswassertiere. Hydrobiologia 42:97-142.[c]

Queal, L., and R. Wood (Kansas Fish and Game Commission, Pratt, Kansas). 1980. Proposed pipeline traversal of wetland habitat in Kansas. (Personal communication.) D. Olson, WCC, Clifton, N.J. May 27, 1980.[c]

Ragland, D.V. 1974. Evaluation of three side channels and the main channel border of the middle Mississippi River as fish habitat. St. Louis: U.S. Army Engineer District.[c]

Rahn, P. 1975. Hydrogeology of the Madison Limestone in the Powder River Basin, with reference to the proposed ETSI ground water withdrawals. Billings, Montana: Burlington Northern, Energy and Minerals Department.[c]

________. 1979a. Effect of the proposed ETSI coal slurry pipeline on water resources in Wyoming, South Dakota, and Nebraska. Proceedings of the South Dakota Academy of Sciences, Vol. 50, pp. 100-113.[c]

________. 1979b. Stream gaging data. (Written communication.) J. Muller. September 27, 1979.[c]

________. 1980. Stream gaging data. (Written communication.) J. Muller. January 4, 1980.[c]

Rahn, P., and J. Gries. 1973. Large springs in the Black Hills, South Dakota and Wyoming. Report of Investigations 107. Vermillion: South Dakota Geological Survey.[c]

Ramada Inn (S. Octkin). 1980. Motel vacancy rates. (Phone conversation.) C. Vaughan, WCC, San Francisco. March 12, 1980.[c]

Rapid City Chamber of Commerce. 1980. (Personal communication.) C. Vaughan, WCC, San Francisco. June 25, 1980.[c]

Rieber, M., and S.L. Soo. 1977a. Comparative coal transportation costs: An economic and engineering analysis of truck, belt, rail, barge, and coal slurry and pneumatic pipelines. Vol. 4: Barge transport. Urbana, Illinois: University of Illinois. August 1977.[a]

________. 1977b. Comparative coal transportation costs: An economic and engineering analysis of truck, belt, rail, barge, and coal slurry and pneumatic pipelines. Vol. 1: Summary and conclusions. Urbana, Illinois: University of Illinois. August 1977.[a]

Robinson, C., W. Mapel, and M. Bergendane. 1964. Stratigraphy and structure of the northern and western flanks of the Black Hills uplift, Wyoming, Montana, and South Dakota. U.S. Geological Survey Professional Paper 404.[c]

Robison, H.W., and G.L. Harp. 1971. A pre-impoundment limnological study of the Strawberry River in northeastern Arkansas. Proceedings of the Arkansas Academy of Sciences 25:70-79.[c]

Rogozen, M.B., L.W. Margler, M. Martz, and D.F. Hausknecht. 1977. Environmental impacts of coal slurry pipeline and unit trains, draft final report. Prepared for U.S. Congress, Office of Technology Assessment.[c]

Rosenberg, D.M., and A.P. Wiens. 1978. Effects of sediment addition on macrobenthic invertebrates in a northern Canadian river. Water Research 42:753-763.[c]

Ross, C.P., D.A. Andrews, and I.J. Witkind. 1955. Geologic map of Montana. Montana Geological Survey (scale 1:500,000).[a]

RSWA-Denver, Inc. 1980. Garfield County housing study. March 1980.[c]

Sanguanruang, S.S. 1977. Water quality aspects of coal transportation by slurry pipeline. Ph.D. dissertation. University of Arkansas.[c]

Scalet, C.G. 1980. Endangered and threatened fishes of South Dakota. South Dakota Cooperative Extension Service.[c]

Schmitt, J. (Heritage Conservation and Recreation Service, South Central Region, Albuquerque, N.M.). 1981. HCRS point rating system on intrusion upon rivers identified under the Nationwide Rivers Inventory, Phase I program. (Phone conversation.) G. Detsis, Bureau of Land Management. April 21, 1981.[b]

Schroder, L. (Moorcroft Town Clerk). 1980a. Temporary housing availability, 1980, for likely pipeline construction spread headquarters. (Phone conversation.) WCC, San Francisco. March 13, 1980.[c]

________. 1980b. Temporary housing availability, 1980, in Moorcroft. (Phone conversation.) C. Vaughan, WCC, San Francisco. June 17, 1980.[c]

SCS. See U.S. Soil Conservation Service.

Sealander, J.A. 1956. A provisional check-list and key to the mammals of Arkansas (with annotations). American Midland Naturalist 56:257-296.[a]

________. 1979. A guide to Arkansas mammals. Conway, Arkansas: River Road Press.[a]

Sealander, J.A., and P.S. Gipson. 1973. Status of the mountain lion in Arkansas. Proceedings of the Arkansas Academy of Science 27:38-41.[a]

Sewell, P. (Newcastle City Clerk). 1980. Temporary housing availability, 1980, for likely pipeline construction spread headquarters. (Phone conversation.) WCC, San Francisco. August 12, 1980.[c]

Sharps, J.C. 1980. Swift fox. Endangered Species Pamphlet No. ESS 27F. South Dakota Cooperative Extension Service.[c]

Shelton, J. 1981. Water supply for Hot Springs, South Dakota. (Phone conversation.) M. Howland. April 3, 1981.[c]

Shelton, J.M., and R.D. Pollock. 1966. Siltation and egg survival in incubation channels. Transactions of the American Fisheries Society 95:183-187.[a]

Shen, Dr. 1981. Solids transport volume percentage. (Phone conversation.) T. Aude, Pipeline Systems Incorporated. February 23, 1981.[c]

Sheridan, W.L., and W.J. McNeil. 1968. Some effects of logging on two salmon streams in Alaska. Journal of Forestry 66:128-133.[a]

Short, R.M. (U.S. Fish and Wildlife Service, Tulsa). 1980. Environmental concerns along the proposed ETSI pipeline route. (Letter.) D. Olson, WCC, Clifton, N.J. June 5, 1980.[c]

Sientz, M. (Douglas City Planner). 1980. Temporary housing availability, 1980, for likely pipeline construction spread headquarters. (Phone conversation.) WCC, San Francisco. August 12, 1980.[c]

Sixth District Council of Local Governments. 1978. South Dakota community data. Montana-Dakota Utilities Co.[c]

________. 1979. Wastewater reuse alternatives for the Black Hills region. August 1979.[c]

________, Mike Strub, Environmental Engineer. 1981. Projected wastewater flows available in South Dakota. (Letter.) P. Ritter, WCC, San Francisco. March 4, 1981.[c]

Smith, K. (Arkansas Nature Conservancy). 1980. Wildlife habitat near proposed pipeline route in Arkansas. (Personal communication.) A. Clark, WCC, San Diego. May 29, 1980.[c]

Smock, R.W. 1978. Unit train transfer terminals lead coal handling revolution. Electric Light and Power, October 1978.[a]

Snow, C. 1972. Habitat management series for endangered species. Report No. 1: American and Arctic peregrine falcons. Denver: Bureau of Land Management.[c]

________. 1973. Habitat management series for endangered species. Report No. 5: Southern and northern bald eagles. Denver: Bureau of Land Management.[c]

Souders, V. (Conservation and Survey Division, University of Nebraska). 1980. Well in Sioux County, Nebraska.[c] (Phone conversation.) C. Fricke, WCC, San Francisco. January 15, 1980.

South Dakota, State of. 1980. Draft (unissued) state environmental impact statement on the West River Aqueduct. Pierre.[b]

South Dakota Department of Economic Development and Tourism. 1980. Population estimates for communities along the Oahe Reservoir-Gillette water pipeline route. (Phone conversation.) January 28, 1980.[c]

South Dakota Department of Water and Natural Resources. 1981. Answers to questions on the West River Aqueduct.[b] (Letter.) R. Traylor, ETSI EIS Project Leader, BLM. February 9, 1981.

________. 1981. Effects of streamflow reductions. (Letter, Comment No. 138 to DEIS.)[b]

South Dakota Ornithologists Union. 1978. The birds of South Dakota: An annotated check list. Vermillion, S. Dak.: W.H. Over Museum.[a]

Sparks, R.E. 1975. Possible biological impacts of wave wash and resuspension of sediments by boat traffic in the Illinois River. St. Louis: U.S. Army Corps of Engineers.[c]

Stafford, C.J. 1979. Map of the structural geology of the Madison Group. (Unpublished.)[c]

Starrett, W.C. 1971. A survey of the mussels (Unionacea) of the Illinois River: A polluted stream. Illinois Natural History Survey Bulletin. 30:265-403.[c]

Stern, E.M., and W.B. Stickle. 1978. Effects of turbidity and suspended material in aquatic environments. Technical Report D-78-21. Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station.[c]

Stewart, R.K., and C.A. Thilenius. 1964. Stream and lake inventory and classification in the Black Hills of South Dakota. South Dakota Department of Game, Fish and Parks.[c]

Stockdale, R. 1974. Report to the state engineer Floyd A. Bishop on the Madison Limestone as it relates to the Energy Transportation Systems Inc. coal-slurry pipeline project. (Unpublished manuscript.)[c]

Strub, M. 1981. (Personal communication.) P. Ritter, WCC, San Francisco. April 16, 1981.[c]

Stuart/Nichols Associates. 1978a. Impact analysis--city of Gillette, Wyoming. Prepared under contract with Old West Regional Commission. Washington, D.C.[c]

________ . 1978b. Impact analysis--Weston County, Wyoming, 1978-1985. Prepared under contract No. 1075271 for Old West Regional Commission.[c]

________ . 1978c. Impact analysis--Crook County, Wyoming.[c]

Swenson, F. 1968. New theory of recharge to the artesian basin of the Dakotas. Geological Society of America Bulletin 79:163-182.[a]

Swenson, F.A., W.R. Miller, W.G. Hodson, and F.N. Visher. 1976. Maps showing configuration and thickness, and potentiometric surface and water quality in the Madison Group, Powder River Basin, Wyoming and Montana. U.S. Geological Survey.[c]

Talmage, S.S., and C.C. Coutant. 1978. Thermal effects. Journal of Water Pollution Control Federation, pp. 1514-1553.[c]

Tebo, L.B., Jr. 1955. Effects of siltation resulting from improper logging on the bottom fauna of a small trout stream in the southern Appalachians. Progressive Fish Culture 17:64-70.[c]

Telliard, William. 1979. Priority pollutant criteria. (Phone conversation.) P. Ritter, WCC, San Francisco. November 8, 1980.[c]

Tennessee Valley Authority. 1979. Draft environmental statement: Edgemont uranium mine. Chattanooga, Tennessee: Tennessee Valley Authority. Released January 24, 1979.[a]

________ . 1981. Letter and data supplied by M.T. El-Ashry, Director of Environmental Quality for TVA in Norris, Tennessee, to C. Fricke, WCC, San Francisco. March 25, 1981.[c]

Tenney, C.S. 1966. Pennsylvanian and Lower Permian deposition of Wyoming and adjacent areas. Bulletin of the American Association of Petroleum Geologists 50(2):227-250.[a]

Tokach, D. (U.S. Soil and Conservation Service, Huron, S.Dak.). 1981. Acreage estimates of cropland irrigated per cfs of surface water diverted from streams. (Phone conversation.) A. Amen, Bureau of Land Management. March 31, 1981.[b]

Trescott, P., and S. Larson. 1976. Documentation of finite-difference model for simulation of three-dimensional ground-water flow. Open-file report 75-438. U.S. Geological Survey.[c]

Turner, D.B. 1964. A diffusion model for an urban area. Journal of Applied Meteorology 3.[a]

Tyree, Mr. (Oklahoma Gas and Electric Co.). 1980. Construction of Oklahoma Gas and Electric Co.'s Ponca City power plant units. (Phone conversation.) February 14, 1980.[c]

USACOE. See U.S. Army Corps of Engineers.

UCLA/SAI. 1978. Water pollution control for coal slurry pipelines, final report. U.S. Department of Energy. June 30, 1978.[e]

U.S. Army Corps of Engineers. 1976. Final environmental impact statement: Mississippi River and tributaries, Mississippi River levees and channel improvement. Vicksburg, Miss.: U.S. Army Engineer District.[e]

_______. 1977. Waterborne commerce of the United States. Part 2: Waterways and harbors, Gulf Coast, Mississippi River system, and Antilles. New Orleans: U.S. Army Engineer District.[e]

_______. 1979. Dredged material research: Information exchange bulletin. Vol. D-79-2. U.S. Army Engineer Waterways Experiment Station.[e]

U.S. Bureau of Chemistry and Soils. 1924. Soil survey of Garden County, Nebraska.[c]

U.S. Bureau of the Census. 1977. Series P-25, No. 698. U.S. Department of Commerce. April 1977.[a]

_______. 1978. County and city data book, 1977. U.S. Department of Commerce.[a]

_______. 1979a. Series P-26. U.S. Department of Commerce. July 1979.[a]

_______. 1979b. 1977 census of governments. Vol. 2: Taxable property values and assessment/sales price ratio. U.S. Department of Commerce. February 1979.[a]

_______. 1979c. 1977 county business patterns. U.S. Department of Commerce. May 1979.[a]

U.S. Bureau of Economic Analysis. 1979. Regional Economic Information System. Table 25.00: Employment by Type and Broad Industrial Sources, 1972-1977. U.S. Department of Commerce. April 1979.[a]

U.S. Bureau of Indian Affairs. 1981. Policy statement regarding Energy Transportation Systems Inc. draft environmental statement. (Memorandum.) R. Traylor, ETSI EIS Project Leader, Bureau of Land Management. May 20, 1981.[b]

U.S. Bureau of Land Management. 1978. Draft environmental statement--eastern Powder River coal. Cheyenne, Wyoming. October 25, 1978.[d]

_______. 1979. Final environmental statement on proposed development of coal resources in eastern Powder River Basin, Wyoming.[b]

_______. 1980. Need for coal in power plants to be supplied by ETSI. (Memorandum.) SPEIT Engineer to ETSI Project Leader. December 13, 1980[b]

U.S. Department of the Army. 1976. Final environmental statement, locks and dam No. 26, Mississippi River, Alton, Illinois. July 1976.[a]

U.S. Department of Commerce. 1965. Calibrating and testing a gravity model. October 1965.[c]

________. 1973. Monthly and annual wind distribution by Pasquill Stability Classes. STAR Program 24089, Casper, Wyoming. Asheville, N.C.: National Climatic Center.[c]

U.S. Department of Energy, Economic Regulatory Administration. 1980a. Powerplant and industrial fuel use act annual report. DOE/RG-0028. March 1, 1980.[c]

________. 1981. Fuels conversion program powerplant profiles. January 1981.[c]

U.S. Department of Housing and Urban Development. 1978-1980. Flood insurance rate maps and project location maps.[c]

U.S. Department of Transportation. 1977a. National transportation trends and choices to the year 2000. Washington, D.C.: U.S. Government Printing Office.[a]

________. Federal Highway Administration. 1977b. A rail relocation and consolidation demonstration project, Lincoln, Nebraska--Corridors C and D environmental impact statement. Prepared by Sverdrup & Parcel and Associates, Inc., and Olsson Associates. June 1977.[c]

________. 1977c. Final standards, classification and designation of lines of Class I railroads in the United States. Vol. II. June 30, 1977.[c]

________. Federal Highway Administration. 1978a. Supplement to a rail relocation and consolidation demonstration project, Lincoln, Nebraska--Corridors C and D environmental impact statement. Prepared by Sverdrup & Parcel and Associates, Inc., and Olsson Associates. October 1978.[c]

________. 1978. Accident/Incident Bulletin No. 146. August 1978.[c]

________. 1979a. C&NW's application for federal assistance, an analysis of no-action alternatives. 1979.[c]

________. 1979b. Accident/Incident Bulletin No. 147. October 1979.[c]

________. 1980a. Accident/Incident Bulletin No. 148. July 1980.[c]

________. 1980b. Proposed final environmental impact statement: Coal line project. May 18, 1980.[a]

U.S. Environmental Protection Agency. 1972. Federal Air Quality Control Regions. Publication No. AP-102. Office of Air Programs.[a]

________. 1974a. Federal Register 36198. October 8, 1974.[a]

________ . 1974b. Information on levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety. Report 55019-74-004.[a]

________ . 1976. Impacts of construction activities in wetlands of the United States. Ecological Research Series, EPA-600/3-76-045. Corvallis, Oregon.[c]

________ . 1978a. Draft environmental impact statement for Independence steam electric station, Independence County, Arkansas. Dallas, Texas.[a,c]

________ . 1978b. Environmental assessment of coal transportation. EPA-600/7-78-081.[a]

________ . 1979a. Federal Register, March 15, July 25, October 1, 1979.[a]

________ . 1979b. Methods for chemical analysis of water and wastes.[c]

________ . 1979c. Federal Register. December 3, 1979.[a]

________ . 1980a. Federal Register 37432, June 3, 1980.[a]

________ . 1980b. Federal Register. November 28, 1980.[a]

________ . 1980c. Treatability manual, Vol. I. Office of Research and Development. July 1980.[a]

________ . 1981a. Computer printout of water quality monitoring data. William Lewis, EPA, Region IX, San Francisco.[c]

________ . 1981b. Federal Register. January 13, 1981.[a]

U.S. Fish and Wildlife Service. 1978. Federal Register 43(94). May 1978.[a]

________ . 1980a. Threatened and endangered species in the vicinity of proposed action and alternatives. (Memorandum.) R. Traylor, BLM, Denver.[b]

________ . 1980b. Endangered species of Texas and Oklahoma--1980. Albuquerque, New Mexico.[a]

________ . 1980c. Endangered and threatened species of the southeastern United States. Region 4. Atlanta, Georgia.[a]

________ . 1981. Comments on the draft EIS for the ETSI coal slurry pipeline. (Memorandum.) R. Traylor, Project Leader, BLM, Denver. January 7, 1981.[b]

U.S. Fish and Wildlife Service and Nebraska Game and Parks Commission. 1978. Stream evaluation map: State of Nebraska. Denver: U.S. Fish and Wildlife Service.[c]

U.S. Fish and Wildlife Service and Oklahoma Department of Wildlife Conservation. 1978. Stream evaluation map--state of Oklahoma. U.S. Fish and Wildlife Service, Denver.[c]

U.S. Fish and Wildlife Service and South Dakota Department of Game, Fish and Parks. 1978. Stream evaluation map--state of South Dakota. U.S. Fish and Wildlife Service, Pierre.[c]

U.S. Geological Survey. 1975. Plan of study of the hydrology of the Madison Limestone and associated rocks in parts of Montana, Nebraska, North Dakota, South Dakota, and Wyoming. Open-file report 75-631. Denver.[a]

______. 1979. Water resources data for Wyoming. Volume I: Missouri River Basin.[c]

______. L. Dutcher. 1980. ETSI--coal slurry pipeline EIS -review of EIS draft and technical papers. (Memorandum). E. Pickering. November 28, 1980.

______. 1980a. WATSTOR printout of stream flow characteristics for USGS gaging stations numbered 06428500, 06430000, 06430500, 06429905, 06431500, 06427500, 06426500, 06429500, 06392900, 06392950, 06394000, 06402000, 06395000.[c]

______. 1980b. Water resources data for South Dakota. Water Data Report SD-79-1. Huron.[c]

______. 1981. Unpublished water-well data from WATSTOR. February 25, 1981.[c]

______. Undated. Water resources computer data bank. (1973 samples collected by W. Back.)[c]

U.S. Heritage Conservation and Recreation Service. Mid-Continent Region. 1981a. Phase I Nationwide Rivers Inventory, February 20, 1980. U.S. Department of the Interior.[b]

______. South Central Region. 1981b. Phase I Nationwide Rivers Inventory, May 1981. U.S. Department of the Interior.[b]

______. Paul Shushan. 1980a. Natural landmark briefs. (Letter.) D. Miller, WCC, San Francisco. August 1980.[c]

U.S. House of Representatives. 1977. Coal Pipeline Act of 1977. Hearings before the Subcommittee on Mines and Mining and the Subcommittee on Indian Affairs and Public Lands of the Committee on Interior and Insular Affairs, Ninety-Fifth Congress, First session on H.R. 1609. April 19, 25, 26, 1977.[a]

U.S. Soil Conservation Service. 1967a. Soil survey of Red Willow County, Nebraska.[c]

________. 1967b. Soil association map, state of Arkansas.[c]

________. 1970a. General soil map, LaSalle Parish, Louisiana.[c]

________. 1970b. General soil map, Allen Parish, Louisiana.[c]

________. 1970c. General soil map, Pointe Coupee Parish, Louisiana.[c]

________. 1971. General soil map, St. James Parish and St. John the Baptist Parish, Louisiana.[c]

________. 1972a. General soil map, Calcasieu Parish, Louisiana.[c]

________. 1972b. General soil map, East Baton Rouge Parish, Louisiana.[c]

________. 1972c. Soil survey of Desha County, Arkansas.[c]

________. 1974a. Soil survey of Ouachita Parish, Louisiana.[c]

________. 1974b. General soil map, Stanley County, South Dakota.[c]

________. 1975a. General soil map, Rapides Parish, Louisiana.[c]

________. 1975b. Soil survey of Butler County, Kansas.[c]

________. 1975c. Soil survey of Ellis County, Kansas.[c]

________. 1975d. General soil map, Hakon County, South Dakota.[c]

________. 1976. Soil survey of Yuma County, Colorado.[c]

________. 1977a. Crawford County, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________. 1977b. Pope County, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________. 1977c. Jefferson County, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________. 1977d. Bradley County, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________. 1977e. Soil survey of Iberville Parish, Louisiana.[c]

________. 1977f. Independence County, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________. 1977g. Desha County, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________. 1978a. General soil map, Campbell County, Wyoming.[c]

________ . 1978b. Prime farmland soil mapping units, by counties, Wyoming. Casper, Wyoming.[c]

________ . 1978c. General soil map, Niobrara County, Wyoming.[c]

________ . 1978d. Soil survey of Stafford County, Kansas.[c]

________ . 1978e. Oklahoma soil survey legends for important farmlands. Stillwater, Oklahoma.[c]

________ . 1978f. General soil map, Pennington County, South Dakota.[c]

________ . 1978g. Soil survey of Meade County, South Dakota.[c]

________ . 1979a. Prime farmland soil survey map units, Nebraska. NE Technical Bulletin No. 2. Lincoln, Nebraska.[c]

________ . 1979b. Prime farmland soil survey map units, Kansas. Salina, Kansas.[c]

________ . 1979c. Soil mapping units that meet the criteria for prime farmland (in Louisiana). Alexandria, Louisiana.[c]

________ . 1979d. Soil survey of north Weld County area, Colorado.[c]

________ . 1979e. Soil survey of Lawrence County, South Dakota.[c]

________ . 1979f. General soil map, Crook County, Wyoming.[c]

________ . 1980. Cleburne and Van Buren counties, Arkansas, prime farmland (list). Little Rock, Arkansas.[c]

________ . Undated. Soil survey of Mayes County, Oklahoma.[c]

U.S. Water and Power Resources Services. 1977. Water for energy, Missouri River reservoirs. Final Environmental Impact Statement. December 1, 1977.[a]

________ . 1981. Draft statement for environmental impact statement on Energy Transportation Systems Inc. proposal for coal slurry pipeline. (Memorandum.) D. Clark, Bureau of Land Management. May 18, 1981.[b]

University of Wyoming. 1979. Boom towns and human services. University of Wyoming Publications, Volume XLIII.[c]

Van Velson, R.C. 1978. The McConaughy rainbow: Life history and a management plan for the North Platte River valley. Technical Report No. 2. Lincoln: Nebraska Game and Parks Commission.[c]

Waage, K.M. 1959. Stratigraphy of the Inyan Kara Group in the Black Hills. Geological Survey Bulletin 1081-B.[c]

Walker, J. (U.S. Army Corps of Engineers). 1980. Barge transport on Arkansas River. (Personal communication.) H. Troy, ETSI, San Francisco. August 14, 1980.[c]

Water and Power Resources Service, 1980. Missouri River Basin water marketing program. (Memorandum.) BLM Assistant Secretary, Land and Water Resources. November 5, 1980.[b]

Waters, T.F. 1972. The drift of stream insects. Annual Review of Entomology 17:253-272.[c]

Watson, J.R. 1977. Seasonal variation in the biodegradation of 2, 4-D in the river water. Water Research 11:153-157.[c]

WCC. See Woodward-Clyde Consultants, Inc.

Webb, R.G. 1970. Reptiles of Oklahoma. Norman: University of Oklahoma Press.[c]

Wesche, T.A., and L.S. Johnson. 1980. Aquatic biota and abiota of selected streams on Thunder Basin National Grassland, Wyoming. Laramie: Water Resources Research Institute, University of Wyoming.[c]

Westover, C. (City Clerk, Sundance, Wyoming). 1980. Temporary housing availability (1980) for Moorcroft, Sundance, and Hulett, Wyoming. (Personal communication.) June 18, 1980.[c]

Whitcomb, H. 1965. Ground-water resources and geology of Niobrara County, Wyoming. Water-Supply Paper 1698. U.S. Geological Survey.[c]

Whitcomb, H.A., and D.A. Morris. 1964. Ground-water resources and geology of northern and western Crook County, Wyoming. (With a section on the chemical quality of the ground water by R.H. Langford.) Water-Supply Paper 1698. Washington, D.C.: U.S. Geological Survey.[a]

White, D.S., and J.R. Gammon. 1977. The effect of suspended solids on macroinvertebrate drift in an Indiana creek. Proceedings of the Indiana Academy of Science 86:182-188.[c]

White, J. (ACBL-Western, St. Louis, Missouri). 1980. St. Louis rail-to-barge transshipment facility. (Phone conversation.) August 26, 1980.[c]

Wiest, W.G., Jr. 1964. Geology and ground water resources of Yuma County, Colorado. USGS Water Supply Paper 1539-5. Washington, D.C.[c]

________. 1965. Reconnaissance of the ground water resources in parts of Larimer, Logan, Morgan, Sedgwick and Weld counties, Colorado. USGS Water Supply Paper 1809-L.[c] Washington, D.C.[c]

Wilhm, J., H. Namming, and C. Ferraris. 1978. Species composition and diversity of benthic macroinvertebrates in Greasy Creek, Red Rock Creek and the Arkansas River. American Midland Naturalist 99:444-453.[c]

Williams, D.D. 1977. Movement of benthos during the recolonization of temporary streams. Oikos 29:306-312.[c]

Williams, D.D., and H.B.N. Hynes. 1977. The ecology of temporary streams, II. General remarks on temporary streams. International Revue der Gesamten Hydrobiologia. 62:53-61.[c]

Williams, D.D., and J.H. Mundie. 1978. Substrate size selection by stream invertebrates and the influence of sand. Limnology and Oceanography 23:1030-1033.[c]

Williams, H. 1980. Rail accidents attributable to all-rail alternative. (Letter.) P. Fleischauer, WCC, San Francisco. March 12, 1980.[c]

Wilson, J.D. 1979. Drinking water radium levels above standard. Rapid City Journal. Rapid City, SD: July 12, 1979.[a]

Wilson, R. (Maintenance Engineer, Potlatch Corp.). Employment and housing of work force for paper mill construction in Desha County, Arkansas. (Personal communication.) March 3, 1980.[c]

Woodward-Clyde Consultants, Inc. 1980a. Draft project description technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980b. Draft-well field hydrology technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980c. Draft surface water quality technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS)[b]

________. 1980d. Draft socioeconomics technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980e. Draft terrestrial biology technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980f. Draft threatened and endangered species technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980g. Draft aquatic biology technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980h. Draft cultural resources technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980i. Draft no-action alternative technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1980j. Draft ruptures and spills technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1981a. Final project description technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1981b. Final well-field hydrology technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1981c. Final surface water quality technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1981d. Final socioeconomics technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline.)[b]

________. 1981e. Final terrestrial biology technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline.)[b]

________. 1981f. Final threatened and endangered species technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1981g. Final aquatic biology technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)[b]

________. 1981h. Final cultural resources technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline.)[b]

________. 1981i. Final no-action alternative technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline.)[b]

________. 1981j. Final ruptures and spills technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline.)[b]

WPRS - See U.S. Water and Power Resources Service.

Wulf, G. 1963. Late Paleozoic tectonics of northeastern Powder River Basin, Wyoming. In Wyoming Geological Association/Billings Geological Society 1963 Guidebook: Northern Powder River Basin, pp. 113-116.[c]

________. 1974. Map on the structural geology of the Madison Group. (Unpublished.)[c]

Wyoming Department of Administration and Fiscal Control. 1978. Wyoming population and employment forecast report. Division of Research and Statistics.[c]

________. 1980. Wyoming population and employment forecast report. Division of Research and Statistics. June 1980.[c]

Wyoming Department of Environmental Quality. 1979. Wyoming air quality: Ambient monitoring data, 1978. State of Wyoming, Air Quality Division.[c]

Wyoming Department of Planning and Economic Development. 1977. Sundance, Wyoming, community profile. Cheyenne.[c]

______ . 1980. Mineral Development Monitoring System, 1980.[c]

Wyoming Employment Security Commission. Undated. Wyoming covered employment and wage data by industry and county, 1976-1978.[c]

Wyoming Game and Fish Commission. 1971. Wyoming stream fishery classification map. Cheyenne, Wyoming: Fisheries Division.[c]

Wyoming Game and Fish Department. 1977. Current status and inventory of wildlife in Wyoming. Cheyenne, Wyoming: Wyoming Game and Fish Department.[a]

______ . 1979. Annual report of big game harvest.[c]

______ . M. Stone. 1981. Impacts to aquatic resources. (Personal communication.) A. Clark, WCC, San Diego. March 1981.[c]

Wyoming Recreation Commission. 1980. Current and projected visitor use of public recreation areas near Campbell County, Wyoming. (Personal communication.)[c]

Wyoming State Engineer's Office. 1976. Investigations of recharge to groundwater reservoirs of northeastern Wyoming (the Powder River Basin). Map pocket and appendices. (Prepared for the Old West Regional Commission.)[a]

Young, W.T. (Texas Eastern Transmission Corp.). 1980. Hydrostatic test water analyses. (Letter.) March 7, 1980.[c]

Zaborac, J. (Glenrock City Planner). 1980. Temporary housing availability, 1980, for likely pipeline construction spread headquarters. (Phone conversation.) WCC, San Francisco. August 13, 1980.[c]

Zapp, A.D. 1951. Structure contour map of the Powder River Basin, Wyoming and Montana (scale 1:316,800). (Revision of 1945 map by W.G. Pierce and R.M. Girard.)[c]

GLOSSARY

Acre-foot - the volume of water that would cover one acre to a depth of one foot, equivalent to 43,560 cubic feet. One cubic foot per second (cfs), flowing for 24 hours, is equivalent to 1.983 acre-feet.

Air quality standard - any state or national ambient air quality concentration limit not to be exceeded more than a specified number of times per year. Each standard is based on measurements over a given time period.

Air quality standards, primary - standards intended to protect the health of most people with a margin of safety.

Air quality standards, secondary - standards intended to protect property and other human welfare values, including aesthetics.

Ambient - in the case of air quality, the portion of the atmosphere external to buildings.

Ancillary facilities - those structures (pump stations, power and communications lines, cathodic protection systems) which are necessary for the continuous operation or maintenance of the pipeline.

Anticline - a convex fold, the core of which contains the older rocks.

Applicant - in this environmental impact statement, applicant refers to Energy Transportation Systems Inc. (ETSI).

AQCR (Air Quality Control Region) - The United States is divided into AQCRs for designating jurisdictional boundaries in measuring and maintaining air quality.

Aquifer - one or more formations that contain sufficient permeable material to yield significant quantities of water to wells and springs.

Aquifer test - see Pumping Test.

Artesian - see Confined Aquifer.

As-mined coal - coal that has not been processed (cleaned) to remove the impurities and noncombustible components such as rocks and gravel.

Authorizing action - granting of a permit, easement, license, or similar legal privilege that is needed before a proposed project can proceed.

Average, one-hour - the average of all measurements made in a one-hour period; other averages for three hours, twenty-four hours, and one year are used in air quality monitoring.

Backfill - earth that is replaced after a construction excavation.

Base flow - that part of a stream flow derived from ground water.

Baseline - air quality, water quality, or meteorological data used as a starting point in estimating the impact of new emissions.

Basin - a general term for a depressed or concave, downward, sediment-filled area.

Benthic macroinvertebrate - an animal that can be seen with the naked eye, that does not have a backbone, and lives in or on the bottom of a body of water.

Biological diversity - the variety of plants or animals; the more diverse a system is, the more kinds of plants and/or animals it contains.

Biological production - the quantity of organic matter produced by a living system (i.e., by an organism, a group of organisms, or an ecosystem). Two types of production are recognized: Primary production is the quantity of organic matter produced by green plants through photosynthesis; secondary production is the quantity of animal material produced.

Biological productivity - the rate of production of organic matter by living organisms (i.e., the amount per unit time).

Biota - the plant and animal life in an area.

Blanketed - covering an area to be blasted with heavy mats to reduce the extent of flying debris from the blasting.

Blue-green algae - microscopic aquatic plants that belong to the phylum Cyanophyta.

Caddisfly - the adults are slender insects with four wings, sometimes with hair-like scales which give them a mothlike appearance. The larvae live in water and often build cases of sand, small pebbles, leaves, etc.

Capital-intensive - in this instance, refers to a project in which the major operating cost component is attributed to fixed charges on the capital investment.

Catenary - the curve assumed by a perfectly flexible inextensible cord of uniform density and cross section hanging freely from two points.

Cathodically protected - protected against corrosion by means of a weak electric current applied to the pipeline to offset the galvanic action causing metal corrosion.

Centrifuge - a machine that separates solids from liquids by means of a rapidly rotating chamber.

Chiseling - loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development (called "chiseling" when the restrictive layers are less than 16 inches deep).

Clariflocculator - a physical-chemical process to remove suspended solids from a liquid.

Clastic - consisting of rock or organic fragments or structures that have been moved from their place of origin.

Coating - a field operation for preparing a pipeline to be lowered into the ditch. The line is coated with an inert material, then spiral-wrapped with a tough, inert wrapper. Machines ride the pipe, and coat and wrap in one continuous operation. This process protects the pipeline from corrosion. For some pipeline jobs the pipe may be coated and wrapped at a mill or construction yard site. Any damage to the coating from transportation or handling can be corrected before the pipe is installed.

Concentration - the relative content of a component (as dissolved or dispersed material); measured by weight or volume of material per unit volume of the medium.

Cone of depression - the roughly conical shape produced in a potentiometric surface by pumping.

Confined aquifer - an aquifer containing confined ground water. In a confined aquifer, the water level in a well usually rises above the top of the aquifer. If it does, the well is called an artesian well and the aquifer is said to exist under artesian conditions. In some cases the water level may rise above the ground surface, in which case the well is known as a flowing artesian well and the aquifer is said to exist under flowing artesian conditions. The water level in a well in an unconfined aquifer rests at the water table.

Copepod - small aquatic crustaceans.

Cultural resources - remains of human activity, occupation, or endeavor, as reflected in sites, buildings, artifacts, ruins, etc.

Criteria pollutant - an air pollutant for which a national ambient air quality standard exists.

Critical habitat - habitat essential to the conservation of an endangered or threatened species.

Crustacean - invertebrate (animals without backbones) with body divided into two sections, two pairs of antennae, often have jointed appendages and often have gills. Crayfish, prawn and river shrimp are common forms.

Decibel - a unit for expressing the relative intensity of sounds on a scale from 0 (for the average least perceptible sound) to about 130 (for the average pain level).

Diatom - microscopic aquatic plants that belong to the phylum Bacillariophyta.

Diffusion model - graphs, formulas, or equations which estimate the dilution of an air pollutant as it is transported by the wind.

Drawdown — the decline in the potentiometric head in an aquifer at a specified period of time. Drawdown is also defined as the difference between the elevation of the water level in a well under non-pumping (static) conditions and the elevation under pumping conditions.

Ecotone - blurred, indefinite transition area between two communities.

Emission - A substance, whether gaseous or particulate, released by human activity into the air or water.

Endemic - restricted to a particular geographical area.

Ephemeral stream - a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and which has a channel bottom that is always above the local water table.

Forb - a broad-leaved flowering plant, as distinguished from the grasses, sedges, etc.

Front - in meteorology, the boundary zone between two dissimilar air masses.

Fugitive dust - particulate matter composed of soil which is uncontaminated by pollutants resulting from industrial activity.

Headwaters - small streams that are the sources of a river.

High-gradient streams - characterized by the majority of the stream having a moderate to fast current.

Host - an organism which is a source of food for a parasite. The parasite may live on the outside or inside of the host and may be harmful or harmless.

Hydrostatic testing - filling a pipeline with water under pressure to test for tensile strength (its ability to hold pressure without rupturing).

Intake - the place at which a liquid (primarily water) is taken into a pipe, channel, etc.

Intermittent stream - (a) A stream or reach of a stream that drains a watershed of at least one square mile, or (b) A stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and ground-water discharge.

Larval - an immature stage for an animal that is intermediate between the egg and the adult. The larva is different in appearance from the adult.

Lineament - straight or gently curved lengthy features of the earth's surface, frequently expressed topographically as depressions or lines of depression. Some express valid structures such as faults, aligned volcanoes, and jointing; the meaning and origins of others are obscure.

Lithic artifact - a man-made object relating to a specific stage in man's use of stone as a cultural tool.

Loessial soil - bluff-colored, wind-blown deposit of fine silt or marl, usually unstratified, which is often exposed in the bluffs with steep to vertical faces.

Low gradient streams - characterized by the majority of the stream having a moderate to slow current.

Madison Group - a water-bearing geologic formation extending under portions of Wyoming, South Dakota, Nebraska, Montana, North Dakota, and Canada.

Mainstem - the river or stream proper, not referring to any of its tributaries.

Market configuration - the route taken to transport coal by pipeline to terminals listed for the market alternative.

Mayfly - also known as shad flies, salmon flies, and June bugs. The adults are sluggish insects with slender filaments at the tail end of the body and have large triangular wings. The immature mayfly lives in the water, while the adult lives on land. The adult may live for only a few days, while the immature stage may last for several years.

Microgram - one millionth of a gram.

Monitoring, air quality - measurements of instantaneous or average ambient air pollutant concentrations.

Monitoring well - a well used to collect hydrologic data.

Monocline - a unit of strata that dips or flexes from the horizontal in one direction only and is not part of an anticline or a syncline.

Monte Carlo technique - a technique used to predict drawdowns in the Madison potentiometric surface by estimating the probability distribution of the hydrogeologic parameters, and then making numerous (100) computer runs using the three-dimensional ground-water flow model. Input values used for each hydrogeologic parameter are chosen for each computer run by randomly sampling from a specified probability distribution. The resultant outcome is an approximation of the probability distribution for the computed drawdown.

Mussel - an aquatic invertebrate two-shelled animal; a clam.

Nitrogen dioxide - a molecule of one nitrogen and two oxygen atoms - NO_2.

Nonresurgent spring — a spring whose flow does not originate from upgradient streamflow losses. Resurgent springs are associated with disappearing streams.

Oxidant - a mixture of chemically oxidizing compounds formed from reactions in the atmosphere.

Ozone - a molecule of three oxygen atoms: O_3.

Paleontology - a science that deals with the life of past geological periods and is based on fossil remains.

Particulate matter - pulverized material or droplets, typically averaging one micron or smaller in diameter.

Perennial stream - a stream or part of a stream that flows continuously during all of the calendar year as a result of ground-water discharge or surface runoff. The term does not include intermittent stream or ephemeral stream.

Periphyton - microscopic organisms that are attached to objects under water.

Petroglyph - figures, symbols, or scenes pecked or etched in rock.

Phytoplankton - microscopic plant life suspended in the water of aquatic habitats.

Plankton - microscopic aquatic plants or animals.

Potentiometric surface - a surface that represents the static water level or head in an aquifer. In a confined aquifer, it is defined by the levels to which water will rise in tightly cased wells. The water table is a particular potentiometric surface.

Pumping test - a test made by pumping a well and observing the change in hydraulic head in the aquifer.

Raptor - predatory bird, such as the eagle, hawk, and owl.

Reproductive potential - the potential number of offspring that could be produced.

Riparian - relating to or living on the bank of a river or stream.

Riprap - a foundation or sustaining wall of stones (as on an embankment slope) to prevent erosion.

Slurry - a mixture containing a fine, insoluble material (such as coal) and a fluid (such as water).

Spread - a group of construction personnel and equipment assembled to do a major construction job. The workers and equipment are dispersed along the right-of-way.

Stipulation - a legal requirement.

Stringing pipe - placing joints of pipe end-to-end along a pipeline right-of-way in preparation for welding the joints together to form a pipeline.

Subsoiling - loosening soil to depths greater than 16 inches (see "Chiseling").

Substrate - soil, organic, and/or rock materials found on the bottom of aquatic habitat.

Throughput - in this report, the amount of coal delivered by means of the slurry pipeline.

Transmissivity - the rate at which water moves through a unit.

Turbid - muddy or cloudy from having the sediment stirred up and suspended in the water column.

Unit train - a train whose entire cargo is loaded from one source and delivered to only one customer.

Vascular plants - plants that have specialized tissues that move water and food throughout the plant.

Watershed - the area drained by a river or river system.

Wind rose - A 360-degree circle broken into 16 equal sectors used for displaying frequency distributions of wind speed and direction.

Zooplankton - small microscopic animals suspended in the water of aquatic habitats.

ABBREVIATIONS

AR	Arkansas
ac-ft/yr	acre-feet per year
AT&SF	Atchison, Topeka, and Santa Fe railroad
BN	Burlington Northern railroad
BLM	Bureau of Land Management
BOD_5	biochemical oxygen demand
Btu	British thermal unit
C&NW	Chicago and North Western railroad
CFR	Code of Federal Regulations
CO	Colorado
CO_2	carbon dioxide
COE	U.S. Army Corps of Engineers
CTC	Centralized Traffic Control Systems
cfs	cubic feet per second
dBA	decibels on the A-weighted scale
EIS	environmental impact statement
ETSI	Energy Transportation Systems Inc.
FS	U.S. Forest Service
FWS	U.S. Fish and Wildlife Service
ft	foot
gpm	gallons per minute
GPA	Gillette Planning Area
HCRS	U.S. Heritage Conservation and Recreation Service

KCS	Kansas City Southern railroad
KS	Kansas
kV	Kilovolts
Kwh	kilowatt hours
LA	Louisiana
lb	pound
MMTA	million (short) tons annually
MKT	Missouri-Kansas-Texas railroad
MO	Missouri
mi	miles
MP	milepost
mg/l	milligrams per liter
MT	Montana
NE	Nebraska
NNL	National Natural Landmark
NPDES	National Pollutant Discharge Elimination System
NTSA	National Trails System Act
O.D.	outside diameter
OK	Oklahoma
ppm	parts per million
pci/l	picocuries per liter
SD	South Dakota
SMSA	Standard Metropolitan Statistical Area
SCS	Soil Conservation Service
SHPO	State Historic Preservation Officer

TDS	total dissolved solids
tph	tons per hour
TSP	total suspended particulates
T&E	threatened and endangered
UP	Union Pacific railroad
USGS	U.S. Geological Survey
WCC	Woodward-Clyde Consultants
WY	Wyoming

INDEX

LIST OF PREPARERS

Name/Education	EIS Responsibility
Woodward-Clyde Consultants (Key Staff)	
Donald Miller, M.A., Geography	Project Manager
James Beley, M.S., Biology	Assistant Project Manager
Jacqueline Bogard, B.S., Wildlife Ecology	Assistant Project Manager
Nicholas Kayhan, B.A., English	Editorial and Production Coordination
Charles Andrews, Ph.D., Geology	Ground-Water Hydrology
Robert Castle, B.A. Geology	Ruptures and Spills
Aaron Clark, M.S., Biology	Aquatic Biology
Marilyn Duffey-Armstrong, M.S., Cybernetic Systems	Visual Resources
Dave Dunbar, M.S., Hydrology	Ground-Water Hydrology
Patricia Fleischauer, M.S., Management; M.A., Economics; Ph.D. (in progress), Economics	Socioeconomics, Recreation, Wilderness Transportation Networks, No-Action Alternative
Perry Fontana, M.S., Meteorology	Air Quality, Noise
Carl Fricke, M.S., Geology; M.S., Water Resources	Ground-Water Hydrology
William Hansen, B.A., Geology	Ground-Water Hydrology
Jodi Lehman, M.S., Civil and Environmental Engineering	Ground-Water Hydrology
Eugene Mancini, Ph.D., Biology	Aquatic Biology
Gordon Morris, B.F.A., Painting and Commercial Art	Graphics
Susan Naughton, M.A., Geography; M.A. (in progress), Anthropology	Cultural Resources
Dan Olson, Ph.D., Ecology	Vegetation, Wildlife
Robert Ray, B.S., Natural Resources Management	Soils, Agriculture

Name/Education	EIS Responsibility
Al Renga, B.S., Geology	Geology, Geologic Hazards
Patrick Ritter, M.S., Environmental Engineering	Surface Water
Edward Schuert, B.S., Mechanical Engineering	Project Description
Paul Smith, M.A. (in progress), City and Regional Planning	Historical Resources

Woodward-Clyde Consultants' Subcontractors (Key Staff)

Pipeline Systems Inc.

Tom Aude, M.B.A., Engineer of Mines	Energy Efficiency, Ruptures and Spills
Jay Chapman, M.S., Engineering	Ruptures and Spills
Scott Miller, B.S., Electrical Engineering	Energy Efficiency
Tedd Dowd, B.S., Chemical Engineering	Energy Efficiency

Heartfield, Price and Green, Inc.

Lorraine Heartfield, Ph.D. Archeology	Cultural Resources
G.R. Dennis Price, B.A., Prehistory and Archeology	Cultural Resources
Tony Dieste, B.A., Archeology	Cultural Resources

Western Interpretive Services

Robert Murray, M.S., History	Historical Resources

S.S. Papadopulos and Associates, Inc.

Stravros Papadopulos, Ph.D., Civil Engineering	Ground-Water Hydrology
Steve Larson, M.S., Civil Engineering	Ground-Water Hydrology

Name/Education	EIS Responsibility
Harter Williams and Associates	
Harter Williams, B.A., Business Administration	No-Action Alternative
Bureau of Land Management (Key Staff)	
Richard E. Traylor, B.S., Forestry; M.S., Forest Management	Project Leader
Lois Cocker, B.S., General Science (Biology); M.A., Science Curriculum Development	Editing and Report Coordination
Alan Amen, B.S., General Agronomy	Soils, Agriculture, Vegetation
Ray Boyd, B.S., General Science (Biology); B.S., Game Management; M.S., Range Management	Wildlife, Vegetation
Larcie Burnett, B.A., Anthropology; M.A., Anthropology	Cultural Resources
Roger Carmichael, B.S., Mechanical Engineering; M.S., Environmental Health Engineering	Air Quality, Water Quality, Energy Efficiency, Ruptures and Spills, Noise
Donald Clark, B.S., Landscape Design	Socioeconomics
George E. Detsis, B.S., Recreation Administration; M.S., Forest Resources	Recreation, Wilderness, Transportation Networks, Authorizing Actions
Jack Edwards, B.A., Education; M.S., Agricultural Economics; Ph.D., Economics	No-Action Alternative, Socioeconomics
Gary Konwinski, B.S., Soil Science; M.S., Earth Science	Surface Water
Will Palmquist, B.A. Geology	Ground-Water Hydrology
Stan Specht, B.S., Landscape Architecture; M.U.P., Urban Planning; M.L.A., Landscape Architecture	Visual Resources
Jim Roseberry, Environmental Coordinator	Reviewer

Name/Education	EIS Responsibility
Fish and Wildlife Service (Key Staff)	
Lee Carlson, B.S., Wildlife Biology; M.S., Wildlife Biology	Wildlife/Aquatic Biology
Merlin Hehnke, B.S., Fish & Wildlife Biology; M.S., Ornithology	Wildlife/Aquatic Biology
Jim Killer, B.S., Fisheries & Wildlife Management	Wildlife/Aquatic Biology
Bob Short, B.S., Wildlife Management	Wildlife/Aquatic Biology
Forest Service (Key Staff)	
Ron Olson, Forester	Reviewer
Frank Shropshire, Hardwoods Specialist	Reviewer
Geological Survey (Key Staff)	
Lee Dutcher, Hydrologist	Reviewer
Ted Hurr, Hydrologist	Reviewer

APPENDIX A ADDENDUM

MAPS

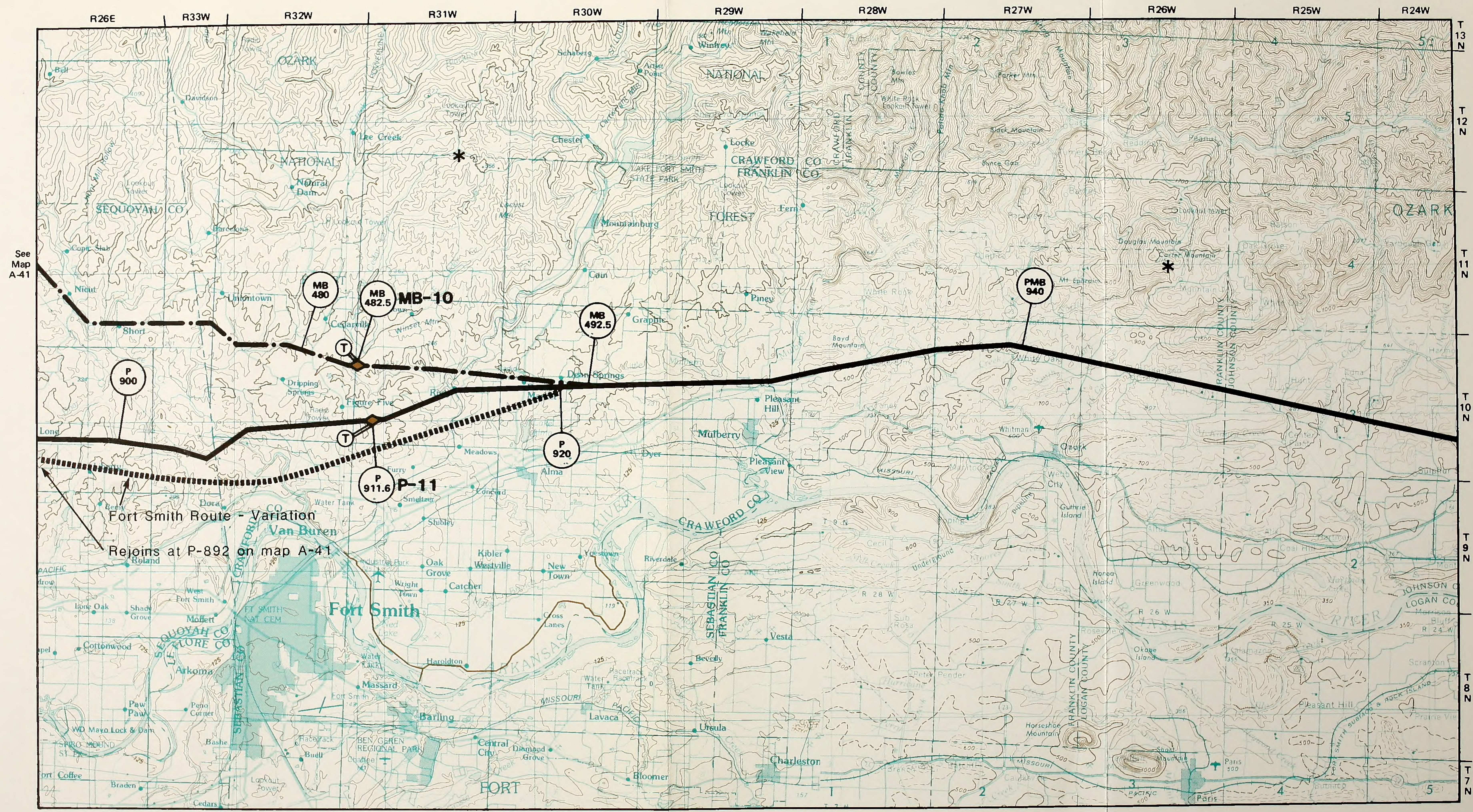
Appendix A (Maps A-1 through A-59) is located in a separate map volume distributed with the draft environmental impact statement. This addendum includes only those maps that required revision and the new maps required to show the treated wastewater alternative route and the route of the Oahe alternative dependent on water purchase from the Water and Power Resources Service.

Revised Maps:	A-19
	A-25
	A-39
	A-49
New Maps:	A-60 through A-64

In addition, on Map A-55 and A-60, the origination point of the Oahe alternative water supply system was incorrectly shown. The preferred location is approximately 7 miles west of the Oahe Dam, as described in the CH_2 M Hill report on the West River Aqueduct.[1]

---

[1] CH_2 M Hill, Inc. and Francis-Meador-Gellhaus, Inc. 1980. Addendum to the report: The West River Aqueduct conceptual feasibility of transporting and using Missouri River water in selected area of western South Dakota and eastern Wyoming, December 1978.



LEGEND

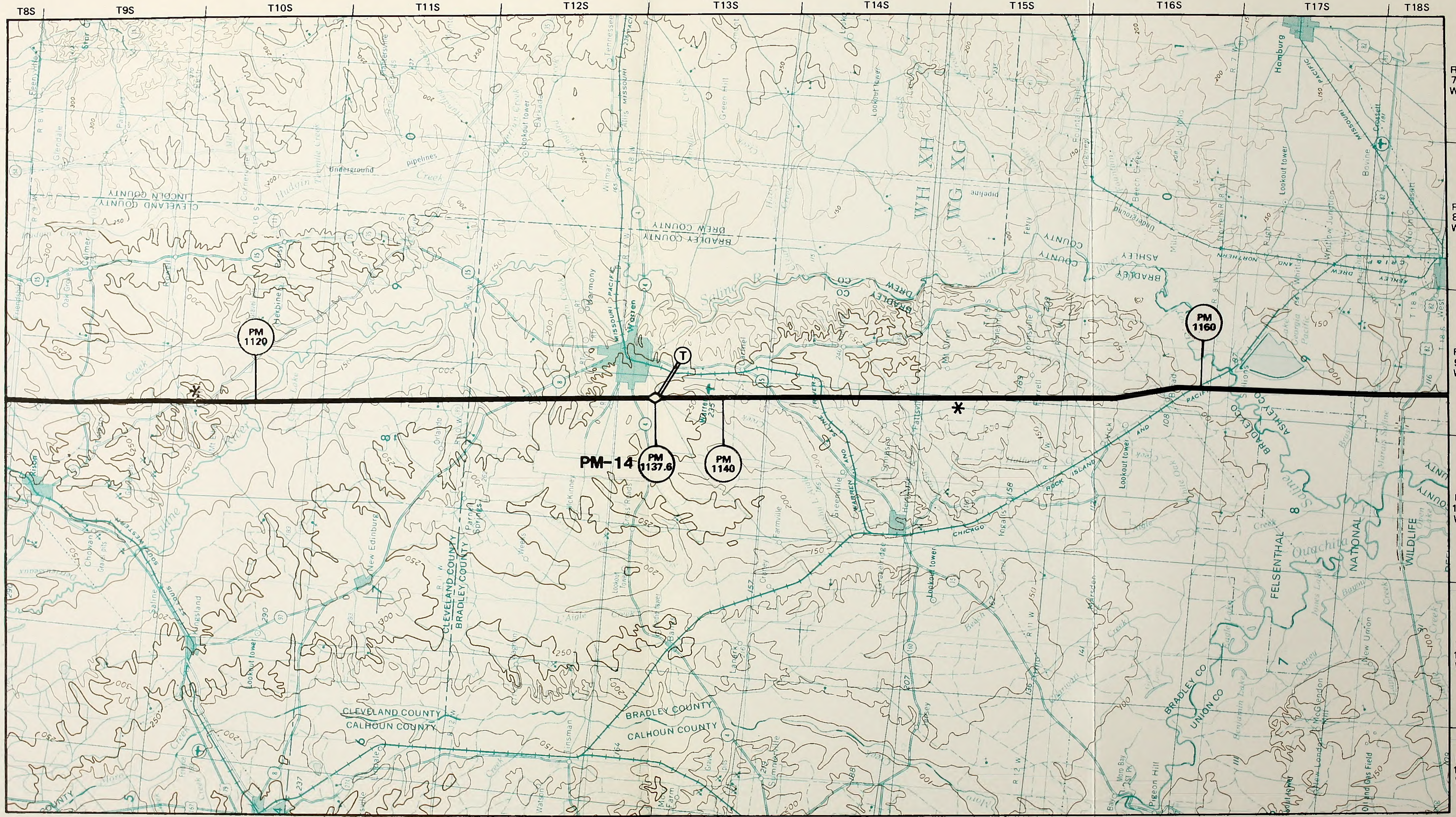
- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- **Treated Wastewater Pipeline**
- Water Gathering Line
- (T) Transmission Line
- Existing Corridor
- (P 80) Route Code/Milepost
- **Wastewater Discharger**
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- * Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

N

0 1 2 3 4 5
miles

Note. Tracts less than 40 acres are usually omitted because of the map scale.

Map A-19. P 897 - PMB 959



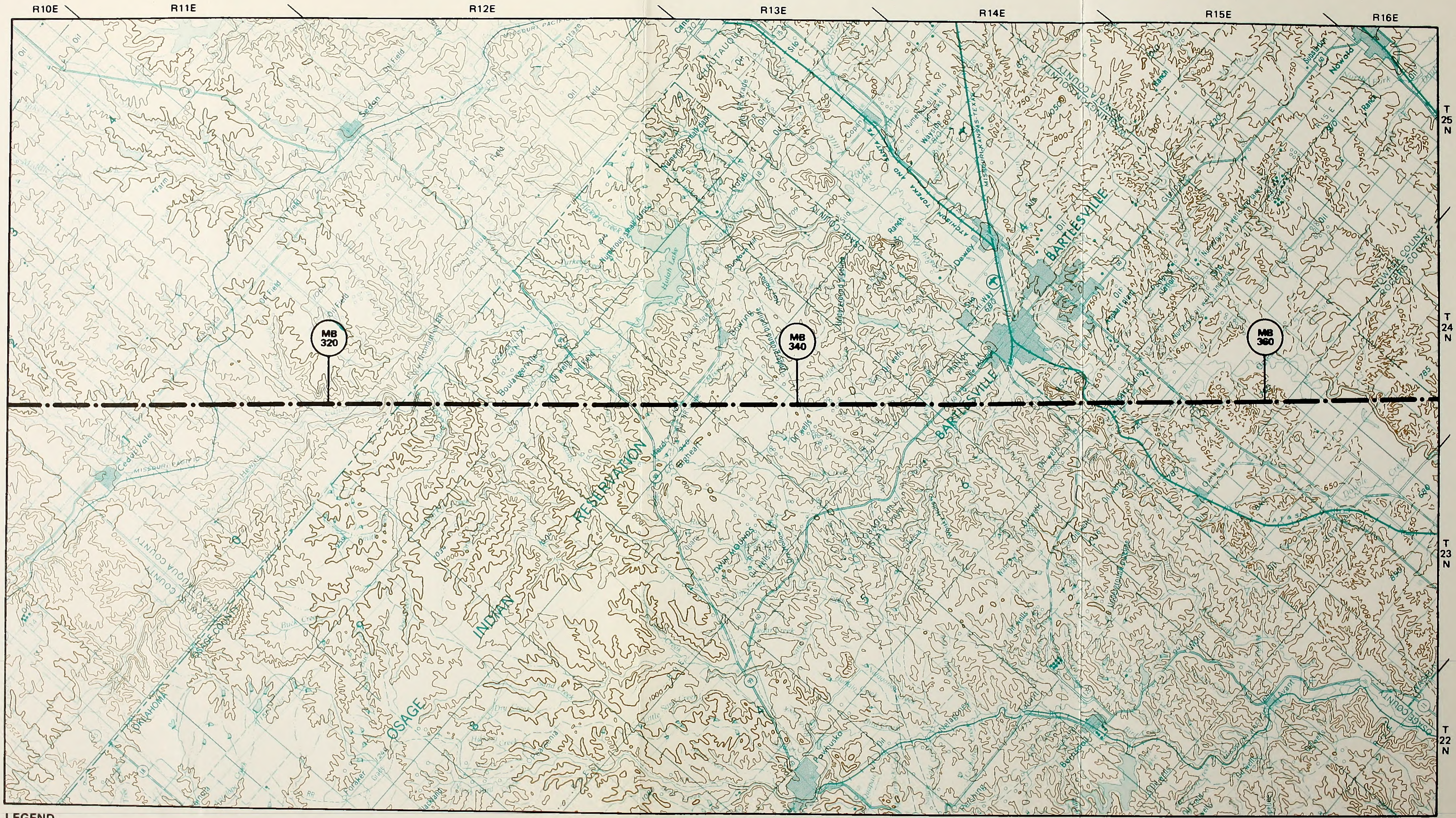
LEGEND

Slurry Gathering Line
Proposed Action
Market Alternative
Colorado Alternative
Pipeline-Barge Alternative
Treated Wastewater Pipeline
Water Gathering Line
Transmission Line
Existing Corridor
Route Code/Milepost
Wastewater Discharger
Preparation Plant
Delivery Terminal
Well Field
Pump Station
Microwave Station
BLM Bureau of Land Management Administered Lands
FS National Forest Service Administered Lands

0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-25. PM 1110 - PM 1170



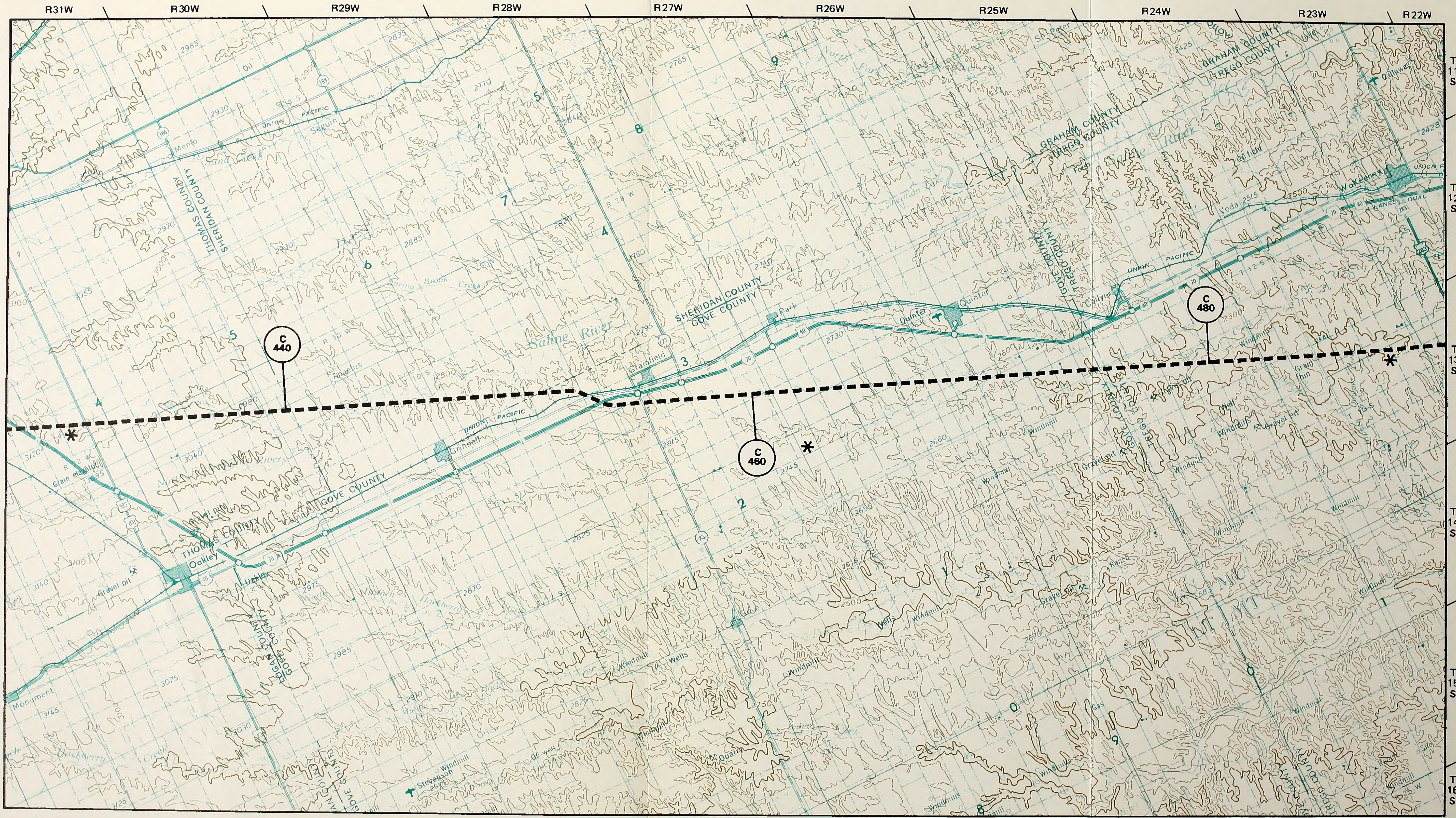
LEGEND

- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- **Treated Wastewater Pipeline**
- Water Gathering Line
- Transmission Line
- Existing Corridor
- Route Code/Milepost (P 80)
- **Wastewater Discharger**
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-39. MB 306 - MB 367



LEGEND

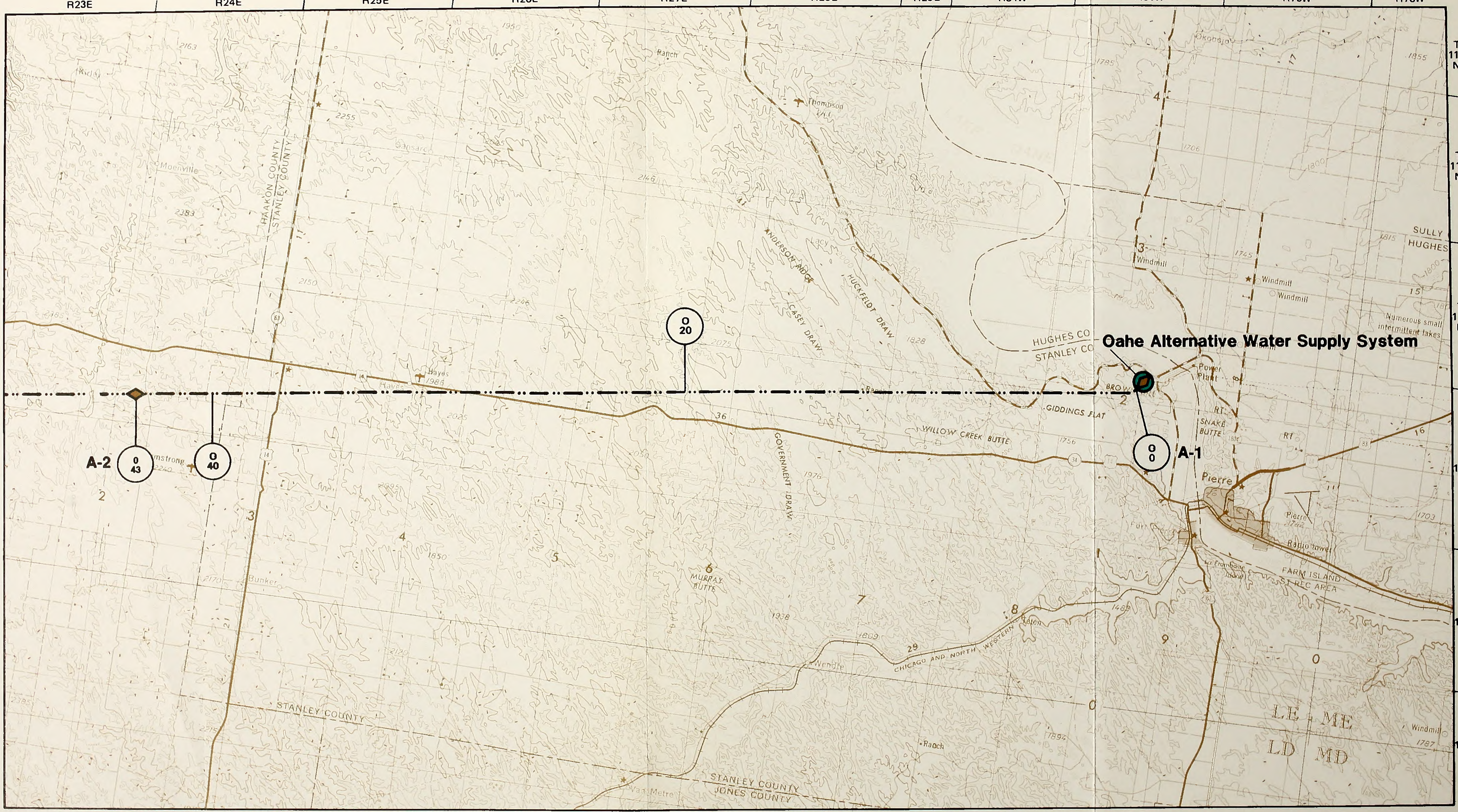
- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- Treated Wastewater Pipeline
- Water Gathering Line
- T Transmission Line
- Existing Corridor
- P 80 Route Code/Milepost
- Wastewater Discharger
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- * Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

N

0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-49. C 428 - C 490



LEGEND

- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- **Treated Wastewater Pipeline**
- Water Gathering Line
- Transmission Line
- Existing Corridor
- Route Code/Milepost
- **Wastewater Discharger**
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- * Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-60. O 49 - O 0

LEGEND

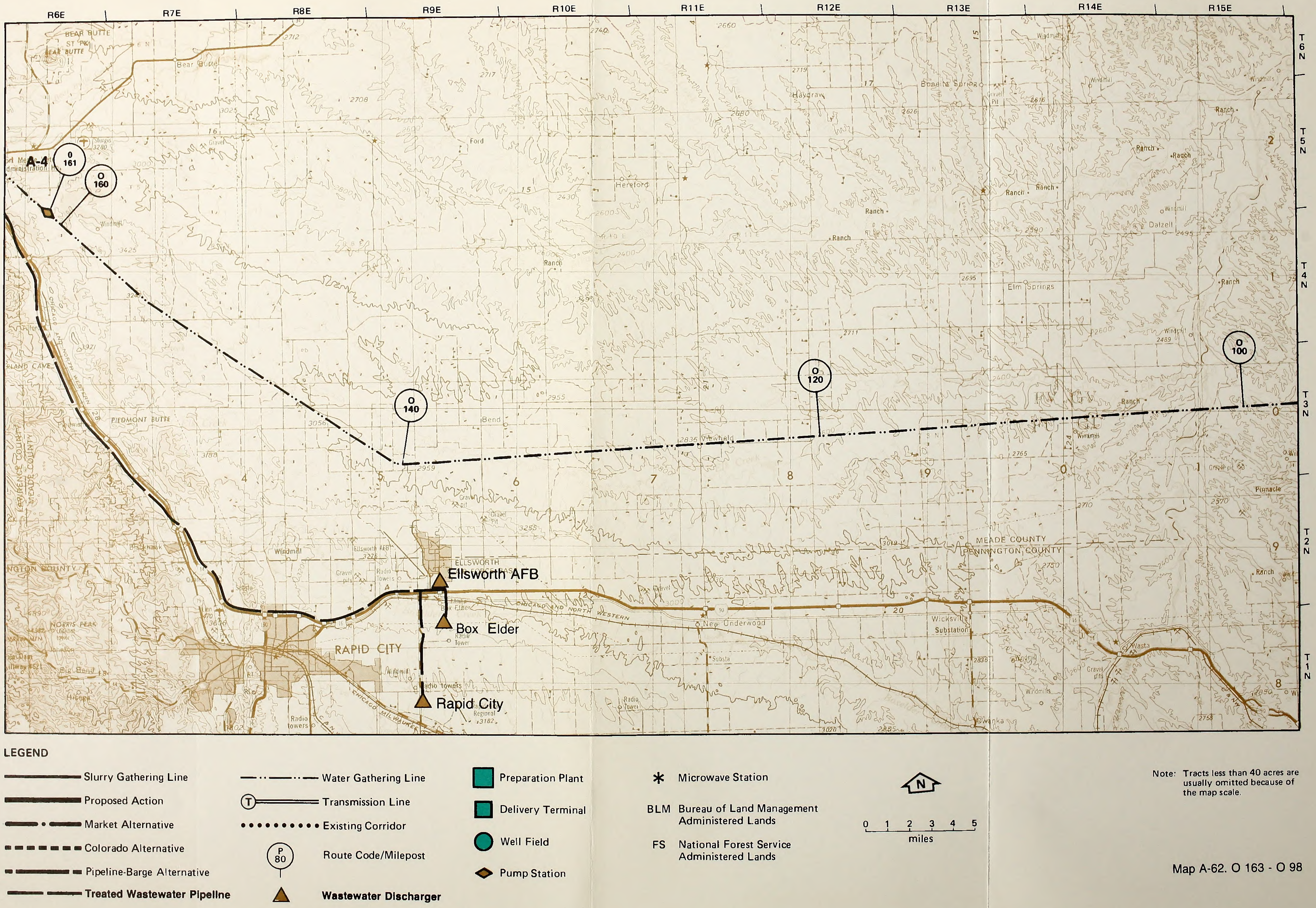
- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- **Treated Wastewater Pipeline**
- Water Gathering Line
- Transmission Line
- Existing Corridor
- Route Code/Milepost (P 80)
- **Wastewater Discharger**
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- * Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

N

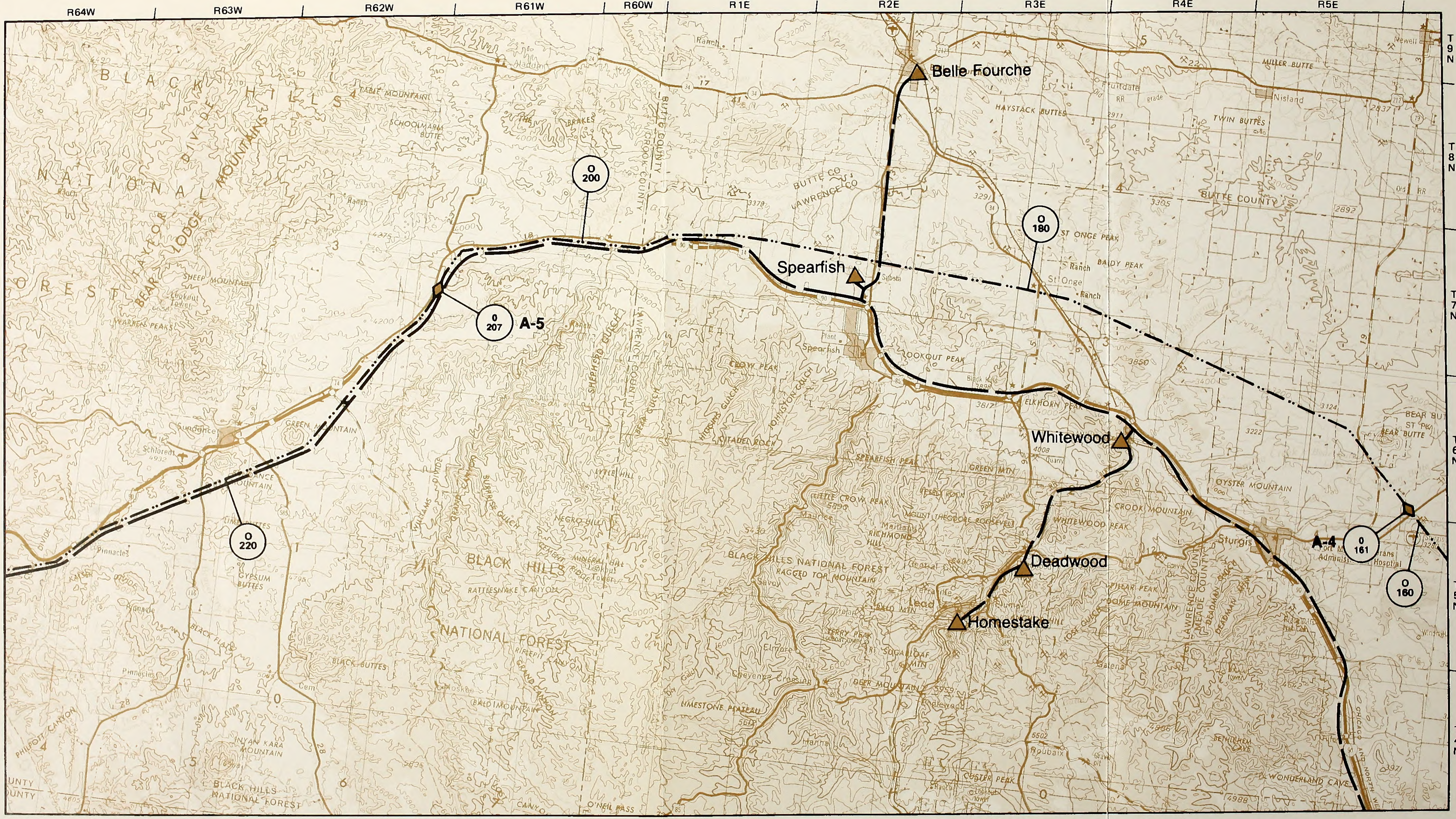
0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-61. O 103 - O 42



Map A-62. O 163 - O 98



LEGEND

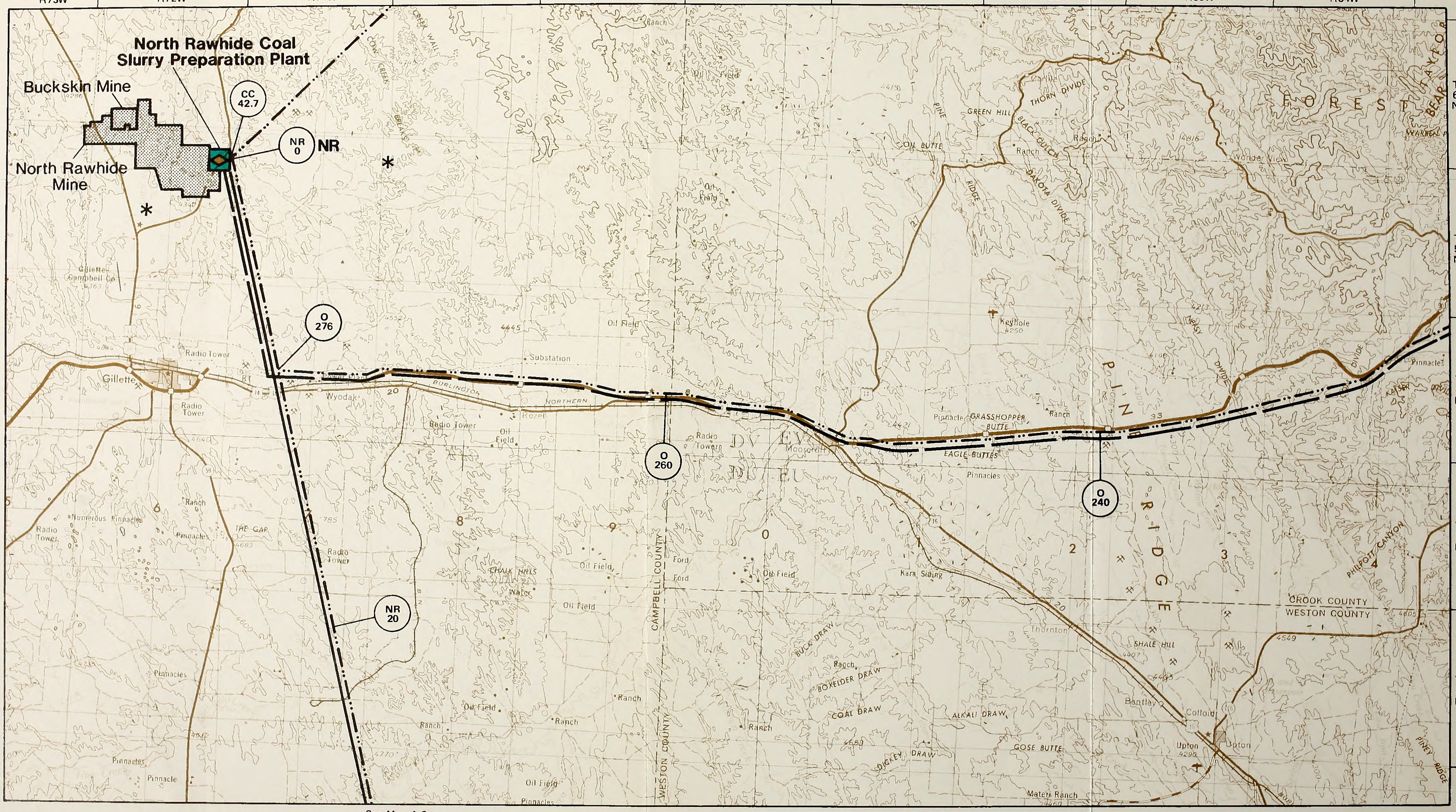
- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- **Treated Wastewater Pipeline**
- Water Gathering Line
- Transmission Line
- Existing Corridor
- Route Code/Milepost (P 80)
- **Wastewater Discharger**
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

N

0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-63. O 230 - O 158



LEGEND

- Slurry Gathering Line
- Proposed Action
- Market Alternative
- Colorado Alternative
- Pipeline-Barge Alternative
- **Treated Wastewater Pipeline**
- Water Gathering Line
- Transmission Line
- Existing Corridor
- Route Code/Milepost (P 80)
- **Wastewater Discharger**
- Preparation Plant
- Delivery Terminal
- Well Field
- Pump Station
- Microwave Station
- BLM Bureau of Land Management Administered Lands
- FS National Forest Service Administered Lands

N

0 1 2 3 4 5
miles

Note: Tracts less than 40 acres are usually omitted because of the map scale.

Map A-64. O 276 - O 225

APPENDIX B

EIS SCOPING PROCESS

The first step in preparing an environmental impact statement (EIS) is called "scoping." The scope of an EIS is the range of actions, alternatives, and impacts to be included in the document. The purpose of scoping is to determine the significant issues related to a proposed action which should be included in the EIS. Scoping is designed to reduce some of the past inefficiencies associated with EIS preparation. Its basic goal is to make environmental impact statements more meaningful and useful to persons in the federal government who must make decisions on the proposal, as well as to the people who may be affected by approval or disapproval of the proposal or its alternatives.

The Bureau of Land Management (BLM) sponsored public meetings designed to involve interested citizens and groups in the scoping process. They were held in nine communities in seven states (Table B-1). The communities were generally located near the route of the proposed pipeline or an alternative.

An announcement about the meetings was published in the August 1, 1979, Federal Register and was distributed to newspapers and radio and television stations in and near the selected communities. Information on the sessions was also sent to federal and state government organizations and to other groups that were potentially interested in the EIS process.

Average attendance at the meetings was 52. There was, however, great variation in the attendance at the various locations. Total attendance for all nine sessions was 469. See Table B-1 for specific attendance figures for each meeting.

The question considered at each meeting was "What are the major issues associated with the proposed coal slurry pipeline that should be examined in an environmental impact statement?" The object was not to seek public support or opposition to the proposed pipeline, but rather to hear the concerns of interested citizens.

To facilitate discussion of the issues, attendees were divided into "work groups" after short introductory presentations by BLM and Energy Transportation Systems Inc. (ETSI) personnel. The work group format was used to ensure all attendees had an equal opportunity to express their views. Each group member listed issues of concern on a sheet of paper. The group-appointed leader then gave each person an opportunity to identify the issues he/she had listed. These issues were written on a large sheet of paper and discussed. Finally, each person listed, on a secret ballot, the three issues he/she felt were most significant. These ballots and the group issue sheets were collected at the conclusion of the meeting.

In addition to the nine meetings sponsored by BLM, scoping meetings were held in Washington, D.C., on June 21, 1979, and in Edgemont, South Dakota, on October 10, 1979. The meeting in Washington involved 28 persons from federal agencies; no private citizens were included. The South Dakota meeting was sponsored and conducted by the South Dakota Department of Water and Natural Resources, although BLM, Woodward-Clyde Consultants (a contractor helping BLM prepare the EIS) and ETSI personnel made

TABLE B-1

SCOPING MEETING LOCATIONS AND ATTENDANCE

Washington, D.C.	U.S. Department of the Interior Building (June 21, 1979)	28*
Cheyenne, Wyoming	Hitching Post Motel (August 7, 1979)	25
Gillette, Wyoming	Ramada Inn (August 9, 1979)	34
Denver, Colorado	Denver Community Progress Center (August 20, 1979)	21
Ponca City, Oklahoma	Public Safety Center (August 21, 1979)	12
Pryor, Oklahoma	Graham Community Building (August 22, 1979)	27
Little Rock, Arkansas	Arkansas Game and Fish Commission Building (August 23, 1979)	34
Hernando, Mississippi	DeSoto County Courthouse (August 27, 1979)	22
Vidalia, Louisiana	Concordia Parish Police Building (August 28, 1979)	9
Alliance, Nebraska	Alliance High School (August 29, 1979)	285
	Subtotal	469
Edgemont, South Dakota	Edgemont High School (October 10, 1979)	230*
	Total	727

*The work group process was not part of this meeting; however, it was a scoping meeting, with the opinion of the attendees recorded and considered in the scoping process.

presentations at this meeting. Approximately 230 people from Edgemont and surrounding areas attended. Although no work group sessions or balloting were included in either of these meetings, major issues raised during the general discussion period were recorded and considered in scoping the EIS.

After all the scoping meetings had been held, BLM personnel analyzed the issues sheets and ballots from the meetings. Issues were categorized and the number of votes for issues included within each grouping was tabulated. A summary of this data is found in Table B-2.

Later, the scope of the EIS was determined by the key participants involved in preparing the EIS based on discussions of the data gathered at the nine scoping meetings, notes from the South Dakota and Washington meetings, and letters received by BLM which identified specific issues of concern. Those involved were BLM, U.S. Department of the Interior, U.S. Fish and Wildlife Service, Woodward-Clyde Consultants, and ETSI.

A detailed report on the EIS scoping process, "ETSI Coal Slurry Pipeline Proposal: A Report on Public Involvement of the Issues," was prepared and distributed. A limited number of copies are available from the Bureau of Land Management, Office of Special Projects, Third Floor East, 555 Zang Street, Denver, Colorado 80228. Among other things, it includes the list of issues raised by each work group, tabulation of work group ballots, scoping meeting participants, and a discussion of the procedures used to analyze the scoping meeting data.

TABLE B-2

SUMMARY OF WORK GROUP BALLOTING

Issue	Votes
WATER ISSUES	
Subsurface Water	142
General	(78)
Effects in Nebraska and South Dakota	(48)
Subsurface-Surface Water Relationships	(11)
Effects in Wyoming	(5)
General	26
Water Rights	25
Alternative Sources of Water	23
Water Recycling	19
Water Quality	19
At Delivery Points	(14)
At Source	(5)
Wetlands and Stream Crossings	9
Effects on Flood Control Structures	6
Interbasin Transfer of Water	5
Alternative Uses of Water	1
	270 Total
SOCIOECONOMIC ISSUES	
Employment Effects	48
Local Socioeconomic Concerns	51
Cost-Effectiveness	35
Landowner Rights and Eminent Domain	20
Construction Impacts	12
Slurry Proposal as Precedent-Setting	10
Slurry Proposal vs. Local Sources of Energy	9
Taxation and Revenues	5
Demand for Coal	4
	194 Total
ENVIRONMENTAL ISSUES	
General	32
Fish and Wildlife	21
Habitat	(9)
Populations	(8)
Threatened and Endangered Species	(4)
Reclamation	16
Agriculture	12
Archeology	6
Land Use	4
Coal Dust	4
Noise	1
	96 Total
PROJECT DESIGN ISSUES	
Description of Proposal	29
Alternative Routes	13
Economics of the Proposal	6
Health and Safety Considerations	4
Alternative Fluids	2
	54 Total
OTHER COAL TRANSPORTATION MODES ISSUES	
Slurry-Other Mode Comparisons	30
Slurry-Rail Comparisons	12
	42
RUPTURE AND SPILL ISSUES	30 Total
ENERGY EFFICIENCY ISSUES	29 Total
ADMINISTRATIVE ISSUES	
Conduct of the Assessment	(5)
Legal Issues	(5)
	10 Total

APPENDIX C - PROJECT DESCRIPTION

APPENDIX C-1

GENERAL CONSTRUCTION, OPERATION, AND RECLAMATION PROCEDURES

Construction and operation of the proposed project would involve well-drilling operations, pipeline installation, and construction of numerous aboveground facilities, including coal slurry preparation plants, pipeline pump stations, slurry dewatering facilities, communications networks, electric power transmission lines, and maintenance bases. Standard or general practices are discussed here, and detailed procedures for specific facilities are discussed in Section 1.F.5.

Site Selection

The location of the rights-of-way and systems facilities involved consideration of current land use patterns and environmental factors. For example, wherever feasible the pipeline route would follow existing or planned right-of-way corridors. Where new right-of-way corridors and system facilities would be located, the impacts of the installation would be fully considered. Emphasis would be placed on selecting locations where the right-of-way and facility structures would result in minimal impact to the landscape, vegetation, and fish and wildlife resources, and would be least noticeable from critical viewing areas.

Equipment Design

The design of all components of the proposed project would include an awareness of the need for energy conservation, emission control, noise suppression, safety, impacts on visual resources, and the use of existing roadways, rights-of-way, and transmission lines wherever feasible. All structures and foundations would also be designed to withstand seismic forces that might be expected in the region. To avoid or reduce the impact of landslides, either natural or those caused by the proposed action, the following measures would be implemented:

- Project facilities would not be located on known or mapped landslides.
- Project facilities would not be located in areas with a known potential for landsliding.
- Project facilities would not be located in known areas with unstable soils.
- Oversteepening or undercutting of existing natural slopes during development and construction would be avoided wherever feasible.
- Engineering solutions to reduce possible landsliding would be implemented.

Visual resource impacts would be minimized by locating and designing facilities so they would create minimal site disturbances and very little contrast with the existing landscape. Structural materials and configurations would repeat the forms, lines, colors, and textures of the surrounding landscape.

Equipment design would be in compliance with all standard codes, practices, and regulations. Safety of the work force would be given full consideration, with protective devices and operating manuals provided for each component.

In order to maintain continuity of operations, surface facilities would be protected from damage due to floods by taking the following steps:

1. Location: As far as possible, surface facilities would be located on high ground above known flood levels.

2. Floor Elevation: This would be set where possible above flood levels.

3. Dikes: Where flood levels are likely to be above floor level, surface facilities would be protected by dikes.

4. Design Criteria: This is set such that in case of loss of a pump station the system could continue to operate at a reduced capacity.

5. Dewatering Plants: These would be located inside the power plant's boundary, and receive the same protection as the power plant. (The Cypress Bend dewatering plant, which is part of the market and pipeline-barge alternative would not be located inside a power plant boundary. At Cypress Bend, flood protection measures, as indicated above, would be provided.)

Construction

Standard construction procedures for all proposed installations would be followed and would include many measures designed to mitigate impacts, such as the following:

- Construction schedules for river crossings would be planned to avoid fish spawning seasons and to avoid periods of high stream runoff.

- Fugitive dust would be controlled by wetting down areas as necessary.

- Vegetation and adjacent resources would be protected whenever possible.

- Natural drainage would be maintained.

- Sidehill bench cuts would be kept to a minimum.

- Construction on steep slopes would be avoided where feasible.

- On-site environmental coordinators and archeologists would be employed during construction.

- Aboveground facilities would be painted in colors compatible with the surrounding landscape.

- Construction sites would be rehabilitated in an overall visually acceptable manner so that any changes would blend with the adjacent landscape.

Erosion Control and Revegetation

Standard procedures would include implementation of erosion control and revegetation measures to assure that lands disturbed by construction activities would be restored to a stable, productive, and aesthetically acceptable condition.

Because the proposed project right-of way is composed of many types of terrain, soils, vegetation, land uses, and climatic conditions, the reclamation procedures would include techniques and measures tailored to each condition encountered. Local expertise and locally effective reclamation methods would be considered when the procedures are developed.

Detailed information regarding applicable techniques and technical assistance to private landowners concerning erosion control measures and reclamation procedures would be obtained from the Soil Conservation Service (SCS) through local soil conservation districts. Technical assistance for federal lands would be obtained from BLM and the Forest Service.

During the construction phase of the project, an on-site reclamation specialist would be employed to provide: (1) liaison with private landowners, federal agency officials, and local governments; (2) expertise to direct applicable restoration procedures, when special conditions are encountered, without causing construction delays; and (3) public relations.

General erosion control and restoration measures have been developed for right-of-way and site clearing, trenching and preservation of topsoil, backfilling and grading, land preparation for seeding and cultivation, revegetation, maintenance and monitoring, and use of biochemicals, as discussed below. The methods used to research the potential reclamation problems and develop these measures are discussed at the end of this appendix.

Right-of-Way and Site Clearing. Emphasis would be placed on the protection of existing vegetation and measures to minimize disturbance of existing environment.

- Land grading would be done only on the area required for construction.
- Existing ground cover such as grasses, leaves, roots, brush, and tree trimmings would be conserved where feasible. Tree limbs and trees not usable or merchantable as timber would be conserved and later shredded and chipped for use in restoration operations or disposed of at the discretion of the landowner.
- Trees and shrubs on the right-of-way that are not cleared would be protected from damage during construction.
- Where the right-of-way crosses streams and other bodies of water, the banks would be stabilized to prevent erosion. Construction techniques would minimize damage to shorelines, recreational areas, and fish and wildlife habitat.
- Care would be taken to avoid oil spills and other types of pollution in streams and other bodies of water and in their immediate drainage areas.
- Design and construction of temporary roads would ensure proper drainage and minimize soil erosion. Upon abandonment, road areas would be restored to the satisfaction of landowner and/or other regulatory officials.
- During adverse weather conditions, construction would be stopped when rutting or excessive tracking of soil and deterioration of vegetation occurs in the right-of-way area, as determined by the on-site reclamation specialist.
- During construction activities at preparation and dewatering plant sites, sedimentation (detention) basins and/or straw bale filters or other protective devices would be constructed to prevent suspended sediments from reaching downstream watercourses.

Trenching and Preservation of Topsoil. Trenching methods and techniques implemented would ensure that:

- Topsoil is removed from the trench area by double ditching (i.e, windrowed separately, protected, and replaced last during backfilling). This procedure would be followed unless otherwise specified by landowner or authorizing officer.

- Remaining unearthed materials are removed and stored in a manner that facilitates backfilling procedure, uses a minimum amount of right-of-way area, and protects the excavated material from vehicular and equipment traffic.

- Cofferdams or other diversionary techniques would be used where necessary to permit flow in one part of a stream while pipelaying construction occurs in another part.

- A specific trenching and excavated material stockpiling procedure would be used in steep-sloping and rough, broken terrain to ensure minimum disturbance.

Backfilling and Cleanup. The following backfilling and cleanup techniques would be used:

- Backfill would be replaced in a sequence and density similar to the preconstruction soil condition.

- Backfilling operations would be conducted in such a manner to minimize further disturbance of vegetation.

- The contour of the ground would be restored to permit normal surface drainage.

- In strongly sloping and steep terrain, erosion control structures such as water bars, diversion channels, and terraces would be constructed to divert water away from the pipeline trench and reduce soil erosion along the right-of-way and other adjoining areas disturbed during construction.

- All structures such as terraces, levees, underground drainage systems, irrigation pipelines, and canals would be restored to preconstruction conditions so that they would function as originally intended.

- The surface would be graded to conform to the existing surface of the adjoining areas except for a slight crown to compensate for natural subsidence. In cropland areas, especially border- and furrow irrigated cropland, the crown would be smoothed to match the bordering area to allow surface irrigation.

- Topsoil would be uniformly replaced over the trench fill to restore productivity to its preconstruction condition.

- Materials unsuitable for backfilling or excess fill material would be disposed of in a waste area arranged by the landowner or other authorizing official.

Land Preparation for Seeding and Cultivation. Construction, backfilling, and cleanup activities may cause compaction and alter soil conditions that affect soil productivity and/or seeding success in the right-of-way area. The following practices and techniques would be used to improve these soil conditions, protect soil from erosion, and provide a favorable seedbed:

- In cropland areas, subsoiling or chiseling would be used, unless objected to by the landowner, to ensure that soil compaction is reduced and preconstruction soil permeability is restored.

- Chiseling would be used, unless objected to by the landowner, in rangeland areas to reduce compaction and improve soil permeability. Pitting and contour furrowing would be done on steeper slopes of disturbed areas to increase infiltration and to reduce runoff and erosion.

- Suitable mulches and other soil stabilizing practices would be used on all regraded and topsoiled areas to protect unvegetated soil from wind and water erosion and to improve water absorption.

- Special mulching practices or matting would be necessary in critical areas where wind and water are serious erosion hazards to protect seeding and seedlings after germination.

- Commercial fertilizers might be applied to soil areas with low inherent fertility to maintain crop yields and establish seeded grasses. Application rates would be commensurate with annual precipitation and available irrigation water.

- Seedbed for areas seeded to grass would be prepared to provide a firm and friable condition suitable for the establishment of grass stands.

- Rock mulches would be used in steep-sloping rock outcrop areas to reduce erosion and promote plant growth.

- Cultivation and land preparation operations on steeply sloping areas would be done on the contour to minimize erosion.

<u>Revegetation (Reseeding and Planting).</u> The loss of vegetation from lands disturbed by pipeline construction can be mitigated only by satisfactory revegetation. To ensure a successful revegetation program, methods and procedures would be consistent with local climate and soil conditions and would follow recommendations of local experts. Revegetation efforts would be continued until a satisfactory vegetative cover is established. The following practices and techniques would be used:

- A firm seedbed would be prepared prior to seeding. This would include a mulch of plant residues or other suitable materials. A cover crop may be needed in larger disturbed areas.

- Seed would be planted by drilling, broadcasting, or hydroseeding. Drilling is the preferred method, because it is usually most successful.

  - Drill seeding with a grass drill equipped with depth bands would be used where topography and soil conditions allow operation of equipment.

  - Broadcast seeding would be used for inaccessible or small areas. Seed would be covered by raking or harrowing.

  - Hydroseeding would be done in critical areas.

- Only species adapted to local soil and climatic conditions would be used. Generally these would be native species; however, introduced species may be considered for specific conditions when approved by the landowner and regulatory authority. Seeding rates in critical area plantings and generally throughout the right-of-way would be increased 100 percent over regular seeding rates to allow for seed mortality due to adverse growing conditions.

- Seeding would be done when seasonal or weather conditions are most favorable and as determined by the landowner or authorized agency official.

- Grazing or mowing would be delayed at least one season after seeding to provide time for vegetation to become established, especially in highly erodible areas, unless objected to by the landowner. Fencing may be necessary in special areas.

Maintenance and Monitoring. The right-of-way would be inspected to monitor the success and maintenance of erosion control measures and revegetation programs on native grazing lands for two growing seasons or for a period determined by the landowner on private land or the authorized agency official on state or federal land. The monitoring program would identify problem areas and corrective measures to ensure vegetation cover and erosion control. Certification of successful revegetation would be determined by the landowner or authorized agency official.

Use of Biochemicals. The use of biochemicals such as herbicides, fungicides, and fertilizers would comply with local, state and federal laws regarding the use of poisonous, hazardous, or persistent substances. State and federal wildlife agencies would be contacted if application of any of these substances would be on or near sensitive wildlife areas. Application of these substances would be by ground methods. Prior to use of such substances on or near the permit or grant area, ETSI would obtain approval of a written plan for such use from the authorizing officer, landowner, and/or appropriate wildlife agency. The plan would outline the kind of chemical, method of application, purpose of application, and other information as required, and would be considered as the authorized procedure for all applications until revoked by the authorizing officer, landowner, or appropriate wildlife and pest control agencies.

Operation

Systems operation would include these standard practices:

- Compliance with all codes and regulations regarding personnel health and safety.

- Development of operating manuals that detail safe operating procedures.

- Use of proper fencing and warning signs around unsafe areas.

- Compliance with spill response action guidelines in emergency situations involving accidental spills (see Appendix C-8).

- Maintenance of the visual quality of areas rehabilitated after construction.

Pump Station Ponds

Ponds associated with pump stations would be made available for various studies (limnobiological, hydrothermodynamic, photodynamic, waterfowl production, shorebird production) with the following stipulations:

a. Predesign proposal by study group must not interfere with pipeline operation.

b. Use of ponds would be subject to approval of grantee's (ETSI's) District Manager.

c. Study group would demonstrate that study objectives could be met.

d. All studies would be subject to constraints and restrictions of the the grantee's (ETSI's) District Manager.

Development of the Erosion Control and Reclamation Procedures and Their Effectiveness

The erosion control and revegetation procedures outlined above were developed and evaluated using information collected in the soil and agricultural review of the project. It was determined that if the guidelines are followed and the appropriate monitoring occurs, the disturbed areas would be successfully revegetated upon completion of the construction phase of the project.

Data Collection. Soils and agricultural information (primarily from the Soil Conservation Service) was collected for the surface areas potentially disturbed by the proposed action and alternatives. General soil survey maps were inventoried to identify soil types and terrain strongly affecting construction procedures and revegetation and restoration potential and success. These general soil surveys provide a broad perspective of the soils and landscape in the area. Because of their small scale, these surveys do not show the kind of soil at a specific site and include additional contrasting soils with varying behavior. Published detailed soil surveys, where available, were used to supplement the general soil surveys. Additional information, consisting of major cropland and rangeland management concerns and recommended conservation practices was obtained from published detailed soil surveys reports.

The soils data was compiled and displayed in tables and on 1:250,000 scale U.S. Geological Survey (USGS) topographic maps by milepost. A special worksheet was used to record: (1) soil association description (including depth, drainage, texture, parent material and physiographic position); (2) slope range; (3) erosion hazard (wind and water); and (4) additional comments concerning soil characteristics affecting construction activities and revegetation potential.

Data Analysis. The soils data was analyzed and evaluated to identify the following:

- areas with soil properties that strongly affect restoration of cropland and revegetation of native rangeland
- areas that are susceptible to high wind and water erosion hazards
- areas where erosion and resultant sediment yield affect water quality
- effective measures to minimize the effect of soil disturbances caused by construction activities and control accelerated erosion

Climatic data, including annual precipitation and length of frost-free season and land use data were used in conjunction with soils information to determine appropriate erosion control and revegetation measures.

Soil erosion hazards were estimated using the universal soil loss equation (USLE) and the wind erosion equation as applied to construction sites for selected soil areas representing various conditions occurring throughout the proposed project area. Recent developments in the USLE have made it a valuable tool for selecting and evaluating conservation practices on areas disturbed by construction activities. The information gained by application of the USLE to selected soil sites was used as a basis for determining appropriate erosion control and revegetation measures and to evaluate the effectiveness of those measures to ensure successful erosion control, revegetation, and restoration.

Development of the Procedures. Based on the potential problem areas identified in the data analysis, erosion control and revegetation procedures were developed to cover the wide range of soil and vegetation types, terrain, land uses, and climatic conditions found in the project area. A key point that was included was that a detailed, site-specific construction and erosion control plan would be developed after the exact location of the pipeline was known, which would include locally recommended techniques and measures tailored to the conditions encountered. The maintenance and monitoring program outlined would identify problem areas caused by adverse weather conditions during the restoration period or small localized areas with adverse soil properties and would provide corrective measures to ensure erosion control. Implementation of the general erosion control and revegetation procedures in conjuction with the locally recommended techniques for specific problem areas would assure successful restoration of land disturbed by project construction activities.

(ORIGINAL SIGNED BY
PRESIDENT AND SPEAKER)

SIGNED BY GOVERNOR

DATE: 2-21-74

CHAPTER NO: 35

ORIGINAL SENATE
FILE NO. 14

APPENDIX C-2

ENROLLED ACT NO. 10, SENATE

FORTY-SECOND LEGISLATURE OF THE STATE OF WYOMING
1974 SESSION

AN ACT to create section 41-10.5 and to repeal sections 41-1.4 and 41-151 of the statutes relating to use of Wyoming water outside of Wyoming; approving the proposal of Energy Transportation Systems Inc. to appropriate underground water subject to the approval of the state engineer; providing criteria upon which the approval of the state engineer is to be predicated; providing certain limitations on approving applications for permits for use of underground water; providing certain conditions on use to be stated in any permit issued; prohibiting the appropriation or transfer of water or water rights outside Wyoming without prior legislative approval; providing for a legislative study; providing for severability; and providing an immediate effective date.

Be It Enacted by the Legislature of the State of Wyoming.

Section 1. Section 41-10.5 of the statutes is created to read:

41-10.5. Applications for use of water outside the state.

(a) All water being the property of the state and part of the natural resources of the state shall be controlled and managed by the state for the purpose of protecting and assuring the maximum permanent beneficial use of waters within the state.

(b) None of the water of the state either surface or underground may be appropriated, stored or diverted for use outside of the state or for use as a medium of transportation of mineral, chemical or other products to another state without the specific prior approval of the legislature on the advice of the state engineer.

(c) No holder of either a permit to appropriate water or a certificate to appropriate water, nor any applicant for a right to appropriate the unappropriated water of this state, may transfer or use the water so appropriated, certificated or applied for outside the state of Wyoming without prior approval of the legislature of Wyoming, provided further, that as a prerequisite to any use or transfer any adjoining state in which any such water is used shall grant reciprocal rights for the use of water in Wyoming.

(d) Subject to the approval of the state engineer, and notwithstanding the provisions of section 41-10.5(b) of the statutes, the legislature hereby approves the proposal of Energy Transporation Systems, Inc., a Delaware corporation, to appropriate no more than twenty thousand (20,000) acre feet annually of the unappropriated underground waters of the state for use in a coal slurry pipeline extending from Wyoming to Arkansas. The state engineer, may in his discretion, issue permits to appropriate such underground water to the extent necessary not to exceed twenty thousand (20,000) acre feet annually to meet the requirements of that project and subject to such conditions as the state engineer may require, and provided that the state engineer determines to his satisfaction that such appropriations of the project meet his requirements, which requirements shall include, but are not limited to the following:

(i) That the water to be used is underground water, from the Madison or Bell Sand formations;

(ii) That such use will not interfere with domestic, municipal, stock watering or irrigation uses or other existing beneficial uses within Wyoming;

(iii) That the water is withdrawn from a source of supply located at a minimum of two thousand five hundred (2,500) feet below the ground surface, from wells constructed to a depth of more than two thousand five hundred (2,500) feet beneath the ground surface; and

(iv) That the wells are cemented or otherwise sealed off from the surface of the ground to the top of the formation or formations from which the water is withdrawn, in order to prevent any movement of water in the well outside the casing and to prevent the entry of water from overlying aquifers into said wells, and that the water so withdrawn will be used to develop other resources of Wyoming.

(e) Nothing in subsection (d) shall be construed as a directive for the state engineer to grant his approval.

(f) The permits shall contain the following requirements and provisions, and any others deemed necessary or desirable, for protection of Wyoming's water and other resources, ecology and environment, by the state engineer and environmental quality agency after mutual consultation:

(i) If at any time the permittee so operates his wells as to lower the water table so as to endanger the water supply of any domestic, municipal, stockwatering or irrigation use or other beneficial use of appropriated water within the state of Wyoming existing at the time the application underlying this permit was filed, permittee may be required by the state engineer at permittees own expense to either:

(A) Deepen the well and pay the additional costs of pumping water for any person whose water supply has been endangered by reason of permittee's pumping operation so that it is equal to the supply available prior to permittee's pumping; or

(B) Provide any person whose water supply is endangered that quantity of suitable water required to equal the amount available prior to permittee's pumping operation; or

(C) Obtain its water from another source that will not significantly affect or endanger the supply of water available to the beneficial users herein described.

(ii) Permittee will pay the costs of court and reasonable fees of attorneys and experts of any person who is required to enforce the terms of this permit by legal action, provided said person is successful in obtaining a final judgment in his favor and against permittee, and provided said fees are found by a court of competent jurisdiction to be both reasonable and necessary. Any such action must be brought in the courts of the state of Wyoming.

ORIGINAL SENATE
FILE NO. 14

ENROLLED ACT NO. 10, SENATE

FORTY-SECOND LEGISLATURE OF THE STATE OF WYOMING
1974 SESSION

(iii) If the state engineer finds reasonable cause to believe the permittee has endangered or is about to endanger the existing water table, an order to show cause why the permit should not be terminated or suspended may be issued. Any hearing held under this section shall conform with the provisions of the Wyoming Administrative Procedures Act.

Section 2. Sections 41-1.4 and 41-151 are hereby repealed.

Section 3. Excluding the applications referred to in subsection 41-10.5(d) of the statutes, and also excluding applications for permits to appropriate underground water for secondary recovery by water flooding of oil and gas fields, and also excluding test wells, no application or applications for the appropriation of undergound water in any one county for industrial purposes totalling more than six thousand (6000) acre feet per year, shall be approved by the State Engineer until April 1, 1975, unless authorized by the Legislature.

Section 4. The Joint Interim Mines, Minerals, and Industrial Development Committee and the Joint Interim Agricultural Public Lands and Water Resources Committee of the 42nd Legislature are hereby directed in conjunction with The Department of Economic Planning and Development, and the Office of the State Engineer to conduct a study of the use of underground water in Wyoming and report back to the 43rd session of the Wyoming Legislature in January 1975.

Section 5. If any provision of this act is held to be unconstitutional, such a ruling shall not affect other provisions of the act which can be given effect without the unconsititutional provision, and to this end the provisions of this act are severable.

ORIGINAL SENATE
FILE NO. 14

ENROLLED ACT NO. 10, SENATE

FORTY-SECOND LEGISLATURE OF THE STATE OF WYOMING
1974 SESSION

Section 6. This act is effective immediately upon passage.

(END)

President of the Senate

Speaker of the House

(ORIGINAL SIGNED BY PRESIDENT AND SPEAKER)

SIGNED BY GOVERNOR

DATE: 2-21-74

CHAPTER NO: 25

APPENDIX C-3
THIRD PARTY BENEFICIARY AGREEMENT BETWEEN OFFICE OF WYOMING STATE ENGINEER AND ETSI

This Agreement between the Office of the State Engineer of the State of Wyoming (State) and Energy Transportation Systems, Inc., a Delaware corporation qualified to do business in Wyoming (ETSI), dated September 24, 1974,

W I T N E S S E T H:

WHEREAS, ETSI has filed applications numbered ETSI P-1 through -26 and ETSI P-31 through -98 with the State Engineer of the State of Wyoming for permits to appropriate groundwater from certain lands in Niobrara County, Wyoming; and

WHEREAS, ETSI has entered into leases with the owners of land in Niobrara County giving ETSI the privilege of entering upon such land for the purpose of pumping water from the Madison Formation, memoranda of said leases being filed with the office of the County Clerk of Niobrara County, and also filed with the State Engineer of Wyoming as exhibits to the aforementioned applications; and

WHEREAS, ETSI has, in addition to its applications for permits to appropriate groundwater, applied for and received permits from the Wyoming State Engineer to construct test wells on lands leased by ETSI in Niobrara County, and pursuant to which said permits ETSI has constructed test and observation wells into the Madison Formation, and has filed the results of its said testing program with the State Engineer; and

WHEREAS, the State Engineer conducted a public meeting in Lusk, Wyoming, on July 15, 1974, at which time ETSI publicly described how it intended to use the pumped groundwater for its coal slurry project, and at which meeting ETSI also described its geologic and hydrologic findings which were based on core drillings, test wells, and other available data; and

WHEREAS, ETSI has advised the State Engineer of Wyoming, as well as the public, that in the opinion of ETSI and on the basis of all the information ETSI has obtained concerning the effects of pumping water for its coal slurry project there will be no interference with the pumping of any preferred or existing user in the State of Wyoming; and

WHEREAS, ETSI intends to protect and the State intends to defend all preferred and existing users in the State of Wyoming against any interference resulting from ETSI's pumping, and to that end ETSI and the State have determined that this purpose can best be accomplished by an agreement between said parties made expressly for the benefit of such persons;

NOW, THEREFORE, in consideration of the promises herein contained, the parties do hereby agree as follows:

1. Definitions. As used in this Agreement, the following terms have the meanings ascribed to them, unless otherwise indicated:

(a) "Person" means a natural person, partnership, association, corporation, municipality, including those specific municipalities named herein, irrigation district, and the State of Wyoming or a political subdivision thereof.

(b) "Groundwater" means any water under the surface of the land or under the bed of any stream, lake, reservoir, or other body of surface water.

(c) "Madison Formation" means the underground geologic structure or formation in the Mississippian System having boundaries that may be ascertained or reasonably inferred and in which water stands, flows, or percolates, and for the purpose of this definition, includes the Bell Sand unit of the Minnelusa Formation.

(d) "Existing User" means any person having a permit to appropriate groundwater senior to any ETSI permit or any person who utilizes groundwater for domestic and stock watering purposes in Wyoming.

(e) "Preferred Users" means the Cities of Newcastle, Upton, Moorcroft, and Osage to the extent of their pumping for preferred uses from the Madison Formation in Weston County, the Cities of Gillette and Sundance and the Devil's Tower National Monument to the extent of their pumping for preferred uses from the Madison Formation in either Weston, Crook, or Campbell County, and one "new city" to be designated by the State Engineer and located within the general vicinity of southeastern Campbell County, to the extent of its pumping for preferred uses from the Madison Formation in either Converse, Campbell, or Weston County.

(f) "Preferred Uses" means all of the existing and future use of groundwater pumped from the Madison by preferred users within their respective counties, but does not include industrial or irrigation use.

(g) "Interference" means such reduction in the quantity of water or degradation in quality of water so as to endanger the utilization of water by any preferred or existing user.

(h) "Pumping" means all withdrawals of water from the Madison Formation for beneficial uses for which said water was appropriated.

(i) "Project" or "Coal Slurry Project" means the coal slurry pipeline system owned and operated by ETSI, and which system will utilize 15,000 acre-feet of water on an average annual basis, and no more than

20,000 acre-feet of water per year. Such average annual use shall be computed on a basis of twenty consecutive years commencing with the year water is first used. Said average shall be computed annually for each twenty-year period following the year water is first used by ETSI, and ETSI shall use no more than 300,000 acre-feet of water in any such twenty-year period. Provided, however, that the State Engineer may, pursuant to application by ETSI and upon showing that additional water may be withdrawn and used from the Madison Formation without interference, permit ETSI to take no more than 20,000 acre-feet of water on an average annual basis.

2. Effective Date and Term.

This Agreement will become effective if and when the State Engineer issues permits to ETSI for the appropriation of groundwater for the coal slurry project, and will remain in effect until such time as the project is terminated or ETSI's permits are canceled from the records of the office of the Wyoming State Engineer.

3. Third-Party Beneficiaries.

All existing and preferred users as herein defined are hereby designated the beneficiaries of this contract.

4. <u>Covenant of ETSI to Protect Beneficial Uses.</u>

In the event ETSI's pumping from the Madison Formation causes interference with the pumping of any existing or preferred user, the State Engineer may on the basis of a valid complaint by any such user, hold a public hearing and investigate and determine whether and to what extent ETSI has caused interference with such user's pumping. If the State Engineer shall determine that any such complaint should be investigated, he shall first undertake any such investigation with his own staff. Should the State Engineer determine that such investigation requires independent consultants to assist in the investigation, the State Engineer shall notify ETSI in writing, and together the State Engineer and ETSI shall select consultants qualified to investigate the complaint. In the event the parties cannot agree on the consultants so to be engaged, the extent of the investigation or the reasonableness of the cost of said investigation, the issue shall be submitted to arbitration. In such event, the State Engineer and ETSI shall each appoint an arbitrator, and the two appointees shall select a third arbitrator. The three arbitrators shall decide whatever issues cannot be agreed to between the parties, and a decision by a majority of the arbitrators shall be conclusive and binding upon the parties. If either the State Engineer or ETSI refuses to appoint an arbitrator, or the two so appointed cannot agree on a third arbitrator, then either party to this Agreement may request a Court of competent jurisdiction to enforce the provisions of this paragraph. The cost of arbitration as well as the cost of any investigation shall be paid for by ETSI. The State Engineer or the arbitrators shall utilize all relevant data, including available monitoring data provided by the United States Geological Survey, in making their findings and determination. If, after a public hearing and investigation, the State Engineer determines that interference with the complainant's pumping has been caused by ETSI, he shall find and determine what corrective measures shall be taken by ETSI, which measures shall include the following, or any combination thereof:

(a) An order requiring restoration of complainant's pumping so that complainant can extract from the Madison Formation a quantity of water equal to the amount pumped before such interference. If the complainant's pumps must be lowered, his well(s) deepened, or a new well or wells constructed in order to enable complainant to pump such equivalent quantity of water from the Madison Formation, ETSI shall pay any and all costs of deepening such well(s) and lowering the pump(s) or constructing a new well or wells and providing new pumps, and ETSI shall also pay such additional pumping costs as may be required by order of the State Engineer.

(b) An order requiring ETSI to supply to said complainant, in the event complainant's pump(s) cannot be lowered, his well(s) deepened, or a substitute well or wells and pumping plant constructed, substantially the same quantity and quality of water enjoyed by complainant prior to interference by ETSI pumping and at a cost to said complainant equivalent to the operation and maintenance costs paid by complainant prior to interference with his pumping. In the case of preferred users, ETSI may at its option, and with the concurrence of the State Engineer, appropriate the wastewater of any such preferred user and either (1) spread or inject said preferred user's wastewater into the underground in order to satisfy ETSI's substitute water supply requirement in whole or in part, or (2) utilize said preferred user's wastewater for ETSI's own benefit and use.

(c) In the event that ETSI's interference with any complainant's pumping cannot be corrected by any of the measures prescribed in Subsections (a) or (b) hereof, the State Engineer shall, before invoking the provisions of Subsection (d) hereof, permit ETSI to correct such interference by whatever supplies, means, or technology available at that time, subject, however to the approval of the State Engineer.

(d) An order of the State Engineer requiring ETSI to cease and desist all its pumping from the Madison, in the event that ETSI's interference with any person's pumping cannot be corrected by any of the measures prescribed in Subsections (a), (b), or (c) hereof. ETSI shall comply with such order to cease and desist no later than twenty-four months after receipt of said order.

5. Potential Interference.

The State Engineer may, on the basis of information developed by his office, the U. S. Geological Survey, or any other reliable source, investigate the possibility that ETSI's pumping will interfere with the rights of existing or preferred users. In such event, the State Engineer shall notify ETSI in writing of his proposed investigation and allow ETSI ninety days in which to submit evidence to the effect that either (1) no interference is threatened, (2) any possible interference can be corrected by any of the measures made available to it under the provisions of Subdivisions (a), (b), and (c) of Section 4, or (3) that any possible interference can be corrected by reduced pumping. The State Engineer will make a final determination that no interference will occur or issue an order requiring ETSI either to take any one or a combination of the corrective measures provided in Subdivisions (a), (b), and (c) of

Section 4, reduce pumping, or issue a cease and desist order as provided in Subdivision (d) of Section 4. Any order of the State Engineer under this Section shall be appealable to the Board of Control, and the final order of the Board of Control shall, in turn, be appealable in the manner provided in Section 41-216 of the Laws of Wyoming.

6. Guaranty.

Within thirty days after written demand by the State Engineer, ETSI shall post a bond in the face amount of One Million Dollars to guarantee compliance with the provisions of Section 4 hereof. Said bond shall be approved by the State Engineer, which said approval shall not be unreasonably withheld. Any order of the State Engineer to ETSI issued pursuant to Sections 4 or 5 other than an order under Subparagraph (d), shall be complied with within sixty days after such order becomes final. In the event ETSI does not so comply, the State Engineer may proceed against the surety under said bond. The rights of third parties under said bond shall remain enforceable even though ETSI, under some other legal, administrative, or legislative authority, is authorized to continue its pumping operations.

In the event ETSI for any reason cannot obtain a bond for the purposes herein prescribed, it may establish a line of credit in the amount of One Million Dollars with a bank approved by the State Engineer to guarantee compliance with the provisions of Section 4 hereof. The conditions under which said line of credit will be implemented shall be negotiated and agreed upon between the parties.

7. Appeal.

ETSI may appeal any order of the State Engineer under this Agreement in the manner provided by Section 41-216 of the Laws of Wyoming, and the Wyoming Administrative Procedures Act.

8. Conditions Precedent to Performance.

ETSI's obligation to carry out the directives of any order of the State Engineer providing corrective measures prescribed in Sections 4 and 5 shall be dependent upon complainant's willingness to permit ETSI to enter upon said complainant's premises for the purpose of taking any such corrective measures as may be ordered by the State Engineer.

9. Future Permits.

In acting upon applications submitted by preferred users for permits to appropriate groundwater from the Madison Formation, the State Engineer shall consider whether or not a "water shortage" might occur or the area might be designated a "control area" under Wyoming law, in which event the State Engineer shall include in any new preferred user permits such terms and conditions, including the metering of well discharges and all other reasonable conservation measures, as will minimize the effects of pumping by said preferred users from the Madison Formation.

10. Successors.

This Agreement is binding on the successors and assigns of the parties signatory hereto.

11. Remedy Not Exclusive.

The bond or line of credit and procedure established for corrective measures shall be available only under this Agreement to those persons designated as beneficiaries of this Agreement pursuant to Section 3 hereof, and in no respect shall this Agreement constitute the exclusive remedy for any persons claiming interference as a result of ETSI's pumping.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed and attested by the proper officers thereunto duly authorized, and their official seals to be hereto affixed as of the day and year first written.

THE OFFICE OF THE STATE ENGINEER
OF THE STATE OF WYOMING

By: Floyd A. Bishop
Floyd A. Bishop,
State Engineer

APPROVED AS TO FORM:

[signature]
Attorney General

ENERGY TRANSPORTATION
SYSTEMS, INC.

By: E. J. Wasp
E. J. Wasp,
Vice-President

APPROVED AS TO FORM:

BEST, BEST & KRIEGER

By: James H. Krieger
James H. Krieger

APPENDIX C-4
SAMPLE ETSI WELL PERMIT

Form U.W. 5

NOTE: Do not fold this form. Use typewriter or ball point pen.

STATE OF WYOMING
OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT TO APPROPRIATE GROUND WATER

Temporary Filing No. U.W. 8-12-297

FILING FEE $2.00

PERMIT NO. U.W. 27867

NAME AND NUMBER OF WELL: ETSI-P-1

WATER DIVISION NO. 2 DISTRICT 1

U.W. DISTRICT Niobrara Co.

1. Name of applicant(s) Energy Transportation Systems, Inc. Phone: (415) 764-5787
2. Address of applicant(s) P.O. Box 3965, San Francisco, California Zip: 94119
3. Name & address of agent to receive correspondence and notices Mr. Lawrence Materi, P.O. Box 151 Upton, Wyoming 82730
4. Use to which the water will be applied: Irrigation ☐ Municipal ☐ Industrial ☒ Commercial ☐ Domestic ☐ Stock Watering ☐ Other
5. Location of the well: Niobrara County, ~~xxxxxxxxxx~~ Center of NW 1/4 of Sec. 21, T. 36 N., R. 62 W., or Lot ___, Block ___ of the ___ Subdivision (or Add'n) of ___ Sec ___ T ___ N., R ___ W., of the 6th P.M. (or W.R.M.), Wyoming.
6. Estimated depth of the well is 3500 feet.
7. MAXIMUM quantity of water to be developed and beneficially used: 1000 gallons per minute.
   Note: If for domestic or stock use, this application will be processed for a maximum of 25 gallons per minute.
8. If for irrigation use,
   ☐ Land will be irrigated from this well only.
   ☐ Land is irrigated from existing water right(s) to be supplemented by this well. Describe existing water right(s) under REMARKS.
9. If for irrigation use, describe MAXIMUM acreage to be irrigated. Show number of acres to be irrigated in each 40-acre subdivision.

Township	Range	Sec.	NE¼ NE¼	NE¼ NW¼	NE¼ SW¼	NE¼ SE¼	NW¼ NE¼	NW¼ NW¼	NW¼ SW¼	NW¼ SE¼	SW¼ NE¼	SW¼ NW¼	SW¼ SW¼	SW¼ SE¼	SE¼ NE¼	SE¼ NW¼	SE¼ SW¼	SE¼ SE¼	TOTALS

WATER WILL BE UTILIZED FOR INDUSTRIAL PURPOSES IN CAMPBELL COUNTY, WYOMING, IN A LOCATION NOT YET FINALLY DETERMINED

REMARKS:

Permit No. U.W. 27867 6-121 Book No. 141 Page No. 98

10. The well is to be constructed on lands owned by John E. DeGering and Kay DeGering (husband & wife) and Leonard L. DeGering and Helen L. DeGering (husband & wife)
(The granting of a permit does not constitute the granting of right of way. If any easement or right of way is necessary in connection with this application, it should be understood that the responsibility is the applicant's. A copy of the agreement should accompany this application, if the land is privately owned and the owner is not a co-applicant.)

11. The water is to be used ~~on land owned~~ for the industrial purposes of the applicant.
(If landowner is not the applicant, a copy of the agreement relating to usage of appropriated water on the land should be submitted to this office. If the landowner is included as a co-applicant on the application, this procedure need not be followed.) A memorandum of lease dated September 7, 1973, between the Owner and applicant is on file as an attachment to application ETSI-T-1 of applicant and is incorporated herein by reference thereto

THE LEGALLY REQUIRED FILING FEE MUST ACCOMPANY THIS APPLICATION.

Under penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.

John Huneke, Vice President
Signature of Applicant or Authorized Agent
Energy Transportation Systems, Inc.

September 7, 19 73
Date

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

THE STATE OF WYOMING }
STATE ENGINEER'S OFFICE } ss.

This instrument was received and filed for record on the 7 day of Sept. A. D. 19 73 at 4:00 o'clock P M.

Permit No. U.W. 27867

for Karen L. Armour
State Engineer

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This application is approved subject to the condition that the proposed use shall not interfere with any existing rights to ground water from the same source of supply and is subject to regulation and correlation with surface water rights, if the ground and surface waters are interconnected. The use of water hereunder is subject to the further provisions of Chapter 169, Session Laws of Wyoming, 1957, and any subsequent amendments thereto.

Granting of a permit does not guarantee the right to have the water level or artesian pressure in the well maintained at any specific level. The well should be constructed to a depth adequate to allow for the maximum devlopment and beneficial use of ground water in the source of supply.

If the well is a flowing artesian well, it shall be so constructed and equipped that the flow may be shut off when not in use, without loss of water into surface formations or at the surface.

Approval of this application may be considered as authorization to proceed with construction of the proposed well.

Construction of well will begin within one (1) year from date of approval. A Statement of Completion will be filed within thirty (30) days of completion of construction, including pump installation.

Completion of construction and completion of the beneficial use of water for the purposes specified in Item 4 of this application will be made by December 31, 19 76.

The amount of appropriation shall be limited to the quantity to which permittee is entitled as determined at time of proof of application of water to beneficial use.

Witness my hand this 24th day of Sept., A. D. 19 74.

Floyd A. Bishop
State Engineer

FOR ADDITIONAL LIMITATIONS SEE THE FOLLOWING PAGES OF THIS PERMIT.

6-122

LIMITATIONS
ETSI PRODUCTION PERMITS

The following conditions and limitations are applicable to Permit Nos. U. W. 27854 through U. W. 27893 issued to Energy Transportation Systems, Inc. (ETSI):

1. ETSI has on file with the State Engineer applications numbered ETSI P-1 through ETSI P-26 and ETSI P-31 through ETSI P-98 to appropriate ground water for processing coal, transporting coal in a coal slurry pipeline, and for related and appurtenant purposes, and these permits are issued subject only to application numbers 1, 19, 31, 33, 34, 35, 37, 39, 41, 43, 44, 46, 48, 50, 52, 53, 55, 56, 60, 64, 66, 68, 69, 71, 73, 76, 77, 78, 79, 83, 84, 85, 86, 88, 90, 91, 92, 94, 95, and 98, and the remainder of said applications are subject to further consideration by the State Engineer as hereinafter provided. These permits are designed to permit ETSI to pump 15,000 acre-feet of water on an average annual basis, and no more than 20,000 acre-feet of water per year. Such average annual pumping shall be computed on the basis of 20 consecutive years commencing with the year the water is first used. Said average shall be computed annually for each 20-year period following the year the water is first pumped by ETSI, and ETSI shall pump no more than 300,000 acre-feet of water in any such 20-year period; provided, however, that the State Engineer may, pursuant to application by ETSI, and upon a showing that additional water may be withdrawn and used from the Madison Formation without interference, permit ETSI to take no more than 20,000 acre-feet of water on a average annual basis. Accordingly, and subject to the approval of the State Engineer, ETSI may be granted additional permits to enable it to pump the quantities of water permitted herein.

2. Neither ETSI, its agents and employees, nor any independent contractor with whom ETSI, its agents or employees may contract or subcontract shall initiate construction or cause to be drilled, dug, or constructed any production well pursuant to any permit until such time as:

(a) The design of a monitoring and observation well system, consisting of five observation wells, one to be located in each of the following townships:

Section 28, T36N, R62W, West of the 6th P.M.
Section 16, T39N, R64W, West of the 6th P.M.
Section 16, T42N, R61W, West of the 6th P.M.
Section 4, T38N, R61W, West of the 6th P.M.
Section 8, T38N, R60W, West of the 6th P.M.

shall have been approved by the State Engineer, provided, the location(s) of any such well(s), as set forth above, may, prior to commencement of construction of any such well(s) and upon written notice from the State Engineer, be changed to any other location as the State Engineer may require; and

(b) ETSI has applied for and the State Engineer has granted permits for each of the said five monitoring and observation wells, and the State Engineer has endorsed on each such permit his approval of the monitoring and observation system. Provided that in no event shall water be produced from any production well under these permits within a period of one year from the date of completion of the final observation well, exclusive of such amounts as the State Engineer may allow to be produced for testing purposes during such period.

3. ETSI shall, at its own expense, install and maintain on each production well such monitoring or other measuring devices as may be required and approved by the State Engineer.

4. ETSI shall, at its own expense, purchase and install metering devices acceptable to the State Engineer on any or all of six wells to be designated by the State Engineer.

5. As a condition of continuing these permits in full force and effect, ETSI shall submit to the State Engineer monthly reports for a period of five years following the date water is first produced under any production well permit(s) indicating the quantity of water withdrawn from each operating well, as well as the cumulative withdrawals from all said wells in operation at any time during the reporting period, and the drawdown of the well levels, if any, on the five monitoring and observation wells required by Condition 2 hereof. Said reports shall be submitted on the first day of each month following commencement of the production of water by ETSI or on the first working day after the first day of each month if the filing date should fall on an official holiday or on a Saturday or Sunday.

If at any time during or prior to the expiration of the five-year reporting period the State Engineer should determine and ETSI and the State Engineer should mutually agree that a monthly reporting period is no longer necessary, ETSI may report to the State Engineer on a semi-annual basis, and said reports shall be submitted to the State Engineer on the second day of January of the year following the commencement of the production of water by ETSI, and the reports shall be filed on the first day of July and the second day of January semi-annually thereafter, or on the first working day after either said date if the filing date should fall on an official holiday or on a Saturday or Sunday. If the State Engineer so elects, he may engage a ground water hydrologist approved by ETSI to examine the data collection process and analyze the data itself for the benefit of the State Engineer, all of the costs of which shall be borne by ETSI.

6. ETSI shall test each production well drilled, dug, or constructed by it and at such times and in such manner as the State Engineer may require and the results of such testing shall be submitted to the State Engineer on a continuing basis, and in no event shall any test results be submitted later than seven days following completion of such tests as may be required.

7. All costs of data processing involved in testing the production wells during or following construction shall be borne by ETSI, and such test data shall include a cement bond log and such other geophysical logs and data as the State Engineer may require.

8. The State Engineer and any of his duly authorized agents or employees shall have the right at any and all times during the life of these permits and at the State's own expense, to run or conduct such independent tests and inspections of any or all of ETSI's wells as the State Engineer may require.

9. Each production well shall be cemented from the surface of the ground to the top of the Madison Formation and in no case shall any well be cased or cemented to a depth of less than 2500 feet below the ground surface.

10. In no case shall any production well constructed pursuant to these permits withdraw water from any formation or formations other than the Madison Formation and the Bell Sand unit of the Minnelusa Formation, provided that in no event shall any water be withdrawn from the Madison Formation or Bell Sand unit of the Minnelusa Formation where said formations shall occur at depths of less than 2500 feet below the ground surface.

11. In no case shall the total withdrawals by ETSI from all production wells exceed the maximum quantity set forth in Condition 1 hereof. Water withdrawn under these permits shall be used to process coal, transport coal in a coal slurry pipeline, and for related and appurtenant purposes, and no other use shall be made of such water without the express prior approval of the State Engineer or the Wyoming State Legislature, or both, if necessary.

12. If at any time ETSI so operates its wells as to lower the water table so as to endanger the water supply of any domestic, municipal, stockwatering or irrigation use, or other beneficial use of appropriated water within the State of Wyoming existing at the time the applications underlying these permits were filed, ETSI may be required by the State Engineer, at ETSI's own expense, to either:

(a) Deepen the well and pay the additional costs of pumping water for any person whose water supply has been endangered by reason of ETSI's pumping operation so that it is equal to the supply available prior to ETSI's pumping; or

(b) Provide any person whose water supply is endangered that quantity of suitable water required to equal the amount available prior to ETSI's pumping operation; or

(c) Obtain its water from another source that will not significantly affect or endanger the supply of water available to the beneficial users herein described.

13. In the event that ETSI should desire to abandon any production well, ETSI shall so inform and notify the State Engineer and state the reason or reasons for such proposed abandonment, and if such abandonment is thereafter allowed, ETSI shall comply with all requirements of the State Engineer in regard to the abandonment of any such well.

14. If and when ETSI, its successors, or assigns should desire to terminate the use of water under these permits for processing coal, transporting coal in a coal slurry pipeline, and related and appurtenant purposes, the State Engineer shall be so notified, and the State of Wyoming, through its duly authorized and appointed officers, shall succeed to ownership of these permits.

15. ETSI and the Office of the State Engineer of the State of Wyoming have entered into an agreement dated September 24, 1974, said agreement being intended to protect the third party beneficiaries named in Section 3 thereof. And in the event that a proper bond or line of credit is not established pursuant to Section 6 of said agreement, the permits herein granted may be cancelled or their operation suspended until such time as an arrangement or new agreement satisfactory to the State Engineer may be entered into or agreed upon between ETSI and the Office of the State Engineer of the State of Wyoming.

16. ETSI shall notify the State Engineer of the specific point(s) of injection of water produced under these permits into the pipeline operated by said ETSI.

17. The conditions and limitations of these permits are binding upon any and all successors and assigns of ETSI.

18. The permits granted herein shall be subject to cancellation at the end of the fifty-year period following the first production of water from the ETSI production wells, provided that ETSI and the State Engineer may mutually agree to extend such cancellation date.

19. The permits granted herein are subject to all other applicable requirements of State law not herein specifically stated.

APPENDIX C-5
MEMORANDUM OF UNDERSTANDING
BETWEEN CITY OF GILLETTE,
WYOMING AND ETSI

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding, dated the 3 day of March, 1980, between the City of Gillette, Wyoming, (hereinafter referred to as the "City"), and Energy Transportation Systems Inc., a Delaware Corporation, (hereinafter referred to as "ETSI") records the intentions of the parties to negotiate a formal agreement between the City and ETSI under which the City will contract to sell the surplus waters produced from its Madison Formation Wells to ETSI.

1. The City is in the process of acquiring well permits to produce up to 11,200 acre-feet of water per year from the Madison Formation, such water to be used for municipal and industrial uses. Incident to the development of this water, the City will construct, own and operate a water pipeline and distribution system from the wells to Gillette which water system will be designed to meet the peak load demand of the City for municipal purposes through 1990 and the years thereafter. The City estimates that its capacity for water from the pipeline will be 7,000 gallons per minute (11,200 acre-feet per year), but its water requirements for municipal purposes will be significantly less until city growth reaches the designed capability and until then water not needed for its municipal requirements will be available for industrial uses.

2. ETSI plans to construct a coal slurry pipeline originating in Campbell County, Wyoming and extending to markets in the southeastern United States.

3. The City projects that its municipal requirements will meet the design capacity of the system during peak load times so that surplus water would be available in nonpeak load times for industrial use throughout the life of the system. A contract with ETSI would permit the City to operate the system efficiently at its designed capacity and therefore lower the overall costs of water to consumers and significantly reduce the costs of capital and debt service in the early years of the project.

4. To permit the municipal and industrial use of the water produced pursuant to the permits which the City now has and which it is in the process of acquiring, the City agrees to take all action necessary, including the filing of new permits and enlargements of permits, and obtaining the necessary legal authority to provide for both municipal and industrial use and legal approval of the agreement by the requisite governmental authorities.

5. The agreement which the parties agree to negotiate shall provide that the City shall produce and deliver to ETSI all water in excess of the City's needs and other prior commitments up to the full designed capacity of the system. The City shall supply ETSI with a minimum of 4,000 acre-feet of water each year from 1983 through 2013; provided, however, that the City, in its sole discretion, shall designate the times at which this water will be made available and exercise its right to make this water available at nonpeak load times.

The obligation of the City to supply a minimum of 4,000 acre-feet per year shall be subject to emergencies, Acts of God, and short-term interruptions in service which will be defined in the agreement.

6. In consideration for delivery of this water, ETSI will pay the City the following sums:

(a) The proportional share of all operational costs based upon the ratio of the amount of water ETSI uses to the overall production of the system; and

(b) The proportional share of the principal retirement and interest cost amortized over thirty (30) years based upon the ratio of the amount of water ETSI uses to the actual production of the system. The calculation of the proportionate share of interest for which ETSI shall be responsible shall be calculated at the interest rate of an industrial bond rated AAA, provided that in no event shall the interest rate paid by ETSI be less than the interest rate paid by the City. To the extent that the interest rate paid by ETSI shall exceed that paid by the City these amounts would accrue to the City to lower the overall cost of water to the consumers.

7. The contract will include provisions for:

(a) Phased option payments to Gillette as their project progresses.

(b) Exchange of scientific and technical knowledge from ETSI's well field operation.

8. The parties shall assist one another during the negotiating process with respect to the engineering system, and the collection and analysis of all data regarding the capacity of the system and the needs of the parties.

9. This is not a legally enforceable contract on the part of either party. Rather, it is a statement of the parties' intentions and the terms upon which the parties desire to negotiate a formal agreement.

DATED this 3 day of March, 1980.

CITY OF GILLETTE, WYOMING

By: Michael B. Enzi, Mayor

ATTEST:

Mildred Hurvantch

ENERGY TRANSPORTATION SYSTEMS INC.

By: F Bellas

ATTEST:

Mildred Hurvantch

APPENDIX C-6

CITY OF EDGEMONT

EDGEMONT, S. D., 57735

MINUTES OF PROCEEDINGS OF:
REGULAR COUNCIL MEETING
MUNICIPAL BUILDING
7;30 p.m July 8, 1974

The council met in regular session on July 8, 1974 at 7:30 p.m,, with Mayor Nelson presiding and the following councilmen present: Mc Carthy, Honadel, Porter, Hatton and Vessberg. Fahy absent.

Moved by Mc Carthy seconded by Honadel that the City of Edgemont accept the offer of ETSI to install, for the City of Edgemont, South Dakota a combination production-observation well upon the following terms and conditions:

1. ETSI will construct the well at least one year prior to production by the proposal ETSI project in Niobrara County, Wyoming;
2. Title to the real estate will remain in Edgemont and title to all personal property in the form of pipes, casings, pumps, valves, and other assemblies essential to the operation of the well will be transferred from ETSI to the City of Edgemont upon completion of the well;
3. ETSI will be responsible for all installation costs of the well and in addition thereto will satisfy costs necessitated by the ESTI scientific information and data accumulation process while ETSI uses the well as an observation well;
4. ETSI will also be responsible for any operating costs of the well necessitated by the effects of the ETSI projection Niobrara County, Wyoming.
5. ETSI will be given a permanent use of the well by Edgemont for the purpose of obtaining scientific data or information and Edgemont will grant ETSI an easement for ingress and egress to the well site for purposes of maintaining the facility or gathering scientific data or information
6. Edgemont will provide ETSI with a suitable well location site.
7. ETSI agrees that the pumps to be installed will be at lease two hundred feet below the present drain down level of the Edgemont wells in the Madison formation;

Motion carried.

Jack E. Nelson, Mayor

Betty Wasserburger, City Auditor

APPENDIX C-7
DRAFT AGREEMENT BETWEEN CITY OF EDGEMONT, SOUTH DAKOTA AND ETSI
(unsigned)

D R A F T

AGREEMENT

This Agreement between the City of Edgemont, South Dakota, "City", and Energy Transportation Systems, Inc., a Deleware corporation, "ETSI", dated the _____ day of _________________, 1981,

W I T N E S S E T H :

WHEREAS, ETSI has filed applications numbered ETSI P-1 through -26 and ETSI P-31 through -98 with the State Engineer of the State of Wyoming for permits to appropriate groundwater from certain lands in Niobrara County, Wyoming; and

WHEREAS, ETSI has entered into leases with the owners of land in Niobrara County giving ETSI the privilege of entering upon such land for the purpose of pumping water from the Madison Formation, memoranda of said leases being filed with the office of the County Clerk of Niobrara County, and also filed with the State Engineer of Wyoming as exhibits to the aforementioned applications; and

WHEREAS, ETSI has, in addition to its applications for permits to appropriate groundwater, applied for and received permits from the Wyoming State Engineer to construct test wells on lands leased by ETSI in Niobrara County, and pursuant to which said permits ETSI has constructed test and observation wells into the Madison Formation, and has filed the results of its said testing program with the Wyoming State Engineer; and

WHEREAS, the Wyoming State Engineer conducted a public meeting in Lusk, Wyoming, on July 15, 1974, at which time ETSI publicly described how it intended to use the pumped groundwater for its coal slurry project, and at which meeting ETSI also described its geologic and hydrologic findings which were based on core drillings, test wells, and other available data; and

WHEREAS, ETSI intends to protect and the City intends to defend all beneficial users in the City against any interference resulting from ETSI's pumping, and to that end ETSI and the City have determined that this purpose can best be accomplished by an agreement between said parties made expressly for the benefit of such persons;

Now, THEREFORE, in consideration of the promises herein contained, the parties do hereby agree as follows:

1. Definitions.

As used in this Agreement, the following terms have the meanings ascribed to them, unless otherwise indicated:

(a) "Beneficial user" means the City of Edgemont, Provo, Igloo, and the area in between; and a citizen residing therein.

(b) "Groundwater" means any water under the surface of the land or under the bed of any stream, lake, reservoir, or other body of surface water.

(c) "Madison Formation" means the underground geologic structure or formation in the Mississippian System having boundaries that may be ascertained or reasonably inferred and in which water stands, flows, or percolates, and for the purpose of this definition, includes the Bell Sand unit of the Minnelusa Formation.

(d) "Interference" means such reduction in the quantity of water or degradation in quality of water so as to endanger the utilization of water by any beneficial user.

(e) "Pumping" means all withdrawals of water from the Madison Formation for beneficial uses for which said water was appropriated.

(f) "Project" or "Coal Slurry Project" means the coal slurry pipeline system owned and operated by ETSI, and which system will utilize 15,000 acre-feet of water on an average annual basis, and no more than 20,000 acre-feet of water per year. Such average annual use shall be computed on a basis of twenty consecutive years commencing with the year water is first used. Said average shall be computed annually for each twenty-year period following the year water is first used by ETSI, and ETSI shall use no more than 300,000 acre-feet of water in any such twenty-year period. Provided, however, that the Wyoming State Engineer may, pursuant to application by ETSI and upon showing that additional water may be withdrawn and used from the Madison Formation without interference, permit ETSI to take no more than 20,000 acre-feet of water on an average annual basis.

2. Effective Date and Term.

This Agreement will become effective if and when the Wyoming State Engineer issues permits to ETSI for the appropriation of groundwater for the coal slurry project, and will remain in effect until such time as the project is terminated or ETSI's permits are canceled from the records of the office of the Wyoming State Engineer.

3. Third-Party Beneficiaries.

The beneficial users as herein defined are hereby designated the beneficiaries of this contract.

4. Covenant of ETSI to Protect Beneficial Uses.

In the event ETSI's pumping from the Madison Formation causes interference with the beneficial use of the City's groundwater, the Mayor of the City, hereafter referred to as "Mayor", may on the basis of a valid complaint by any user within the City, hold a public hearing and investigate and determine whether and to what extent ETSI has caused interference with such user's groundwater. If the Mayor shall determine that any such complaint should be investigated, he shall first undertake any such investigation with his own staff. Should the Mayor determine that such investigation requires independent consultants to assist in the investigation, the Mayor shall notify ETSI in writing, and together the Mayor and ETSI shall select consultants qualified to investigate the complaint. In the event the parties cannot agree on the consultants so to be engaged, the extent of the investigation or the reasonableness of the cost of said investigation, the issue shall be submitted to arbitration. In such event, the Mayor and ETSI shall each appoint an arbitrator, and the two appointees shall select a third arbitrator. The three arbitrators shall decide whatever issues cannot be agreed to between the parties, and a decision by a majority of the arbitrators shall be conclusive and binding upon the parties. If either the Mayor or ETSI refuses to appoint an arbitrator, or the two so appointed cannot agree on a third arbitrator, then either party to this Agreement may request a Court of competent jurisdiction to enforce the provisions of this paragraph. The cost of arbitration as well as the cost of any investigation shall be paid for by ETSI. The Mayor or the arbitrators shall utilize all relevant data, including available monitoring data provided by the United States Geological Survey, in making their findings and determination. If, after a public hearing and investigation, the Mayor and the consultants, or in the event arbitrators are used, then a majority of the arbitrators, determines that interference with the complaining user's pumping has been caused by ETSI, he or they shall find and determine what corrective measures shall be taken by ETSI, which measures shall include the following, or any combination thereof:

(a) An order requiring restoration of complainant's pumping so that complainant can extract from the Madison Formation a quantity of water equal to the amount pumped before such interference. If the complainant's pumps must be lowered, his well(s) deepened, or a new well or wells constructed in order to enable complainant to pump such equivalent quantity of water from the Madison Formation, ETSI shall pay any and all costs of deepening such well(s) and lowering the pump(s) or constructing a new well or wells and providing new pumps, and ETSI shall also pay such additional pumping costs as may be required by order of the Mayor.

(b) An order requiring ETSI to supply to said complainant, in the event complainant's pump(s) cannot be lowered, his well(s) deepened, or a substitute well or wells and pumping plant constructed, substantially the same quantity and quality of water enjoyed by complainant prior to interference by ETSI pumping and at a cost to said complainant equivalent to the operation and maintenance costs paid by complainant prior to interference with his pumping. ETSI may at its option, and with the concurrence of the Mayor and City Council, appropriate the wastewater of the City and either (1) spread or inject said preferred user's wastewater into the underground in order to satisfy ETSI's substantive water supply requirement in whole or in part, or, (2) utilize said preferred user's wastewater for ETSI's own benefit and use.

5. Potential Interference.

The Mayor may, on the basis of information developed by his office, the U.S. Geological Survey, or any other reliable source, investigate the possibility that ETSI's pumping will interfere with the rights of beneficial users. In such event, the Mayor shall notify ETSI in writing of his proposed investigation and allow ETSI ninety days in which to submit evidence to the effect that either (1) no interference is threatened, (2) any possible interference can be corrected by any of the measures made available to it under the provisions of this Agreement, or (3) that any possible interference can be corrected by reduced pumping.

6. Guaranty.

Within thirty days after written demand by the Mayor, ETSI shall post a bond in the face amount of One Million Dollars to guarantee compliance with the provisions of Section 4 hereof. Said bond shall be designated to provide a guaranty to Edgemont, Igloo, Provo, and any other beneficial users of the Madison in the area and approved by the Mayor, which said approval shall not be unreasonably withheld. Any order to ETSI issued pursuant to Section 4 shall be complied with within sixty days after such order becomes final. In the event ETSI does not so comply, the Mayor may proceed against the surety under said bond. The rights of third parties under said bond shall remain enforceable even though ETSI, under some other legal, administrative, or legislative authority, is authorized to continue its pumping operations.

In the event ETSI for any reason cannot obtain a bond for the purposes herein prescribed, it may establish a line of credit in the amount of One Million Dolllars with a bank approved by the Mayor to guarantee compliance with the provisions of Section 4 hereof. The conditions under which said line of credit will be implemented shall be negotiated and agreed upon between the parties.

7. Appeal.

ETSI may appeal any order of the Mayor or arbitration panel under this Agreement to a Court of competent jurisdiction in the manner provided by the applicable laws of South Dakota.

8. Conditions Precedent to Performance.

ETSI's obligation to carry out the directives of any order providing corrective measures prescribed in Section 4 shall be dependent upon the City's and complaining beneficial user's willingness to permit ETSI to enter upon their premises for the purpose of taking any such corrective measures as may be ordered.

9. Successors.

This Agreement is binding on the successors and assigns of the parties signatory hereto.

10. Remedy Not Exclusive.

The bond or line of credit and procedure established for corrective measures shall be available only under this Agreement to those persons designated as beneficiaries of this Agreement, and in no respect shall this Agreement constitute the exclusive remedy for any persons claiming interference as a result of ETSI's pumping.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed and attested by the proper officers thereunto duly authorized, and their official seals to be hereto affixed as of the day and year first written.

THE CITY OF EDGEMONT, SOUTH DAKOTA

By: ______________________ (title)

ENERGY TRANSPORTATION SYSTEMS INC.

By: ______________________
E. J. Wasp
Vice President

APPENDIX C-8
DRAFT AGREEMENT BETWEEN STATE OF SOUTH DAKOTA AND ETSI
(unsigned)

DRAFT

AGREEMENT

This Agreement between the Office of the Secretary of the Department of Natural Resource Development of the State of South Dakota, "State", and Energy Transportation Systems, Inc., a Delaware corporation qualified to do business in Wyoming, "ETSI", dated the _____ day of __________, 1979,

WITNESSETH:

WHEREAS, ETSI has filed applications numbered ETSI P-1 through -26 and ETSI P-31 through -98 with the State Engineer of the State of Wyoming for permits to appropriate groundwater from certain lands in Niobrara County, Wyoming; and

WHEREAS, ETSI has entered into leases with the owners of land in Niobrara County giving ETSI the privilege of entering upon such land for the purpose of pumping water from the Madison Formation, memoranda of said leases being filed with the office of the County Clerk of Niobrara County, and also filed with the State Engineer of Wyoming as exhibits to the aforementioned applications; and

WHEREAS, ETSI has, in addition to its applications for permits to appropriate groundwater, applied for and received permits from the Wyoming State Engineer to construct test wells on lands leased by ETSI in Niobrara County, and pursuant to which said permits ETSI has constructed test and observation wells into the Madison Formation, and has filed the results of its said testing program with the Wyoming State Engineer; and

WHEREAS, the Wyoming State Engineer conducted a public meeting in Lusk, Wyoming, on July 15, 1974, at which time ETSI publicly described how it intended to use the pumped groundwater for its coal slurry project, and at which meeting ETSI also described its geologic and hydrologic findings which were based on core drillings, test wells, and other available data; and

WHEREAS, ETSI has advised the State Engineer of Wyoming, as well as the public, that in the opinion of ETSI and on the basis of all the information ETSI has obtained concerning the effects of pumping water for its coal slurry project there will be no interference with the pumping of any preferred or existing user in the State of Wyoming or the State of South Dakota; and

WHEREAS, ETSI intends to protect and the State of South Dakota intends to defend all preferred and existing users in the State of South Dakota against any interference resulting from ETSI's pumping, and to that end ETSI and the State have determined that this purpose can best be accomplished by an agreement between said parties made expressly for the benefit of such persons;

NOW, THEREFORE, in consideration of the promises herein contained, the parties do hereby agree as follows:

1. Definitions. As used in this Agreement, the following terms have the meanings ascribed to them, unless otherwise indicated:

(a) "Person" means a natural person, partnership, association, corporation, municipality, including those specific municipalities named herein, irrigation district, and the State of South Dakota or a political subdivision thereof.

(b) "Groundwater" means any water under the surface of the land or under the bed of any stream, lake, or reservoir, or other body of surface water.

(c) "Madison Formation" means the underground geologic structure or formation in the Mississippian System having boundaries that may be ascertained or reasonably inferred and in which water stands, flows, or percolates, and for the purpose of this definition, includes the Bell Sand unit of the Minnelusa Formation.

(d) "Existing User" means any person having a permit to appropriate groundwater senior to any ETSI permit in the State of Wyoming or any person who utilizes groundwater for domestic and stock watering purposes in South Dakota.

(e) "Preferred Users" means the Cities of Hot Springs and Edgemont, to the extent of their pumping for preferred uses from the Madison Formation in the Fall River County, South Dakota.

(f) "Preferred Uses" means all of the existing and future use of groundwater pumped from the Madison by preferred users within their respective counties, but does not include industrial or irrigation use.

(g) "Interference" means such reduction in the quantity of water or degradation in quality of water so as to endanger the utilization of water by any preferred or existing user.

(h) "Pumping" means all withdrawals of water from the Madison Formation for beneficial uses for which said water was appropriated.

(i) "Project" or "Coal Slurry Project" means the coal slurry pipeline system owned and operated by ETSI, and which system will utilize 15,000 acre-feet of water on an average annual basis, and no more than 20,000 acre-feet of water per year. Such average annual use shall be computed on a basis of twenty consecutive years commencing with the year water is first used. Said average shall be computed annually for each twenty-year period following the year water is first used by ETSI, and ETSI shall use no more than 300,000 acre-feet of water in any such twenty-year period. Provided, however, that the Wyoming State Engineer may, pursuant to application by ETSI and upon showing that additional water may be withdrawn and used from the Madison Formation without interference, permit ETSI to take no more than 20,000 acre-feet of water on an average annual basis.

2. <u>Effective Date and Term.</u>
This Agreement will become effective if and when the Wyoming State Engineer issues permits to ETSI for the appropriation of groundwater for the coal slurry project, and will remain in effect until such time as the project is terminated or ETSI's permits are canceled from the records of the office of the Wyoming State Engineer.

3. <u>Third-Party Beneficiaries.</u>
All existing and preferred users as herein defined are hereby designated the beneficiaries of this contract.

4. <u>Covenant of ETSI to Protect Beneficial Uses.</u>
In the event ETSI's pumping from the Madison Formation causes interference with the pumping of any existing or preferred user, the Secretary of the Department of Natural Resource Development, hereafter referred to as "Secretary", may on the basis of a valid complaint by any such user, hold a public hearing and investigate and determine whether and to what extent ETSI has caused interference with such user's pumping. If the Secretary shall determine that any such complaint should be investigated, he shall first undertake any such investigation with his own staff. Should the Secretary determine that such investigation requires independent consultants to assist in the investigation, the Secretary shall notify ETSI in writing, and together the Secretary and ETSI shall select consultants qualified to investigate the complaint. In the event the parties cannot agree on the consultants so to be engaged, the extent of the investigation or the reasonableness of the cost of said investigation, the issue shall be submitted to arbitration. In such event, the Secretary and ETSI shall each appoint an arbitrator, and the two appointees shall select a third arbitrator. The three arbitrators shall decide whatever issues cannot be agreed to between the parties, and a decision by a majority of the arbitrators shall be conclusive and binding upon the parties. If either the Secretary or ETSI refuses to appoint an arbitrator, or

the two so appointed cannot agree on a third arbitrator, then either party to this Agreement may request a Court of competent jurisdiction to enforce the provisions of this paragraph. The cost of arbitration as well as the cost of any investigation shall be paid for by ETSI. The Secretary or the arbitrators shall utilize all relevant data, including available monitoring data provided by the United States Geological Survey, in making their findings and determination. If, after a public hearing and investigation, the Secretary determines that interference with the complainant's pumping has been caused by ETSI, he shall find and determine what corrective measures shall be taken by ETSI, which measures shall include the following, or any combination thereof:

(a) An order requiring restoration of complainant's pumping so that complainant can extract from the Madison Formation a quantity of water equal to the amount pumped before such interference. If the complainant's pumps must be lowered, his well(s) deepened, or a new well or wells constructed in order to enable complainant to pump such equivalent quantity of water from the Madison Formation, ETSI shall pay any and all costs of deepening such well(s) and lowering the pump(s) or constructing a new well or wells and providing new pumps, and ETSI shall also pay such additional pumping costs as may be required by order of the Secretary.

(b) An order requiring ETSI to supply to said complainant, in the event complainant's pump(s) cannot be lowered, his well(s) deepened, or a substitute well or wells and pumping plant constructed, substantially the same quantity and quality of water enjoyed by complainant prior to interference by ETSI pumping and at a cost to said complainant equivalent to the operation and maintenance costs paid by complainant prior to interference with his pumping. In the case of preferred users, ETSI may at its option, and with the concurrence of the Secretary, appropriate the wastewater of any such preferred user and either (1) spread or inject said preferred user's wastewater into the underground in order to satisfy ETSI's substitute water supply requirement in whole or in part, or (2) utilize said preferred user's wastewater for ETSI's own benefit and use.

(c) In the event that ETSI's interference with any complainant's pumping cannot be corrected by any of the measures prescribed in Subsections (a) or (b) hereof, the Secretary shall, before invoking the provisions of Subsection (d) hereof, permit ETSI to correct such interference by whatever supplies, means, or technology available at that time, subject, however, to the approval of the Secretary.

(d) An order of the Secretary requiring ETSI to cease and desist all of its pumping from the Madison, in the event that ETSI's interference with any person's pumping cannot be corrected by any of the measures prescribed in Subsections (a), (b), or (c) hereof. ETSI shall comply with such order to cease and desist no later than twenty-four months after receipt of said order.

5. Potential Interference.
The Secretary may, on the basis of information developed by his office, the U.S. Geological Survey, or any other reliable source, investigate the possibility that ETSI's pumping will interfere with the rights of existing or preferred users. In such event, the Secretary shall notify ETSI in writing of his proposed investigation and allow ETSI ninety days in which to submit evidence to the effect that either (1) no interference is threatened, (2) any possible interference can be corrected by any of the measures made available to it under the provisions of Subdivisions (a), (b), and (c) of Section 4, or (3) that any possible interference can be corrected by reduced pumping. The Secretary will make a final determination that no interference will occur or issue an order requiring ETSI either to take any one or a combination of the corrective measures provided in Subdivisions (a), (b), and (c) of Section 4, reduce pumping, or issue a cease and desist order as provided in Subdivision (d) of Section 4. Any order of the Secretary under this Section shall be appealable to a Court of competent jurisdiction.

6. Guaranty.
Within thirty days after written demand by the Secretary, ETSI shall post a bond in the face amount of One Million Dollars to guarantee compliance with the provisions of Section 4 hereof. Said bond shall be approved by the Secretary, which said approval shall not be unreasonably withheld. Any order of the Secretary to ETSI issued pursuant to Sections 4 or 5 other than an order under Subparagraph (d), shall be complied with within sixty days after such order becomes final. In the event ETSI does not so comply, the Secretary may proceed against the surety under said bond. The rights of third parties under said bond shall remain enforceable even though ETSI, under some other legal, administrative, or legislative authority, is authorized to continue its pumping operations.

In the event ETSI for any reason cannot obtain a bond for the purposes herein prescribed, it may establish a line of credit in the amount of One Million Dollars with a bank approved by the Secretary to guarantee compliance with the provisions of Section 4 hereof. The conditions under which said line of credit will be implemented shall be negotiated and agreed upon between the parties.

7. Appeal.
ETSI may appeal any order of the Secretary under this Agreement to a Court of a competent jurisdiction in the manner provided by the applicable laws of South Dakota.

8. Conditions Precedent to Performance.
ETSI's obligation to carry out the directives of any order of the Secretary providing corrective measures prescribed in Sections 4 and 5 shall be dependent upon complainant's willingness to permit ETSI to enter upon said complainant's premises for the purpose of taking any such corrective measures as may be ordered by the Secretary.

9. Future Permits.
In acting upon applications submitted by preferred users for permits to appropriate groundwater from the Madison Formation, the Secretary shall consider whether or not a "water shortage" might occur or the area might be designated a "control area" under South Dakota law, in which event the Secretary shall include in any new preferred user permits such terms and conditions, including the metering of well discharges and all other reasonable conservative measures, as will minimize the effects of pumping by said preferred users from the Madison Formation.

10. Successors.
This Agreement is binding on the successors and assigns of the parties signatory hereto.

11. Remedy Not Exclusive.
The bond or line of credit and procedure established for corrective measures shall be available only under this Agreement to those persons designated as beneficiaries of this Agreement pursuant to Section 3 hereof, and in no respect shall this Agreement constitute the exclusive remedy for any persons claiming interference as a result of ETSI's pumping.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed and attested by the proper officers thereunto duly authorized, and their official seals to be hereto affixed as of the day and year first written.

THE SECRETARY OF THE DEPARTMENT OF NATURAL RESOURCE DEVELOPMENT OF THE STATE OF SOUTH DAKOTA

By:______________________________

ENERGY TRANSPORTATION SYSTEMS, INC.

By:______________________________
E. J. Wasp
Vice President

APPENDIX C-9

FALL RIVER COUNTY COMMISSIONERS EVALUATION OF DRAFT AGREEMENT BETWEEN THE CITY OF EDGEMONT AND ETSI

TO: Mr. Richard Traylor
Office of Special Projects
3rd Floor East
555 Zang Street
Denver, Colorado 80228

FROM: Fall River County Commissioners on behalf of the citizens of Fall River County, by their attorneys Marvin D. Truhe and Gary D. Jensen of Lynn, Jackson, Shultz & Lebrun, P.C., P.O. Box 8110, Rapid City, South Dakota 57701

RE: Comments on written proposal submitted to Edgemont, South Dakota by ETSI

1. Unlike the agreement offered to Wyoming, ETSI's proposal (copy attached as Exhibit "A") specifically limits its coverage to the communities of Edgemont, Provo and Igloo, and does not protect any other citizens of Fall River County or residents of South Dakota.

2. The proposal extends only to "groundwater" and does not include protection for reductions in stream flows, springs, surface water, or any water supplying irrigation districts.

3. The proposal permits only ETSI to appeal from any Order or decision, and does not give the City of Edgemont an equal right.

4. Unlike the Wyoming agreement, ETSI's proposal does not give South Dakota the right to shut down ETSI's pumping.

5. ETSI's proposal permits it to ignore any Order of the Arbitration Panel until after they have exhausted all of their appeals remedies in the courts, which could well mean a delay of several years.

6. ETSI's proposal permits it to cancel the agreement at any time on its own initiative leaving the City of Edgemont without any recourse for damages it has already sustained at that time.

7. ETSI's proposal would protect only the city's withdrawals from the Madison Formation, and would offer no protection to upper aquifer users, even though all data indicates that upper aquifer users will be impacted almost as severely as the Madison Formation.

8. The proposed bond is woefully inadequate to cover the cost of replacing wells and installing pumps in the impacted areas.

9. ETSI's proposal puts the burden of proving interference on the City of Edgemont, which is a virtually impossible burden, rather than requiring ETSI to establish that severe drawdowns are not the fault of their pumping.

10. The definitions in the proposal are so vague as to be utterly unenforceable. For example, "interference" is defined as that which endagers the utilization of water.

CONCLUSION

The above list constitutes only a partial summary of the deficiencies and inequities in the proposal. The proposal is not consistent with the statements made by ETSI during the public hearing in Edgemont, South Dakota and severely limits the persons covered, the so-called "protection" provided, and the remedies available. Finally, it would be inappropriate for this totally unacceptable "proposal" by ETSI to be considered in any way as a mitigating factor or otherwise in consideration of the final Environmental Impact Statement.

Dated this 30th day of January, 1981.

LYNN, JACKSON, SHULTZ & LEBRUN, P.C.

BY: ______________________
Marvin D. Truhe

APPENDIX C-10

DESIGN, CONSTRUCTION, AND OPERATING FEATURES FOR PREVENTING AND MINIMIZING COAL SLURRY SPILLS

Many features of design, construction, and operation of the proposed pipeline would prevent or reduce the likelihood of a spill. Others would minimize or contain coal which could possibly be released. Some of these features have been incorporated specifically for spill prevention or control, while others provide spill prevention in addition to their main function. The following discussion summarizes these features for the proposed slurry transportation project. Spill response action guidelines are included in Appendix C-11.

Pump Stations

Pump stations along the pipeline would be fenced and lighted. Pressure alarms would be placed on pumping units, which would be monitored in the supervisory control center. A valve interlock system would assure proper operation of valves. Pump station valves would be remotely operated from the operations control center, and regular maintenance and inspection personnel would check potential leak sources, test equipment, and replace inoperative parts as necessary.

Design and fabrication of materials for the pump stations would be in accordance with the applicable codes and standards for the pipeline facility.

Slurry Pipeline

The pipeline would be designed and constructed according to applicable codes and standards. Pipeline welds would be X-rayed according to Department of Transportation requirements. The pipeline would be hydrostatically pressure-tested at each point to at least 125 percent of the internal design pressure. The pipeline would be cathodically protected for its entire length, significantly reducing the likelihood of corrosion.

The mainline valves at pump stations and some river crossings located along the pipeline route would be capable of significantly reducing potential drainage from the pipeline. These valves would be regularly checked for operation. Other features include:

- Pipeline route markers, which would be placed at road crossings, water crossings, property boundaries, and other pipeline crossings
- Aerial markers, which would be placed on fence lines in cultivated areas and at intervals of 5 to 10 miles in open lands
- Contacts would be established and maintained with police and fire departments and with people in the vicinity of the pipeline route; this program would include persons to be contacted if unusual activity is observed
- Contacts with other pipeline operators so that notification is given if work is to be conducted close to the proposed pipeline

Design and fabrication would be in accordance with applicable codes, standards, and regulations. These currently are as follows:

- American National Standards Institute, American National Standard Code for Pressure

Piping, Liquid Petroleum Transportation Piping Systems (ANSI B31.4)

- U.S. Department of Transportation, Office of Pipeline Safety, Title 49, Chapter 1, Subchapter B, Part 195; Transportation of Liquids by Pipeline
- American Petroleum Institute, Specification for Pipeline Valves

Slurry Storage Tanks

Slurry storage tanks would be designed in accordance with all applicable codes, standards, and regulations. Tanks would be hydrostatically tested before being placed in service and would be equipped with tank gaging alarm systems to prevent overfilling. Overflow piping would also be provided to channel overspills into a sump recovery system.

Maintenance, Inspection, and Monitoring

The maintenance and inspection program would include frequent inspection of potential leak sources, as well as periodic testing and replacement of equipment.

Identification of Potential Spills

Potential pipeline drainage calculations would be made when the final designs were completed.

Five primary means of detecting or identifying slurry spills would be incorporated into the design and operation of the proposed pipeline:

- Aerial reconnaissance
- Ground patrols
- Third-party reports
- Coal slurry metering systems
- Pipeline drainage

Each of these detection methods is discussed below, based on the pipeline operating and design parameters at this time.

Aerial Reconnaissance. Low-level aerial reconnaissance would be regularly conducted along the pipeline route as a part of normal pipeline operation. The specific time interval would be determined by specific circumstances. Reconnaissance could occur as frequently as every two weeks. Details on the specific timing of these inspections would be presented in the Pipeline Operating Plan, which must be approved by appropriate federal agencies.

This reconnaissance would determine any activities along the route that might present a problem to pipeline operations, such as excavation by a third party, washouts, erosion, landslides, or slumping. Aerial reconnaissance reported by other pipeline operations in or near the proposed slurry pipeline would also be used to identify any activity that may affect slurry pipeline operations. Aerial reconnaissance would also be used to supplement ground patrols in checking for potential leaks indicated by the pipeline monitoring system.

Ground Patrols. Designated teams would patrol the pipeline route during regularly scheduled maintenance and inspection. Sensitive areas along the pipeline route, such as major and scenic stream crossings, very populous areas, and environmentally sensitive areas, would be patrolled frequently.

The maintenance bases, which would support pipeline operations, would direct normal ground reconnaissance and provide response for potential pipeline leaks, are described in the spill response action guidelines included in Appendix C-11.

Third-Party Reports. Persons with activities along or near the pipeline route would be requested to report coal found on the ground or in the water along the pipeline route. These persons would also be requested to report activities or conditions in the vicinity of the pipeline that may possibly cause a spill.

Coal Slurry Metering Systems. Depending upon their role in pipeline integrity and operation, selected pump stations would have a capability to monitor various pipeline measurements that would indicate a leak. This monitoring system would be able to detect a leak and locate it between two consecutive metering stations. Three systems would be used to monitor the movement of coal slurry in the pipeline: flow rate metering, volume balance monitoring, and hydraulic gradient analysis. These systems would be monitored continuously in the operations control center. If a leak were indicated, the pipeline operator would be able to react quickly and initiate the proper operational and spill contingency plan actions. Each of these systems is discussed below, followed by a discussion of their combined use to detect leaks.

Flow Rate Metering (Station to Station). Stations possessing a flow rate metering capability would be able to monitor the pipeline continually and could detect potential losses with a minimum threshold of between 1 and 1.5 percent of throughput. This would be accomplished by a metering system that would constantly monitor the volume and flow rate of coal slurry passing through the station and then relay the readings to the master control station. Operations control would transmit readings from each metering station into a master computer, which would compare current readings with previous readings and correlate them with readings from other metering stations.

Volume Balance Monitoring (Total Mass Balance). Flow rate meters would regularly be simultaneously calibrated to ensure that the same amount of coal slurry entering the pipeline is being received at the pipeline terminals. This system would be capable of detecting losses in excess of 1.5 percent.

Hydraulic Gradient Analysis. This system incorporates pipeline pressure and temperature monitoring systems which would be combined to analyze the hydraulic gradient along the pipeline route. This system would be able to detect losses of 10 percent or more.

It should be noted that the detection capability would improve with operating experience, making it possible to identify smaller losses, since at this point the system is not in operation and is still theoretical. These three systems would be used together to provide detection of potential leaks.

The amount of coal slurry lost from a pipeline leak would depend upon the following factors: throughput rate, detection and verification time, pipeline pressure at the leak point, pipeline shutdown time, hole size, and pipeline drainage. A general discussion of potential spill volumes and the factors that would affect this volume follows. This discussion includes the placement of valves along the pipeline that would be effective in limiting pipeline drainage and thus the total spill volume.

Operational actions to be initiated by the dispatcher would depend upon size and/or duration of the monitored decrease in throughput. A small decrease (1 to 1.5 percent) would be monitored for an additional period of time after discovery to see if the system returned to a steady state or if the decrease remained constant. It should be emphasized that metering systems could record variances, in the range of 1 to 1.5 percent and below, which are not leaks. Such a small variance in throughput might require some time to verify as a leak. In this case, the maintenance base nearest the affected portion of pipeline would be alerted and would immediately initiate an aerial and/or ground reconnaissance of the pipeline to verify the leak. If the variance were due to a leak, only a small amount of coal slurry would be lost during this time.

It is likely that a small decrease in throughput would be due to circumstances other than a leak. A very slight change in input at the initial pump station would be periodically reflected in the computer scanning system as the decreased volume reached each downstream metering station. Trouble would be indicated if stations upstream from a given point began to record an increased throughput and stations downstream from the same point began to show a decrease.

If the recorded decrease reached a steady state, or increased to its previous reading, and if it were recorded at all metering stations, it is likely that the decrease would be the result of either a slight change in input at the initial stations or a change in the operating temperature. If the decrease were monitored at only one metering station with no decrease monitored at downstream metering stations, it would indicate that the meters at the station recording the decrease were malfunctioning. However, if the decrease in throughput continued to drop off, and if it were more prominent at one metering station with smaller decreases being recorded at downstream metering stations, it would be likely that the decrease would indicate a leak. If the output from the central computer recorded a decrease less than 1 to 1.5 percent of throughput, the pipeline dispatcher would attempt to verify the loss before initiating changes in pipeline operations.

Recorded losses in excess of 1.5 percent would be treated differently by the pipeline dispatcher. Verification time would be considerably less for larger decreases in throughput. Not only would the metering stations record decreases in volume, but drops in pressure would also occur and pumps and pump station valves would automatically shut down. A leak that was discharging more than 1.5 percent of throughput would be noticeable within minutes of occurrence, and the spill response action guidelines could be initiated immediately (see Appendix C-11). The loss rate would vary with hole size and the operating pressure of the pipeline.

<u>Pipeline Drainage</u>. Drainage characteristics of a slurry pipeline are an important factor in determining the total volume of a pipeline spill. Coal slurry would begin to drain from the pipeline to equalize pressures in the ruptured pipeline section after shutdown. The coal solids would also begin to settle in the pipeline, and the concentration of coal in the spill would decrease with time. As coal settles into pipeline valleys and as the pipe drains, sections of the pipeline may close off and not permit further flow.

APPENDIX C-11

SPILL RESPONSE ACTION GUIDELINES

This section provides basic guidelines on the initial response actions to be taken by ETSI personnel upon detection of a coal slurry spill. In addition, a discussion of the various containment and cleanup techniques that may be implemented to minimize the spill extent and impacts has been included.

Spill Detection And Initial Response Actions

Once a spill has been detected, a well coordinated and organized response is essential to minimizing the extent and impacts of a spill. The spill detection systems to be used by ETSI have been described previously and can be grouped into three basic categories: instrumental detection, routine patrols, and third party reports. Each of these types of detection is associated with different initial response actions which are discussed below.

Instrumental Spill Detection. Initial response actions for instrumental detection will depend partially on the size and duration of the monitored decrease in throughput. Decreases of 1.5 percent or less are not always a result of a pipeline rupture and should be handled differently than decreases greater than 1.5 percent. The response actions for each case are given in the following.

Less Than 1.5 Percent Throughput Decrease.

1. If decrease continues for any period of time, the pipeline Dispatcher will identify the affected pipeline segment and alert nearest maintenance base.

2. Maintenance base will initiate aerial and/or ground reconnaissance of pipeline and report findings immediately to Dispatcher by radio.

3. If a leak is observed, the Dispatcher will initiate shutdown procedures and the Maintenance Crews will take appropriate containment actions.

4. If no leak is observed, the Dispatcher will continue to monitor instruments closely and Maintenance Crew will perform another reconnaissance of the pipeline.

Greater Than 1.5 Percent Throughput Decrease.

1. Dispatcher will verify throughput decrease with redundant instrumentation (see Appendix C-10).

2. Dispatcher will initiate shutdown procedures if decreased throughout is verified.

3. Dispatcher will determine affected pipeline segment if possible and alert nearest maintenance base.

4. Maintenance base will mobilize a response team to locate spill and implement appropriate containment techniques.

5. Dispatcher will establish radio communications with Maintenance Crews and notify ETSI management of spill.

6. Maintenance Crew will regularly advise the Dispatcher of the situation who will relay all information to ETSI Management.

7. Dispatcher will alert appropriate regulatory agency(s) that a

spill has been detected, give approximate location, and indicate that an emergency team has been dispatched.

8. ETSI Management will assure direction of all further actions.

Routine Patrol Spill Detection.

Aerial Detection.

1. Reconnaissance aircraft will radio the Dispatcher if a possible spill is detected, and provide coordinates and other relevant information.

2. If spill is positively identified by inspection aircraft, Dispatcher will institute shutdown procedures and alert appropriate regulatory agencies.

3. If spill is not positively identified, Dispatcher will activate nearest Maintenance Base Crews.

4. Dispatcher will notify ETSI Management.

5. Dispatcher will initiate shutdown procedures if Maintenance Base Crew verifies spill.

6. Crew Leader will locate spill, evaluate public safety hazards, take appropriate containment actions, and advise Dispatcher as soon as possible.

7. (Safety hazards only.) Dispatcher will alert appropriate local emergency services.

8. Dispatcher will relay field assessment and actions to date to ETSI Management.

9. ETSI Management will assure direction of all further actions.

Ground Detection.

1. Personnel detecting spill will immediately notify Dispatcher.

2. Dispatcher will initiate shutdown procedures and notify appropriate regulatory agencies.

3. Maintenance Base Crew Leader will assess spill, determine potential for public safety hazards, notify Dispatcher, and commence on-scene containment actions.

4. Dispatcher will notify local emergency services and request assistance if necessary.

5. Dispatcher will notify ETSI Management and request additional assistance if required.

6. Dispatcher will notify ETSI Spill Response Coordinator where immediate control is not possible.

7. ETSI Management will assume direction of all further actions.

Third Party Detection.

1. Dispatcher will log pertinent data from the Third Party.

2. Dispatcher will check instrumentation if spill is related to pipeline, pump stations, or delivery facilities.

3. Dispatcher will activate nearest Maintenance Base Crew.

4. Dispatcher will notify ETSI Management.

5. Maintenance Base Crew will locate and assess spill, and take immediate containment actions as appropriate. Crew Leader will report to Dispatcher as soon as possible.

6. Dispatcher will initiate shutdown procedures if spill is verified and will notify appropriate regulatory agencies.

7. Dispatcher will alert local emergency services if necessary.

8. Dispatcher will keep ETSI Management informed of response progress.

9. ETSI Management will assume direction of all further actions.

Spill Response Techniques

In the event of a coal slurry spill, various response techniques can be employed to reduce the extent of the spill and the resulting environmental impacts. These techniques can be applied to both aquatic and terrestrial spills and will be implemented by spill response teams made up of ETSI Maintenance Base Crews, supplemented by local contractors. Upon notification of a spill, the Maintenance Base Crew will be mobilized and respond to the spill site with the appropriate response equipment and implement the applicable techniques as described below.

Containment--Terrestrial Spills. The primary techniques for containing slurry spills on land involve construction of berms or dams ahead of the moving spill. Containment berms are used on relatively flat areas and are constructed in a horseshoe shape so that the opening faces the oncoming slurry discharge and has sufficient width to encompass the spill's leading edge. If possible, the berm should be located around a natural depression or excavated sump in the ground surface to increase the storage capacity of the containment area. Berms are best constructed using a motor grader or angle-blade bulldozer to cast a windrow of earthen materials that is high enough to adequately contain the entire discharge. Front-end loaders, backhoes, or similar equipment may also be used if the former equipment is unavailable. If no equipment is available and the spill is small, berms may be constructed manually or hay bales or sandbags may be placed in the same configuration. Berms may also be used to divert spills around sensitive areas or to divert spills to natural containment depressions. In this case, the berm is angled downslope across the direction of slurry flow and in the desired direction of flow.

Dams can be utilized to contain slurry spills in more confined natural drainage courses or dry stream beds. They are typically constructed of onsite earthen materials but can also be made of plywood, steel sheeting, or sandbags covered with an impermeable sheeting. The dam should be located in a relatively narrow section of the drainage course that will provide adequate upstream storage. Earthen materials should be excavated from the upstream side of the dam to increase the storage capacity. Front-end loaders, backhoes, and bulldozers are well suited for dam construction, as are shovels for manual construction.

Containment--Aquatic Spills. Containment of coal slurry spills entering the aquatic environment is relatively difficult due to slurry distribution throughout the water column and the small sizes of the coal particles. The primary objective in containment is to confine the slurry plume in a relatively small area until the majority of the coal particles settle out. The settled coal can then be removed by techniques discussed later in this section. In moving waters the task is more difficult and is accomplished by reducing current velocities in a given area to stimulate settling.

Containment in lakes, reservoirs, wetlands, or other areas with very low currents can be accomplished by deploying silt curtains in a semicircle ahead of the spreading slurry, with the opening facing the oncoming plume. Silt curtains are impermeable barriers made of flexible material which extends from a flotation collar on the water's surface to the stream or lake bottom. If the spill is continuing or approaching a water body, the curtain should be placed in a semicircle around the point of entry and anchored to the shoreline at each end. Earthen dikes may be used in very shallow waters where curtain placement is not practical.

Silt curtains can also be used in low current areas of rivers and streams by deploying them at an angle to the current flow. A space of at least 1 foot should be left between the bottom of the silt curtain and the stream bottom. Several curtains deployed in succession may be required, depending on the stream current and size of the slurry plume. Small outboard motorboats and strong anchoring systems are usually the only equipment necessary for implementing this containment technique.

Overflow dams may be used for streams or small rivers with relatively high current velocities to reduce flow velocities and encourage settling. Such dams are constructed in the same manner as described above for terrestrial containment, but in this case the water is allowed to flow over the top of the dam. For this reason the top of overflow dams using earthen materials should be covered with plastic sheeting to prevent erosion of dam materials. Because the dams do not actually block stream flow, several dams constructed in succession may be required for effective slurry containment. These dams may also be used in conjunction with silt curtains where the dams are used to reduce current velocities and the curtains are deployed for additional velocity reduction.

Cleanup--Terrestrial. In most cases the slurry water will infiltrate rapidly into the ground, leaving a layer of coal on the surface. Recovery of the coal layer is dependent on the size of the spill and the accessibility and sensitivity of the area. Small spills may be cleaned up manually with shovels, whereas larger spills are most efficiently cleaned up with heavy equipment such as front-end loaders, backhoes, motor graders, and/or elevating scrapers.

The use of heavy equipment depends upon the accessibility to the area and its sensitivity. In some cases the use of heavy equipment or even manual labor can cause greater environmental damage than the spill itself. Erosion and destruction of vegetation must be considered as potential problems associated with spill cleanup. Although seeding and revegetation of the area can mitigate these impacts, a local expert on the environment should be consulted prior to implementing cleanup techniques. The coal may also be plowed into the ground surface, as it is considered a good soil additive and would probably help purify any rainwater percolating through the soil.

Cleanup--Aquatic. For cleanup of coal slurry spills entering the aquatic environment, it is recommended that an expert on the local aquatic environment be consulted prior to implementing any cleanup techniques, as they may result in greater environmental damage than the spill itself. If cleanup is to be implemented, the efforts should concentrate on the areas of highest coal deposition. Cleanup techniques include physical removal of the contaminated stream or lake bottom, or a somewhat more selective means of removal utilizing vacuum systems.

Vacuum systems are the most desirable means of removing coal deposits, as they can usually be operated to recover the coal particles without much bottom material. Barge-mounted vacuum dredges can be used for major spills in large rivers or lakes, whereas vacuum trucks operating from the shore can be used for smaller rivers or streams. In any case, the vacuum should be regulated so that only the coal and finer bottom materials are picked up.

Removal of the contaminated stream or lake bottom is generally not considered practical but can be implemented with the use of heavy equipment. Major spills in large lakes or rivers can be dealt with by barge-mounted mechanical dredges, but these dredges will also remove excessive quantities of bottom material. Clamshells and backhoes can be used for smaller streams or lakes, provided the contaminated area is within their reach. Front-end loaders can operate effectively in some shallow areas to remove coal, provided there is a firm substrate.

Regardless of the method used to remove coal depositions from aquatic environment, a considerable amount of the coal particles will be resuspended in the water and could move to previously cleaned or uncontaminated areas. For this reason containment systems such as those described above should always be placed around the operating area prior to implementing any cleanup techniques.

SPECIAL PROJECTS STAFF
SEP 22 1980
RECEIVED
REI

Energy Transportation Systems Inc.
P.O. Box 7598
San Francisco, CA 94120
Telephone (415) 768-7080

ETSI

September 19, 1980

Mr. Richard E. Traylor
Special Projects Staff
Bureau of Land Management
555 Zang Street, Third Floor East
Denver, CO 80228

Dear Dick:

I have discussed the four additional mitigation measures noted in your letter of September 9, 1980 with Mr. Walt Hale and Mr. Avtar Sandhu. In lieu of an acceptance or a non-acceptance statement, I will go through the measures with an explanation of our position on the issue.

ALL ALTERNATIVES

1. Measure: Where higher volumes of test water would be discharged into streams during low flow periods, route hydrostatic test water through settling or detention basins or through straw or hay bales in order to decrease the levels of iron and suspended solids in discharge water.

We have deleted retention time and number of straw bales as the action to decrease levels of iron and suspended solids is a function of water volume flow in the receiving stream. length of pipeline being tested and the number of discharge points along the line.

As stated above our position is acceptance to the mitigation measure.

2. To control erosion and excess levels of stream turbidity, hydrostatic test water will be routed directly into a flowing stream at reduced levels of velocity. By careful routing of discharge water into the drainage and controlling velocities, erosion and excess levels of turbidity will be avoided.

As stated above our position is acceptance to the mitigation measure.

3. Perpendicular changes cannot be introduced in a slurry pipeline due to problems of pipe erosion and are therefore not acceptable. Long radiis turns, often required for perpendicular changes, increase the length of the pipeline resulting in an increase in the potential for impact. This could be an important consideration in sensitive non-agricultural areas. In addition, the fact that the permanent right-of-way will be allowed to revegetate, should reduce the length of time the viewer will

"Slurry Pipelines — Moving The Nation's Coal Safely, Cleanly, Silently, Cheaply"

Mr. Richard E. Traylor
Page Two
September 19, 1980

come in contact with right-of-way clearings.

Our position is non-acceptance.

COLORADO ALTERNATIVE

1. The only way we can avoid strutting grounds of the greater prairie chicken along the Colorado Alternative Route is to identify these strutting grounds prior to right-of-way acquisition. If these strutting grounds can be positively identified between milepost C-310 and milepost C-330 prior to the time of right-of-way acquisition, then they can be avoided. If prairie chicken strutting grounds are identified in close proximity to the construction area, then necessary steps will be taken to avoid affecting the birds during the strutting period. I would suggest rewording the measure to read:

When strutting grounds of the greater prairie chicken along the Colorado Alternative Route between milepost C-310 and milepost C-330 are located prior to ROW acquisition, these areas will be avoided. During strutting periods of the greater prairie chicken, steps will be taken to avoid disturbing the birds as required.

As stated above our position is acceptance to the mitigation measure.

Sincerely,

Fred Eiserman
Manager--Environmental Activities

FE:mm

cc: Odasz
Hale
Troy
Derammelaere
Sandhu

Energy Transportation Systems Inc.
330 South Center Street, Suite 219
Casper, Wyoming 82601
Telephone (307) 265-1800

ETSI

SPECIAL PROJECTS STAFF

OCT 3 1980

RECEIVED

Rev

September 26, 1980

Mr. Richard Traylor
BLM, Special Projects Staff
555 Zang Street, 3rd Floor East
Denver, CO 80228

Dear Dick:

To document our telephone conversation of 9/26, the three mitigation measures referred to in your letter of 9/25 will be accepted as follows:

1. Measure: In order to avoid affecting wetland habitat, site-specific visits should be made by Fish & Wildlife Service, BLM & ETSI to detail the location of these wetlands: in Kansas, at the crossing of Rattlesnake Creek (MP551); North Fork Ninnescah River (MP567); South Fork Ninnescah River (MP593); and in Arkansas, MP 1010. When mapped in more detail in relationship to the proposed action route, these areas should be avoided to the extent feasible.

2. Measure: To the extent feasible, in order to avoid affecting the northern swift fox along the Oahe pipeline in South Dakota, a more detailed identification of denning sites in relationship to the Oahe alternative pipeline route between MP 35 and 65 should be made. This identification should be done by the South Dakota Department of Game, Fish and Parks in conjunction with the definite route location in cooperation with ETSI.

3. Measure: In order to avoid affecting an important winter range area for mule deer, construction should be avoided when feasible along the Oahe water pipeline in Wyoming between MP 195 and 225 from December through March.

Sincerely,

Fred M. Eiserman
Manager, Environmental Activities

FE/cr

cc: Helena Troy
Walt Hale

Energy Transportation Systems Inc.
330 South Center Street, Suite 219
Casper, Wyoming 82601
Telephone (307) 265-1800

ETSI

March 3, 1981

SPECIAL PROJECTS
MAR 5 1981
RECEIVED
REO

Mr. Richard E. Traylor
Special Projects Staff
Bureau of Land Management
555 Zang St., Third Floor East
Denver, CO 80228

Dear Dick:

I have discussed the additional mitigation measures noted in your letters of February 6 and 17, 1981, with Mr. Walt Hale and Mr. Frank Odasz. I will enumerate the measures with an explanation of our position on each.

1. Measure: To provide housing consistent with Gillette, Newcastle, Upton, and Wright planning efforts, ETSI will work with representatives of these cities to assess this potential problem. To deal directly with these issues, ETSI will engage a Manager of Mitigating Measures in April.

   Effectiveness: Would avoid housing shortage, add to stable employment and would stimulate tax benefits in excess of cost of services in the area.

2. Measure: Reduce bank erosion and improve esthetics of bank zones disturbed on stream and river crossing by replanting vegetation recommended by local land use managers and appropriate state and federal agencies.

   Effectiveness: These actions would eliminate the disturbance of banks that might otherwise constitute more than temporary adverse impacts on streams and rivers.

3. Measure: Niobrara County well field only. All madison wells in the vicinity of the well field will be monitored if owner permission is granted. These will include the Madison wells at Edgemont and Provo, South Dakota. Madison well F-9, F-10, and F-11 will be monitored if they are accessible, for the level, quality and quantity of water. Observation wells will be installed in or near locations OW-5, OW-6, OW-7, and OW-8. Well OW-7 now exists as ETSI well M-1.

   We prefer that well OW-5 be located approximately four miles to the west. (See Fig. 4, Monitoring Wells Around the ETSI Water Well Field, by Cy Stafford, 10/78). We also prefer that OW-6 be located closer to the town of Edgemont as defined in the City of Edgemont Resolution of July 8, 1974. Well OW-5, OW-6, and OW-7 would be completed to the Madison formation and OW-8 to the Minnelusa formation.

Effectiveness: This monitoring network serves as an early warning system for impacts that might occur from pumping the Madison Formation.

4. Measure: Niobrara and Gillette well fields. In addition to the monitoring program described for the Niobrara field, the Gillette wells will be monitored for discharge rates. Periodic water level measurements will be made on any unpumped Gillette wells.

   Effectiveness: This monitoring network will assess impacts that might occur from pumping the Madison Formation.

5. Measure: Crook County well field only. If possible, all Madison groundwater wells in the well field area will be monitored. These will include the Madison wells at Belle Creek, Montana; Crook County, Wyoming; and Butte and Lawrence Counties, South Dakota (Wells P-1 through P-4, B-1 through B-9, and L-7, L-8, L-11, L-12, and L-13, noted in Appendix E of the EIS). Where practical, these wells will be monitored for water level, water quality, and the amount of water produced. Observation wells will be installed in or near locations OW-9, OW-10, and OW-11. Wells OW-9 and OW-10 will be completed to the Madison and Well OW-11 to the Minnelusa.

   Effectiveness: This monitoring network will assess impacts that might occur as a result of pumping from the Madison Formation.

6. Measure: Crook County and Gillette well fields. A monitoring program as noted for the Crook County well field and the Gillette well field will be monitored in the manner and schedule outlined for these respective well fields in Measures 4 and 5.

   Effectiveness: The monitoring network will assess impacts that might occur as a result of pumping the Madison Formation.

7. Measure: If recommended by the USGS, a recording stream gauge will be maintained on the Belle Fourche River in northeast Crook County. (Data point number 19, Fig. 5-2 or SG-14, Fig. G-1, EIS Well Field Hydrology.)

   Effectiveness: This additional stream gauging station may help define the relationship between groundwater and stream flow on the Belle Fourche River between Keyhole Reservoir and the Wyoming-South Dakota State Line.

8. Measure: Assist with the maintenance of the U. S. Geological Survey Gauging Stations No. 06429905, Sand Creek near Ranch A, Beulah, Wyoming; No. 06429500, Cold Springs Creek, Buckhorn, Wyoming; No. 06392900, Beaver Creek, at Mallo Canyon, Four Corners, Wyoming; No. 06392950, Stockade Beaver Creek, near Newcastle, Wyoming; and No. 06400497, Cascade Springs, Hot Springs, South Dakota, will be supported at a cost of $22,000.00 through 1981 and until a more permanent arrangement can be decided upon and the relevancy to the ETSI project demonstrated.

Effectiveness: Should demonstrate the relationship between groundwater and stream flow and help identify and quantify potential effects on the above-noted streams.

9. Measure: To provide maximum protection to the Cheyenne Bottoms Wildlife Refuge in Kansas, consult with state and federal agencies on the installation of control valves on Deception Creek.

   Effectiveness: To minimize potential impacts on whooping crane habitat from a possible rupture at that point.

10. Measure: To provide maximum protection to the Saline River in Arkansas, consult with state authorities on the installation of valves.

    Effectiveness: Reduce potential impact on highly scenic river and important fishery.

11. Measure: Avoid the proposed Walnut Creek Recreation site in Kansas.

    Effectiveness: By avoiding this area, the recreation use and the quality of the user experience at the proposed recreation area will not be disrupted.

ETSI accepts all of these mitigation measures.

Copies of the Protection Proposal to the State of South Dakota and the City of Edgemont are enclosed.

Sincerely,

Fred Eiserman
Manager, Environmental Activities

FE/cr

Enclosures

cc: H. Troy
W. Hale
F. Odasz

Energy Transportation Systems Inc.
330 South Center Street, Suite 219
Casper, Wyoming 82601
Telephone (307) 265-1800

ETSI

SPECIAL PROJECTS STAFF

APR 9 1981

RECEIVED

Rer

April 7, 1981

Mr. Richard E. Traylor
Special Projects Staff
Bureau of Land Management
555 Zang St., Third Floor East
Denver, Colorado 80228

Dear Dick:

I have reviewed Appendix C-1 and the revised Mitigation and Monitoring Section for the Final EIS and approve both revisions with the following exception:

> On the mitigation associated with BLM - Required Measures, would these measures supersede state and/or federal agency authority in a specific area, such as the Cheyenne Bottoms Wildlife Refuge? Under this heading, Measure No. 1, we would like to have the statement read:
>
> > If the Colorado Alternative is used, ETSI will be required to install pipeline valves on both sides of Deception Creek in Kansas at M.P. C-558 or use best-possible pipeline rupture technology for maximum protection.

If this wording is used, we have no objection to this mitigation measure.

With reference to your revised Table 4-32 on Stream Gauging Stations, we have no objections to the list of stations provided they conform to the list submitted to you in my correspondence dated March 3, 1981.

The supplemental sheets on mitigation measures, which we received on April 3rd, are acceptable with the following exceptions:

> Reword to read:
>
> 4. Measure: When strutting grounds of the greater prairie chicken along the Colorado alternative route between M.P. C-310 and C-330 are defined by the appropriate state agency prior to right-of-way acquisition, these areas will be avoided. During strutting periods of the greater prairie chicken, steps will be taken to avoid disturbing the birds as required.

Page Two
Mr. Richard E. Traylor
April 7, 1981

5. Measure: In order to avoid affecting the northern swift fox along the Oahe pipeline in South Dakota, a more detailed identification of denning sites in relationship to the Oahe alternative pipeline route between M.P. 0-35 and 0-65 will be made by an appropriate agency prior to right-of-way acquisition.

6. Measure: In order to avoid affecting an important winter range area for mule deer, construction will be avoided along the Oahe water pipeline in Wyoming between M.P. 0-195 and 0-225 from December through March, or as recommended by the appropriate state agency.

Sincerely,

Fred Eiserman
Manager, Environmental Activities

FE/cr

cc: Frank Odasz
Helena Troy
Walter Hale

ETSI Pipeline Project
P.O. Box 7598
San Francisco, CA 94120
Telephone (415) 768-7080

ETSI

April 28, 1981

SPECIAL PROJECTS
STAFF

APR 29 1981

RECEIVED

Mr. Richard E. Traylor
ETSI EIS Project Leader
Bureau of Land Mangement
Special Projects Staff
555 Zang Street, 3rd Floor East
Denver, Colorado 80228

Dear Dick:

Responding to Carl Fricke's comments on our mitigation package of March 3, 1981, and brought to your attention in a memo to Jim Beley from Carl Fricke, dated April 6th, I have the following comments:

1. We will agree on keeping the well designated as OW-5 at or near the location specified in figure 6-1 of the Well Field Hydrology Technical Report, or at a location as recommended by the Wyoming State Engineer as being more favorable to measure the hydraulic response of the Madison acquifer to withdrawals. This should be considered as an amendment to the second paragraph of my Measure No. 3 as noted to you in my memo of March 3.

2. Well No. OW-6 will not be located in the Town of Edgemont, nor in Igloo. This should be considered as an amendment to my Measure No. 3, second paragraph, second sentence, which is also noted in my memo to you of March 3rd.

3. As an addendum to Measure No. 5 in the above noted letter, add a sentence to read, "In addition to the wells noted above, where possible, monitor representative wells in Butte County, lying within the predicted radius of influence of ETSI's pumping, will be included in a monitoring program."

I believe that comments noted in No. 4 of Carl Fricke's memo are covered in my above noted comments, or have been clarified as a result of telephone conversations with you (b. New stream gage on the Belle Fourche River, and c. Existing USGS stream gages and monitoring wells).

Referring to your letter of April 22 on replacement mitigation measure (#9), "To provide maximum protection for any rivers of special interest that are crossed, install pipeline valves on both sides of the rivers or use best possible pipeline rupture technology," we will agree to the measure.

Sincerely,

Fred Eiserman
Manager, Environmental Activities

FME:lmcm
cc: Odasz, Troy, Hale

APPENDIX D - AUTHORIZING ACTIONS

APPENDIX D-1

SUMMARY LIST OF REQUIRED AUTHORIZING ACTIONS

I. Federal Authorizing Actions

A. Bureau of Land Management (BLM)

1. Right-of-way grant
2. Temporary use permit

B. Forest Service (FS)

1. Right-of-way grant
2. Temporary special use permit

C. Army Corps of Engineers (COE)

1. Section 404 and Section 10 river and stream crossing permits (A detailed list is included in Appendix D-6.)

D. Federal Communications Commission (FCC)

1. Approximately 66 licenses to operate repeater stations (FCC Form 402)

E. Bureau of Indian Affairs (BIA)

1. Right-of-way grant
2. Easements

F. Federal Highway Administration

1. Permits to cross federal highways

II. State Authorizing Actions

A. Wyoming

1. Separate approvals to construct three coal slurry preparation plants
2. Separate permits to operate three coal cleaning and preparation plants
3. Sanitary wastewater disposal permits

4. Permits for water storage ponds
5. Permit to operate coal slurry pipeline
6. State highway crossing permits

B. Nebraska

1. Special state highway crossing permits
2. Flood plain permits

C. Kansas

1. Permits for stream crossings if stream flow is greater than 5 cfs
2. Permits for drilling of three water well sites

D. Oklahoma

1. Water disposal permits
2. Water use permits
3. State highway crossing permits

E. Arkansas

1. Water quality permits
2. Prevention of Significant Deterioration permits
3. State highway crossing permits

F. Louisiana

1. Class B use permits to cross 3 natural and scenic rivers
2. Permits for air, water, hazardous and solid waste effluents
3. Pipeline authorization
4. Right-of-way authorizations to cross state land
5. State highway crossing permits

APPENDIX D-2

BUREAU OF LAND MANAGEMENT GENERAL MEASURES

The grant of right-of-way and temporary use permit issued by the Bureau of Land Management (BLM) would include general and specific stipulations. These stipulations would include, but not be limited to, the following general measures:

1. The applicant will be required to comply with the Code of Federal Regulation, 43CFR 2801.'2, and Bureau of Land Management Instruction Memorandum WY 80-155.

2. The applicant shall conduct all activities associated with the project in a manner that will avoid or minimize degradation of air, land, and water quality. In the construction, operation, maintenance, and abandonment of the project, the applicant shall perform its activities in accordance with applicable air and water quality standards, related facility siting standards, and related plans of implementation, including but not limited to the Clean Air Act, as amended (42 U.S.C. 1321)

3. Access roads for operation and maintenance of the water and coal slurry pipelines will be clearly identified. These access roads will be ostensibly open for public use, including but not limited to off-road vehicular travel.

4. Roads required for access by the applicant will be maintained and/or rehabilitated by the applicant as necessary if damaged beyond normal wear and tear the by applicant's vehicles.

5. The reclamation and revegetation plan included in Appendix C-1, will be required, as a minimum, for the approximately 5.5 miles of public lands crossed by the pipeline.

6. If a natural barrier used for livestock control is broken during construction, the applicant will adequately fence the area to prevent drift of livestock. In pronghorn antelope ranges, the fence may have to be constructed to allow passage of antelope. Fence specifications will be determined on a case-by-case basis.

7. No gates or cattle guards on established roads on public land will be locked or closed by the applicant.

8. Garbage and other refuse will be disposed of in an authorized disposal site or landfill. Engine oil changed on the right-of-way will be caught in suitable containers and disposed of as refuse; no fuel, oil, or other hydrocarbon spills are permitted. If such a spill accidentally occurs, the contaminated soil is to be excavated and the authorized officer notified immediately.

9. Landowners, permittees, and other regular users of Public Lands in the right-of-way will be notified in advance of construction activities that may affect their business or operations. This will include signing of any temporary road closures in advance of construction. Ranchers will be advised of any fence openings, disturbances to range improve-

ments, or other range-use-related structures in advance of construction.

10. The applicant will meet all stipulations detailed in a Memorandum of Agreement (MOA) between the Advisory Council on Historic Preservation and the Bureau of Land Management, Wyoming State Office, to fulfill all federal and state cultural resource legal requirements. (A copy of the MOA is included in Appendix D-3.)

11. The applicant will be required to submit an approved, detailed spill contingency plan covering the 5.5 miles of public land administered by BLM.

12. The applicant will be required to employ a trained biologist to ensure compliance, to avoid impacts to threatened or endangered species by construction activities, and to monitor any problem areas identified by field surveys.

13. The applicant will be required to assure that all project field employees are briefed on threatened or endangered species concerns.

14. The applicant will be required to report all threatened or endangered species previously unidentified to the BLM and the FWS and protect the species until a Biological Opinion can be rendered.

15. The applicant will be required to meet all recommendations contained in the FWS Biological Opinion (Appendix D-4).

16. As explained in the FWS Biological Opinion (Appendix D-4), the applicant will be required to survey for the black-footed ferret and red-cockaded woodpecker. Survey methodologies required for the black-footed ferret are included with the Biological Opinion; those for the red-cockaded woodpecker follow as Attachment 1.

ATTACHMENT 1

DRAFT
RED-COCKADED WOODPECKER SURVEY TECHNIQUES

The red-cockaded woodpecker may be present along the proposed route through portions of Arkansas and Louisiana. The first phase of work to reduce potential impacts to this woodpecker will include contacting additional federal and state agency personnel and other knowledgeable individuals (e.g., recovery team members, university ornithologists, etc.) in an attempt to delineate all areas presently used. The proposed alignments then will be adjusted to miss such areas, where feasible.

The second phase of work will involve defining additional areas of potentially suitable habitat. A portion of this will be completed during the first phase, because all personnel contacted will be asked to define any such habitat. In addition, available vegetation type maps and aerial photography will be reviewed in an attempt to define other suitable habitat.

If suitable habitat does exist along the route and realignment of the route appears to be impractical, the third phase of work would involve field surveys to document the presence or absence of the red-cockaded woodpecker and to attempt to realign the right-of-way to avoid as much impact as is practical. The procedures to be followed are briefly described below:

1) A team of two to four biologists will walk the staked right-of-way through the areas of suitable habitat; each would walk approximately 50 feet on either side of the staked line thereby covering a minimum belt of 100 feet between them plus as much or more habitat on the outside.

2) As the team walks through the suitable habitat, red-cockaded woodpeckers and their sign will be noted.

3) The team will listen for calling individuals.

4) Any individuals or colonies located would be mapped on topograhic maps.

5) If any colonies are located, surveys will be conducted in adjacent areas in an attempt to relocate the right-of-way in an area of potentially less impact.

APPENDIX D-3

PROPOSAL TO THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

FOR A MEMORANDUM OF AGREEMENT

BETWEEN

THE BUREAU OF LAND MANAGEMENT, WYOMING STATE OFFICE

THE FOREST SERVICE, ROCKY MOUNTAIN REGION

AND

THE STATE HISTORIC PRESERVATION OFFICERS OF

WYOMING, KANSAS, NEBRASKA, COLORADO, SOUTH DAKOTA, OKLAHOMA, ARKANSAS,

AND LOUISIANA

FOR THE

ENERGY TRANSPORTATION SYSTEMS, INC. (ETSI) COAL SLURRY PIPELINE

STIPULATIONS

THE BLM AND THE FOREST SERVICE WILL CONDITION THEIR RIGHTS-OF-WAY ON THE FOLLOWING MEASURES TO ENSURE THAT THEY ARE CARRIED OUT:

1. ETSI will be required to allocate sufficient funds and time in advance of construction of any element of the pipeline system and its related facilities, to perform acceptable BLM (Class I-III) cultural property inventories, to recover materials and document information, to prepare and disseminate to proper authorities resultant reports, and to implement the cultural propertys management program in this Agreement.

2. The cultural property management program for the ETSI pipeline will cover the entire pipeline and all related surface disturbing activities, including all areas that could reasonably be considered affected by construction of the pipeline and its related facilities.

3. The BLM will supervise the cultural property management program (BLM Manual 8100.03) to ensure quality control of all program elements and proper phasing of investigations with construction schedules, and to ensure that all cultural property investigations undertaken by ETSI are conducted under the appropriate Federal and State antiquities permits.

4. For the definitive and construction phases ETSI will be required to engage a professional archeologist, historical archeologist and historian when appropriate meeting, at minimum, professional qualifications outlined in BLM Manual Sections 8111.41 and 8111.42 (attached) and proposed regulations, 36 CFR Part 66 (F.R. 1/28/77 Vol. 42 F.R. 5382) to complete inventory, evaluation, salvage, mitigation and monitoring of cultural properties.

The BLM will approve and monitor the selection of ETSI field supervisory cultural personnel to ensure they meet these same qualifications.

5. Inventory reports and mitigation proposals will be sent to the Wyoming State Director for review and distribution to the appropriate BLM State Offices, the Rocky Mountain Regional Office of the Forest Service, and the respective State Historic Preservation Officers. Final analytical reports on the results of all cultural property investigations will be sent to the Wyoming State Director for distribution to the above-named parties and other appropriate Federal and State agencies. Report and data recovery standards will conform to the proposed regulations 36 CFR Part 66 and appropriate Antiquities or Special Use Permit requirements.

6. ETSI will provide for the curation of all artifacts and other cultural materials recovered until their final analytical report for the cultural property has been completed and accepted by BLM. ETSI will assure that artifacts are then curated at an appropriate repository unless the landowner requests their return. Proof of curation must be submitted with the final analytical report.

7. Prior to the notice to proceed with construction ETSI will inventory, and evaluate using National Register criteria (36 CFR Section 60.6) all cultural properties within project areas that could reasonably be considered directly and indirectly impacted by the pipeline project and its related facilities, as determined under Stipulations 8. The inventories will include but need not be limited to (a) a Class I--Existing Data Inventory (in accordance with BLM Manual Section 8111.12) which will include but not be limited to archival and literature search, ethnographic research, and museum research; (b) a Class III--Intensive field survey (BLM Manual Section 8111.14 A and B). All information from the inventory will become a part of the State Survey Data maintained by the respective SHPO or state repository. BLM will authorize the notice to proceed for the project area only after all intensive (Class III) field surveys are completed and the area is proven devoid of National Register eligible properties, or the protective steps detailed in stipulations 9, 10, 11, 12 and 13 of this MOA have been completed.

8. BLM in consultation with the appropriate SHPO will determine areas to be excluded from Class III survey. Excluded areas will include lands not likely to contain potentially eligible cultural properties as determined by Class I surveys and SHPO recommendations.

9. All cultural properties identified in the project area that appear to be eligible for inclusion in the National Register of Historic Places will be recorded and documented on forms suitable for use in requesting a determination of eligibility in accordance with 36 CFR Part 63. National Register Nomination Forms (Form No. 10-300, 10-306), Bureau of Land Management Cultural Resources Inventory Record Forms (8110-1,2,3,4,5) or equivalent forms (SHPO) may be used.

10. Assessments of a properties potential eligibility for inclusion in the National Register of Historic Places will be made by the BLM, other land managing agencies as appropriate, and ETSI's archeologist or historian in consultation with the respective SHPO within 30 days of receipt of an acceptable inventory report from ETSI's archeologist or historian. The opinion of the landowner will be submitted if immediately available for eligibility determinations. A completed inventory form, as described in Stipulation 9, for all properties appearing to meet the criteria for inclusion in the National Register of Historic Places will also be forwarded by the BLM to the Keeper of the National Register within 30 days with a written request for a consensus determination pursuant to 36 CFR

Section 63.3. In situations where the participants disagree as to eligibility, the BLM will request a determination of eligibility in writing from the Secretary of the Interior in accordance with 36 CFR Section 63.2.

11. ETSI will avoid by project redesign or project relocation, where prudent and feasible, cultural properties included in or appearing to be eligible for inclusion in the National Register of Historic Places. When it is neither prudent nor feasible to avoid cultural resource properties, ETSI will provide a report documenting that fact and recommending mitigation measures.

12. Within 30 days after receipt of an acceptable report from ETSI documenting that it is neither prudent nor feasible to avoid a cultural property that is included in or eligible for inclusion in the National Register of Historic Places (Stipulation 9), the BLM and permitted archeologists will consult with the respective SHPO, landowner or land managing agency and, . . .

A. If it is determined that the affected cultural properties are eligible for inclusion in the National Register of Historic Places principally because they may be likely to yield information important to prehistory, and it is determined that a data recovery program will avoid the adverse effect of the undertaking in accordance with Section X.2 of the Executive Directors' "Procedures for Review of Proposals for Treatment of Archeological Properties" (Attachment 1, Part II), a data recovery program will be developed and implemented in consultation with the SHPO in accordance with the councils "Recommendations for Archeological Data Recovery" (Attachment 1, Part III). If the SHPO does not concur with the data recovery program the council will be afforded further opportunity to review and comment; or

B. If it is determined that the affected cultural properties are eligible for inclusion in the National Register of Historic Places principally for some other reason, or if it is determined that they are eligible principally because they may be likely to yield information important in prehistory but that they do not meet criteria detailed in Section X.2 of the Executive Directors' procedures "Supplementary Guidance", the BLM and ETSI archeologists will consult with the appropriate SHPO, and other Federal land managing agencies to determine the nature of the undertaking's effect and pursuant to 36 CFR Section 800.4(d) the BLM will forward a request for Council comments, with a preliminary case report (as specified in 36 CFR Section 800.13(b)) to the Executive Director of the Council. The Director of the Council will comment to BLM on recommended action.

13. During the implementation of any construction phase the BLM will ensure that ETSI or its Assignee will:

A. Assure that all project field employees are briefed on cultural property concerns as a part of their technical environmental briefing program;

B. Employ an archeologist meeting, at minimum, the qualifications outlined above to ensure compliance with measures to avoid damage to cultural properties by construction activities, vehicles, and other equipment and to monitor areas of surface disturbance for sub-surface artifacts or sites;

C. Report all previously unidentified subsurface or surface cultural properties to the BLM and respective SHPO, and protect the property until compliance with Section 14 has been completed.

14. The BLM, in consultation with the appropriate SHPO, will develop pipeline salvage plans within 60 days of notification of this agreement and prior to the Secretary's route decision these plans will present procedures for ETSI and the BLM to follow if previously unknown sites or artifacts are discovered during project construction activities. This plan will also apply in emergency situations, as determined by BLM (such as when the time to undertake adequate mitigation is short, or when failure to act in a short time would result in construction delays).

15. It is the responsibility of the BLM and the Forest Service that the cultural property management program in this Agreement be incorporated into the right-of-way grant and temporary use permits associated with the ETSI Pipeline Project (Application #W-47191).

16. One year from the date of ratification of the agreement by the Chairman of the Council, and annually thereafter until the pipeline is completed, the BLM, respective SHPO and ETSI will review the program established by the Agreement and submit to the Council an assessment of the program operation and copies of the annual report prepared by ETSI. Unless modified, the Agreement will continue in effect until completion of the construction phase.

Maxwell T. Lieurance — 2/26/81

State Director, Wyoming — Date

Craig W. Rupp — 2/26/81

Regional Forester — Date

DEFINITIONS

Cultural Property Management Program - A program, established by this memorandum of agreement to ensure identification, evaluation and appropriate protection of cultural properties prior to and during construction of surface and subsurface elements of the ETSI pipeline project. The program requires a consistent approach to hiring qualified people, reporting, consultation, determining eligibility of properties for inclusion in the National Register, curation, project redesign where appropriate, data recovery, and emergency salvage.

Annual Report - A progress report by the proponent company including, but not limited to a status report on inventory work completed (%), a listing and brief description of those sites found, a listing of those found to be eligible for the National Register, a listing of those to be avoided, a listing of sites where it was not prudent or feasible to avoid. The report should itemize current expenditures, i.e., overhead, contracts, and salvage costs. The company's regular annual report will not satisfy this requirement.

Definitive phase for the ETSI project extends from January 1, 1980 to July 1, 1983. Activities associated with this phase are the Environmental Impact Statement, route definition, procurement of final right-of-way, compliance with the Statement and the acquisition of the environmental permits, final engineering design, shipper contracts, and financing.

Construction phase is scheduled to start July 1983 and continue through July 1985. Activities in this phase are environmental compliance, planning, contractor procurement awards, budget and schedule control, construction, pre-operational testing, and start-up.

Final Analytic Report - A report that is professionally researched and written to the standards outlined in BLM Manual 8111 and proposed regulations 36 CFR Part 66 (F.R. 1/28/77 Vol. 42 F.R. 5382).

APPENDIX D-4

FISH AND WILDLIFE SERVICE BIOLOGICAL OPINION

ADDRESS ONLY THE DIRECTOR, FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

In Reply Refer To:
FWS/OES BLM-81-1

MAY 15 1981

Memorandum

To: Team Manager, Special Projects Environmental Impact Team, Bureau of Land Management, Denver, Colorado

From: Chief, Office of Endangered Species

Subject: Request for Section 7 Consultation, Energy Transportation Systems, Inc. (ETSI) Coal Slurry Pipeline

This responds to your January 30, 1981, request for formal consultation on the subject pipeline on the bald eagle, (Haliaeetus leucocephalus), red-cockaded woodpecker (Picoides [=Dendrocopos] borealis), and American alligator (Alligator mississippiensis).

Biological Opinion

It is my biological opinion that the construction of the proposed coal slurry pipeline by ETSI is not likely to jeopardize the continued existence of the bald eagle, red-cockaded woodpecker, or the American alligator. The opinion is contingent upon the exclusion of all construction activities from within a 200-foot radius of any red-cockaded woodpecker cavity tree.

Project Description

ETSI proposes to construct a coal slurry pipeline. The complete transportation project would involve 1,828 miles of right-of-way for water and coal slurry pipelines. The 1,664-mile main slurry pipeline would carry a coal-water slurry from the Powder River Basin of northeastern Wyoming through Nebraska and Kansas to locations in Oklahoma, Arkansas, and Louisiana (see attached map). The Colorado alternative would go through eastern Colorado, bypassing Nebraska. Construction is proposed to begin in 1983, and would continue in phases through 1989. Limited operation of the system would start in 1985.

Basis for Opinion

Bald Eagle - As stated in the biological assessment, there are no known bald eagle nests (active or inactive) that would be affected by any of the alternative routes. A known winter roost exists approximately 3 miles east of the Belle Fourche River, Wyoming, crossing of the North Rawhide Slurry Gathering Line. The eagles occupying this roost forage mainly on carrion and their food base is not associated with aquatic prey of the Belle Fourche River. The location of the crossing, approximately 3 miles from the roost, should not disturb these eagles.

The Colorado alternative crosses the North Platte River near the Platte-Goshen County line. This area of the North Platte River is important not only to bald eagles, but also to other riparian and aquatic resources, and is the least desirable alternative from a fish and wildlife standpoint. Wintering bald eagles use this stretch of the North Platte River for foraging and roosting, and also as a spring staging area. Eagles generally begin arriving in October, peak in late January, and disperse in late March. Pipeline construction in this area would cause some disturbance and temporary displacement of eagles and it would be difficult to avoid some loss of perch sites.

Wintering bald eagles are also found near large reservoirs and rivers at a number of locations in Oklahoma, Arkansas, and Louisiana. Because the construction of the pipeline will not affect any known bald eagle nests, because there appears to be a fairly large population of bald eagles that winter in the lower 48 States (over 13,000 in a 1980 winter survey), and because most of the construction impacts would be temporary, effects on the bald eagle will be minimal.

Red-cockaded Woodpecker - The red-cockaded woodpecker may be affected by the construction of this pipeline if colonies are found to be in the area of the pipeline route. Therefore, surveys are required to determine if this species occurs along the pipeline route in Arkansas and Louisiana. All mature pine forests must be surveyed for active colony sites and, if found, negative impacts of pipeline construction on this species can be avoided by simply maintaining a buffer zone of 200 feet around each cavity tree.

American Alligator - The construction of this pipeline may affect the American alligator if construction takes place during the nesting season, generally from late spring to early summer. The destruction of wetlands results in nest destruction and changes in water levels and has been one of the factors causing the decline of the alligator in portions of its range. Changes in water levels have been shown to influence nesting attempts, hatching success, predation, cannibalism, and desiccation losses. The effects of construction activities on the alligator may be limited if the necessary habitat alterations of construction and related activities are confined to the proposed 100-foot right-of-way and limited to the non-nesting season. Since any alterations of wetland habitat will be only temporary, the project will have no long-term effects on this species.

Recommendations

Pursuant to Section 7(a)(1) of the Endangered Species Act, all Federal agencies shall utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of listed species.

For the conservation of specific species, and in addition to the measures proposed in the assessment, we make the following recommendations:

1. A search of the pipeline route, prior to construction, should include a survey for nesting bald eagles and additional roosting concentrations of eagles. If nests or roosting concentrations are found, all construction should be kept outside of a 1,500-foot radius of these areas. During the nesting season, October through May, construction should be restricted to an area outside of a 1-mile radius from the nest tree.

2. All pipeline river crossings should avoid destruction of potential perch trees and roost areas for bald eagles. In particular, the large trees used by eagles for perching and roosting should not be destroyed at the crossing of the Cheyenne River approximately 9 miles north of Wasta, Meade County, South Dakota.

3. The 3-mile distance from the bald eagle winter roost east of the Belle Fourche River crossing for the North Rawhide Slurry Gathering Line should be maintained during the final staking of the pipeline route.

4. Should the Colorado alternative be selected, the pipeline construction schedule should be adjusted to avoid overlap with eagle use of the North Platte River. Both the Wyoming Game and Fish Department and the U.S. Fish and Wildlife Service should be consulted so that the best crossing location and special stipulations to protect eagle use on the North Platte River can be identified and incorporated into the construction plan.

5. A search of mature pine forests along the pipeline route in Arkansas and Louisiana must be made for red-cockaded woodpecker colonies prior to the start of construction. If cavity trees are found, construction and all associated activities must be outside of a 200-foot radius of the cavity trees.

6. All construction should be limited to exclude areas of known alligator distribution during the period of May through August to provide protection for alligator nests and young and should not result in permanent alterations of water levels. Construction and related activities should be kept within the 100-foot right-of-way in areas where alligators are present, helping to preserve as much of the wetlands as possible.

Operation and Abandonment of Pipeline

As was discussed with Ray Boyd of your staff, this consultation is only for construction and does not include the operation or abandonment of the project.

Any affect on Endangered or Threatened species from operation or abandonment will also require consultation if there is Federal involvement in the action and a "may affect" determination is made. Operation and abandonment of the pipeline may affect the species of concern in the following manner.

Black-footed Ferret - Pipeline abandonment could have an adverse affect on a prairie dog town, and hence, on prairie dogs and black-footed ferrets if this abandonment includes pipeline salvage and back-filling within a town occupied by ferrets.

Bald Eagle - During pipeline operations, a slurry spill may affect the bald eagle if it were to occur near a winter concentration of eagles. We recommend an acceptable contingency plan be developed and that clean-up equipment be located in reasonable proximity of bald eagle winter concentration areas. Salvage operations during abandonment may affect this species if it is done near winter concentration areas or a nest site.

Whooping Crane - Operation of the pipeline may affect the whooping crane and its Critical Habitat at the Platte River crossings in Nebraska and via the Deception Creek drainage into Cheyenne Bottoms State Waterfowl Management Area in Barton County, Kansas, if a slurry spill should occur. An acceptable contingency plan and equipment for slurry clean-up would minimize the hazard to whooping cranes and its Critical Habitat on the Platte River in Nebraska. An acceptable contingency plan, and equipment for river crossings with appropriate low level emergency dikes that would divert an accidental slurry spill away from the Deception Creek drainage, would protect the Critical Habitat and the whooping crane in Kansas. A second alternative for the Deception Creek drainage would be to relocate the pipeline to avoid this and other drainages into the Cheyenne Bottoms State Waterfowl Management Area.

Abandonment would not affect this species for the same reasons that construction would not (see Basis For No Affect Determination, below).

American Alligator - A slurry spill may also affect this species. A contingency plan should be developed to minimize the impact of accidental spills in alligator habitat. Salvage operations during abandonment could have effects similar to the construction phase and would require the same precautions.

Red-cockaded Woodpecker - Pipeline operations and pumping facilities should be carefully controlled in the vicinity of red-cockaded woodpecker colony sites to avoid undue disturbance, particularly during the nesting season (April-June). The same would apply to abandonment if it includes salvage.

Other Endangered and Threatened Species

We concur with the Technical Report on Threatened and Endangered Species that construction of the project will not affect the gray bat, Indiana bat, Ozark big-eared bat, Florida panther, red wolf, Eskimo curlew, peregrine falcon, Bachman's warbler, or the ivory-billed woodpecker. Also, after careful consideration, we believe that the project construction will have no affect on the black-footed ferret or the whooping crane.

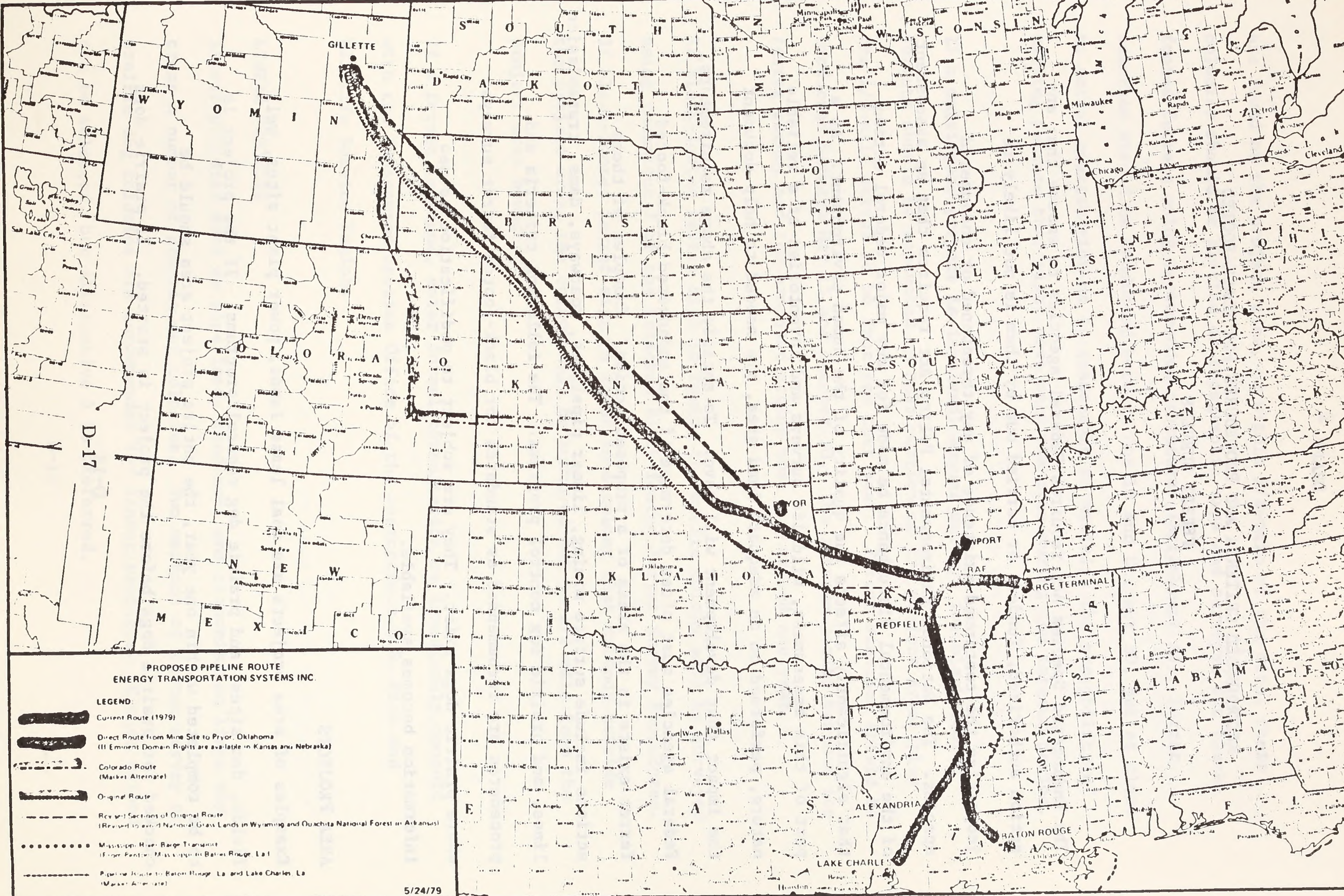
Basis For No Affect Determination on Black-footed Ferret and Whooping Crane

Black-footed Ferret - The biological assessment prepared for the Bureau of Land Management by Woodward-Clyde Consultants very adequately discusses historical background, occurrence, and potential impacts of the project on the ferret. We have no information to add to the assessment. Therefore, provided the surveys are conducted prior to pipeline construction as proposed (see attachment for survey methods), and no ferret signs are found, the pipeline construction will have no impacts on this species. If ferret signs are found, the consultation must be reinitiated.

Whooping Crane - The biological assessment also adequately covers the impacts the construction of the pipeline will have on the whooping crane. Since construction will not take place within the migration corridor of the whooping crane during the migration period, and since the route will not cross any whooping crane Critical Habitat, the construction of the slurry pipeline will not affect the whooping crane or its Critical Habitat. On page one of the whooping crane section of the assessment, the third paragraph should read ". . . 140 miles west of Pierre" instead of ". . . 250 miles west of Pierre."

This concludes consultation on the construction of the ETSI pipeline. If project plans or conditions change which may affect listed species, if new species are listed that may be affected, or if a black-footed ferret is found as a result of the ferret surveys, consultation should be reinitiated.

Attachments



● Coal Fired Power Plants
▲ – Barge Load out Facilities

RECOMMENDED CRITERIA AND PROCEDURES FOR BLACK-FOOTED FERRET SURVEYS

The Endangered Species Act requires Federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any threatened or endangered species. The National Environmental Policy Act requires that an assessment of the environmental disturbance be made for any major Federal action that significantly affects the quality of the human environment. As a part of this assessment, wildlife surveys and inventories of a reliable nature, performed on an adequate land area, are needed to help document the impact that development will have. To satisfy the above requirements, Federal agencies must often determine if the endangered black-footed ferret exists in the areas of a proposed action. Examples of these actions include surface mining, linear pipelines, roadways, dams, transmission lines, and prairie dog control programs. The following criteria and procedures are recommended as standards for black-footed ferret surveys where prairie dogs exist. They are subject to modification as new information becomes available.

AREA PROJECTS

Examples of area projects are coal lease lands, power plant sites, well fields, dam sites, and prairie dog control programs. If the project is to be completed within one year, the entire project area should be checked for prairie dogs before the project is started. If prairie dogs are found on the project area, or within 1/8-mile of the site, their colonies should be plotted on topographic maps and surveyed for black-footed ferrets using recommended procedures (Attachment A). Ferret searches should be conducted between May 15 and October 30, but as close to actual construction as is reasonable to minimize the possibility of missing ferrets that might move onto the area during the interum period.

If a multi-year project is involved, annual surveys for black-footed ferrets should be conducted on that portion of the project area (plus the 1/8-mile strip) to be impacted that year. Ferret searches should be conducted between May 15 and October 30. The interum period between the ferret survey and the proposed action must not exceed one year.

If black-footed ferret sign is found, the entire colony will be surveyed using technique I of the attached Black-footed Ferret Survey Procedures. If black-footed ferret sign is found in a colony that extends outside the project area, the colony will be surveyed out to 1/2 mile from the project area boundary.

If a ferret is found, enter formal consultation or immediately consult with the Endangered Species Office of the appropriate U.S. Fish and Wildlife Service Region.

LINEAR PROJECTS

Linear projects such as pipelines, roadways, and transmission lines may cross a number of prairie dog colonies. Two methods of ferret survey on prairie dog colonies are recommended for linear projects. Either method can be selected, but Alternative 1 is preferred.

DRAFT

NOT FOR

Linear Projects Except for Transmission Lines

Alternative 1 (Simultaneous survey and construction)

A. Using Black-footed Ferret Survey Procedures, survey that portion of each prairie dog colony lying within the project right-of-way and within 1/16 mile of each side of the project right-of-way. The interum period between the ferret survey and the proposed action must not exceed one week.

B. If black-footed ferret sign is found, the entire prairie dog colony will be surveyed out to a distance of 1/2 mile on each side of the project right-of-way, using Technique I of Black-footed Ferret Survey Procedures. Sign justifying the preceding action is fresh trenching activity, the presence of numerous freshly plugged burrows, or the sighting of green eyeshine from what is believed to be a black-footed ferret.

C. If a ferret is found, enter formal consultation or immediately consult with the Endangered Species Office of the appropriate U.S. Fish and Wildlife Region.

Alternative 2 (Survey preceding construction)

A. Survey between May 15 and October 30. If the proposed action does not take place by May 15 and the following year, another survey is necessary.

DRAFT
NOT FOR PUBLIC

B. Using Survey procedures survey all prairie dog colonies found within the project right-of-way and within 1/8 mile of each side of the project right-of-way. Colonies extending beyond this corridor will be surveyed out to 1/2 mile on either side of the project right-of-way. If black-footed ferret sign is found, use Technique I of the Survey procedures. Sign justifying this action is identified on page 3, Alternative 1, Part B.

C. If a ferret is found, enter formal consultation or immediately consult with the Endangered Species Office of the appropriate U.S. Fish and Wildlife Service Region.

Transmission Lines

Alternative 1 (Simultaneous survey and construction)

A. Using Black-footed Ferret Survey Procedures, survey that portion of each prairie dog colony lying within the right-of-way. The interum period between the ferret survey and the proposed action must not exceed one week.

B. If black-footed ferret sign is found, the entire prairie dog colony will be surveyed out to a distance of 1/4 mile one each side of the project right-of-way, using Technique I of Black-footed Ferret Survey Procedures. Sign justifying this action is identified above on page 3, Alternative 1, Part B.

DRAFT

NOT FOR

C. If a ferret is found, enter formal consultation or immediately consult with the Endangered Species Office of the appropriate U.S. Fish and Wildlife Region.

Alternative 1 (Survey preceding construction)

A. Survey between May 15 and October 30. If the proposed action does not take place by May 15 the following year, another survey is necessary.

B. Using Survey procedures, survey all prairie dog colonies found within the project right-of-way and within 1/16 mile of each side of the project right-of-way. Colonies extending beyond this corridor will be surveyed out to 1/4 mile on each side of the project right-of-way. If black-footed ferret sign is found, use Technique I of the Survey procedures. Sign justifying this action is identified above on page 3, Alternative 1, Part B.

C. If a ferret is found, enter formal consultation or immediately consult with the Endangered Species Office of the appropriate U.S. Fish and Wildlife Service Region.

SOURCE OF THE CRITERIA AND PROCEDURES The preceding recommendations were developed by the Division of Wildlife Research, Denver, and the Endangered Species Offices in Regions 2, Albuquerque, and 6, Denver, of the U.S. Fish and Wildlife Service with the cooperation of the Black-footed Ferret Recovery Team.

Below is a list of States within the range of the black-footed ferret that reviewed these criteria and procedures and indicated that the requirements for black-footed ferret surveys would be satisfied if the preceding criteria and attached procedures are followed:

(the names of the States will be inserted after they have reviewed this document)

DRAFT

Black-Footed Ferret Survey Procedures

A. Conduct search of literature and other potential sources of information to locate any historic or recent sightings of black-footed ferrets in the proposed project area.

B. Identify area proposed for survey.

C. Locate all prairie dog colonies within the area using aerial photographs, ground searches, and other information that may be available from natural resource or cooperative agencies.

D. Plot all prairie dog colonies on 7.5-minute topographic maps from the U.S. Geological Survey. If 7.5-minute maps are not available, use 15-minute maps.

E. Divide colonies into workable marked segments in preparation for systematic searching.

F. Start surveys in the early morning with one or more hours of spotlight searching on previously selected areas of the prairie dog colony(ies).

G. Prior to conducting daytime surveys, scan colonies for black-footed ferrets and fresh diggings using binoculars and spotting scopes.

H. Conduct daytime surveys on the colony, examining holes which are 6 cm or more in diameter while looking for black-footed ferrets or the following sign:

1. Trenches or stringers of soil 15-20 cm wide, 5-cm deep, and from .3-3.5 m long with a groove in the center.

2. Prairie dog burrows plugged with soil.

3. Skeletal material: (1) skulls of prairie dogs that have been chewed or show small tooth marks near the base, (2) skulls of black-footed ferrets. If found, photograph in place and mark location prominently.

4. Fecal droppings from mustelid-type animals. Usually marked by segmentation and twisting when composed of hair, varying from dark brown to black in color, approximatly 6 mm in diameter and 25-100 mm long.

5. Prairie dog behavior: upright posture and alarm chatter in response to predators.

1. In areas where possible ferret sign is found, three consecutive night surveys are recommended, using the following procedures:

1. During the daytime, locate and mark area to be spotlighted and locate access roads to area.

2. Park vehicle at the search area and wait 5 minutes before starting searches with spotlight. Using a 100,000 candle-power spotlight (hand-held or vehicle-mounted), sweep the light slowly back and forth across the colony, looking for green eyeshine. Use the spotlight at intervals of 5 minutes on and 5 minutes off for a minimum of 1 hour per stop. Conduct spotlighting during the periods of 1-3 hours prior to dawn and 1-3 hours after dusk.

3. When green eyeshine is observed, attempt to identify the animal. If identification is not possible, mark the location with flagging for future day and night surveys.

Note: Surveyors should be provided with reference photos of a black-footed ferret, weasel, European ferret, ferret skulls, scats, and any other visual aids available.

J. Documentation of search and survey will include: dates of surveys, man-days of efforts, estimated acres of prairie dog colonies surveyed, number of colonies surveyed, hours of spotlighting conducted, ferret sign encountered, and location of ferret sign.

APPENDIX D-5

FOREST SERVICE GENERAL MEASURES

The special use permit and easement for right-of-way issued by the Forest Service (FS) would include general and specific stipulations. These stipulations would include the following general measures:

1. The FS will conduct a field review of the right-of-way that crosses the Thunder Basin National Grasslands with the applicant prior to survey work.

2. Prior to beginning construction on the right-of-way, the applicant shall prepare a Development and Construction Plan for FS lands for approval by the Forest Supervisor. Approval will be conditional upon requirements deemed necessary by the Forest Supervisor for proper management of the right-of-way.

3. In cooperation with the Forest Supervisor, the applicant will provide a schedule for the development and construction of all facilities within the water and coal slurry pipelines right-of-way. The schedule shall include a list of planned improvements and the scheduled date for completion. The applicant may accelerate the schedule date for construction of any improvement authorized, provided the other scheduled priorities are met and that all authorized priority installations are completed to the satisfaction of the Forest Supervisor prior to the scheduled due date. All required plans and specifications for site improvement and structures included in the construction schedule shall be submitted to the District Ranger at least 45 days before the construction date stipulated in the development schedule.

4. The applicant will make no substantial change or alternation in the design, location, or construction of the water and coal slurry pipelines or their facilities until the change is approved by the Forest Supervisor.

5. In cooperation with the Forest Supervisor, the applicant will prepare a Fire Protection Plan that details the fire prevention, presuppression, and suppression measures that will be taken by the applicant, its employees, contractors, and subcontractors and their employees in all operations during the construction stage. The fire plan shall be made available to all bidders prior to letting the contract. The applicant shall ensure its contractors comply with all provisions of the fire plan and buring permits issued for disposal of flammable materials.

6. In cooperation with the Forest Supervisor, the applicant will prepare an Erosion Control, Landscaping, and Revegetation Plan for controlling soil erosion on the easement right-of-way and adjacent lands during construction, operation, and maintenance of the water and coal slurry pipelines. The applicant will revegetate all ground where the soil has been exposed and shall maintain all terracing, water bars, load-off ditches, and other preventive works that may be required by the Erosion Control, Landscaping, and Revegetation Plan.

7. In cooperation with the Forest Supervisor, the applicant will prepare an Improvements Construction and Relocation Plan. This plan will designate the location and standards of all gates, crossings, cattle guards, fences, water wells, corrals, sheds, reservoirs, and other improvements to property owned by the United States that will be constructed to mitigate impacts on wildlife, livestock, ranchers, recreationists, and other grassland users. The plan shall specify the mutually agreed upon time frame for relocating, replacing, and maintaining the improvements.

8. In order to fulfill all federal and state cultural resources legal requirements, the applicant will comply with all stipulations detailed in a Memorandum of Understanding between the Advisory Council on Historic Preservation, Forest Service (Rocky Mountain Region), Bureau of Land Management (Wyoming State Office), and State Historic Preservation Officers of the affected states.

9. The applicant will take reasonable precautions to protect all Public Land survey monuments, private property corners, and National Grassland boundary markers. If any such land markers or monuments are destroyed, the applicant shall see that they are reestablished or referenced in accordance with (1) the procedures outlined in the "Manual of Instruction for the Survey of the Public Land of the United States," (2) the specifications of the county surveyor, or (3) the specifications of the Forest Service. The applicant will amend any official survey records as required by law.

10. The applicant will assign an environmental inspector who will assure that all environmental matters referred to in the Development and Construction Plan; Fire Protection Plan; Erosion Control, Landscaping and Revegetation Plan; Improvements Construction and Relocation Plan are followed. The applicant shall inform the Forest Supervisor, Laramie, Wyoming, in writing of the name and address of the environmental inspector. If a substitute inspector is appointed, the applicant shall immediately inform the Forest Supervisor.

11. The Forest Supervisor will be provided an opportunity to review any plans involving the use or protection of land administered by the FS or adjoining FS land. All design, construction, and maintenance features involving the use or protection of land administered by the FS will be approved by the Forest Supervisor.

12. The applicant shall comply with the regulations of the Department of Agriculture and with all federal, state, county, and municipal laws, ordinances, or regulations which are applicable to the right-of-way or to operations within it. The applicant will maintain the right-of-way and all improvements in a condition which conforms with standards of repair, orderliness, neatness, sanitation, and safety acceptable to the FS.

13. The applicant will pay the United States for all damage to federal property or resources and for all federal fire-suppression costs resulting directly or indirectly from the applicant's use and occupancy of the area covered by easement, regardless of whether

the applicant is negligent or otherwise at fault. However, liability for damages that may be incurred by the applicant is subject to a maximum limitation on damages as set forth in Public Law (P.L.) 94-579. Until the limitation required by P.L. 94-579 is effective,"... liability in excess of $1,000,000 shall be determined by ordinary rules of negligence."

14. Chemical materials may not be used to control undersirable vegetation, aquatic plants, insects, rodents, fish, etc., without the prior written approval of the FS. A report of planned pesticide use will be submitted annually by the applicant on a date established by the Forest Supervisor. The report will cover a 12-month period of planned use beginning 3 months after the established date. Information essential for review will be provided in the form specified. Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the annual report was submitted. Only those materials approved and registered by the U.S. Department of Agriculture for the specific purpose planned will be considered for use on these lands. Label instructions for preparing and applying pesticides and disposing of excess materials and containers will be strictly followed.

15. The FS reserves the right of occupancy and use by the United States, its grantees, permittees, or lessees, without charge and without the consent of the applicant, of any part of the right-of-way across lands of the United States within the exterior boundaries of a National Grasslands not actually occupied by the applicant's pipelines or associated facilities. The FS reserves the right to permit free and unrestricted access in, through, and across the right-of-way for officers and employees of the United States in the performance of their official duties and for authorized users of National Grassland products, when consistent with the right-of-way privileges of the applicant.

16. The applicant will not assign or transfer the right-of-way across lands of the United States except on condition that the assignees or transferees have agreed in writing to fulfill and perform all duties and obligations of the applicant arising from this easement.

17. This easement may be terminated by the FS upon surrender by the applicant and approval by the FS, upon abandonment, or upon 60-day notice to the applicant that the FS has determined the right-of-way is not being used for the purpose for which it was granted, or for failure to comply with the terms of the grant.

18. Unless terminated or revoked in accordance with the provision of the easement, this easement shall expire and become void upon issuance of a new authorization or one year after publication of regulations by the Secretary of Agriculture under the provisions of Title V, P.L. 94-579, whichever comes first. A new authorization to occupy and use the same National Grasslands will be issued provided the applicant will comply with the then-existing rules and regulations governing the occupancy and use of National Grasslands.

19. Upon the abandonment, termination, or forfeiture of the right-of-way, and in absence of an agreement to the contrary, the applicant will remove within 2 years all structures and facilities which it has placed or caused to be placed on lands of the United States within the exterior boundaries of the National Grassland. If the applicant fails to remove any structures and facilities within that period, they shall become the property of the United States and the applicant shall remain liable.

20. The applicant will develop and submit for approval a detailed spill contingency plan for all Forest Service land to be crossed by the project.

APPENDIX D-6

RIVER AND STREAM CROSSINGS REQUIRING INDIVIDUAL CORPS OF ENGINEERS SECTION 10 AND SECTION 404 PERMITS

The river and stream crossings that require individual Department of the Army permits under provisions of Section 10 of the Rivers and Harbor Act of 1899 and/or Section 404 of the Clean Water Act of 1977 that are issued by the U.S. Army Corps of Engineers are identified for the proposed action, market alternative, Cypress Bend pipeline-barge alternative, Colorado alternative, and Oahe alternative water supply system in Tables D-1 through D-5. Energy Transportation Systems Inc. (ETSI) may obtain special construction contracts for the crossings listed if pipeline construction were approved. A detailed list of crossings to which certain nationwide permit measures would apply is found in the Surface Water Quality Technical Report (WCC 1981c).

TABLE D-1

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: PROPOSED ACTION

Waterway Name	Type Permit	State	Corps District
1. North Platte River	404	Nebraska	Omaha
2. South Platte River	404	Nebraska	Omaha
3. Republican River	404	Nebraska	Omaha
4. Walnut Creek	404	Kansas	Albuquerque
5. Arkansas River	404	Kansas	Albuquerque
6. South Fork Solomon River	404	Kansas	Tulsa
7. Saline River	404	Kansas	Tulsa
8. Smokey Hill River	404	Kansas	Tulsa
9. Chikaskia River	404	Oklahoma	Tulsa
10. Salt Fork/Arkansas River	404	Oklahoma	Tulsa
11. Arkansas River	404	Oklahoma	Tulsa
12. Verdigris River	404	Oklahoma	Tulsa
13. Neosho (Grand) River	10/404	Oklahoma	Tulsa
14. Arkansas River-M.K.N.S.	10/404	Oklahoma	Tulsa
15. Spaniard Creek	10/404	Oklahoma	Tulsa
16. Arkansas River-M.K.N.S.	10/404	Oklahoma	Tulsa
17. Lee Creek	10/404	Oklahoma	Tulsa
18. Frog Bayou	404	Arkansas	Little Rock
19. Little Mulberry	404	Arkansas	Little Rock
20. *Mulberry River	10/404	Arkansas	Little Rock
21. White Oak Creek	404	Arkansas	Little Rock
22. *Spadra	404	Arkansas	Little Rock
23. Little Piney	404	Arkansas	Little Rock
24. East Fork Horse Creek	404	Arkansas	Little Rock
25. Horsehead Creek	404	Arkansas	Little Rock
26. Gum Log Creek	404	Arkansas	Little Rock
27. *Big Piney Creek	404	Arkansas	Little Rock
28. *Illinois Bayou	404	Arkansas	Little Rock
29. Point Remove Creek(2)	10/404	Arkansas	Little Rock
30. Arkansas River	10/404	Arkansas	Little Rock
31. West Fork Point Remove Creek	404	Arkansas	Little Rock
32. East Fork Point Remove Creek	404	Arkansas	Little Rock
33. North Fork Cadron Creek	404	Arkansas	Little Rock
34. Greers Ferry Lake	10/404	Arkansas	Little Rock
35. Little Red River	404	Arkansas	Little Rock
36. Big Creek	404	Arkansas	Little Rock
37. White River (Newport terminal)	10/404	Arkansas	Little Rock

TABLE D-1 (Concluded)

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: PROPOSED ACTION

Waterway Name	Type Permit	State	Corps District
38. Cypress Creek	404	Arkansas	Little Rock
39. Fourche La Fave River	10/404	Arkansas	Little Rock
40. Harris Brake Lake	404	Arkansas	Little Rock
41. Big Maumelle River	404	Arkansas	Little Rock
42. Fourche Creek	404	Arkansas	Little Rock
43. *Saline River	10/404	Arkansas	Vicksburg
44. *Saline River	10/404	Louisiana	Vicksburg
45. *Bayou Bartholomew	10/404	Louisiana	Vicksburg
46. Ouachita River	10/404	Louisiana	Vicksburg
47. *Little River	10/404	Louisiana	Vicksburg
48. Red River	10/404	Louisiana	New Orleans
49. Bayou Boeuf	10/404	Louisiana	New Orleans
50. Bayou Boeuf and Cocodrie Diversion Channel	10/404	Louisiana	New Orleans
51. *Spring Creek	10/404	Louisiana	New Orleans
52. Bayou Cocodrie	10/404	Louisiana	New Orleans
53. Calcasieu River	10/404	Louisiana	New Orleans
INDEPENDENCE LATERAL			
54. White River	10/404	Arkansas	Little Rock
NEW ROADS-WILTON LATERAL			
55. Bayou des Glaises Diversion Channel	404	Louisiana	New Orleans
56. Atchafalaya River	10/404	Louisiana	New Orleans
57. Bayou Fordoche	404	Louisiana	New Orleans
58. Gulf Intracoastal Waterway-Port Allen Canal	10/404	Louisiana	New Orleans
59. Bayou Plaquemine	10/404	Louisiana	New Orleans
60. Bayou Lafourche	10/404	Louisiana	New Orleans
61. Mississippi River	10/404	Louisiana	New Orleans

*Scenic or recreational waterway.

TABLE D-2

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: MARKET ALTERNATIVE

Waterway Name	Type Permit	State	Corps District
1. North Platte River	404	Nebraska	Omaha
2. South Platte River	404	Nebraska	Omaha
2. Republican River	404	Nebraska	Omaha
4. Saline River	404	Kansas	Kansas City
5. South Fork Solomon River	404	Kansas	Tulsa
6. Smokey Hill River	404	Kansas	Tulsa
7. Verdigris River	404	Oklahoma	Tulsa
8. Neosho (Grand) River	404	Oklahoma	Tulsa
9. *Illinois River	10/404	Oklahoma	Tulsa
10. *Barren Fork River	404	Oklahoma	Tulsa
11. *Lee Creek	10/404	Oklahoma	Tulsa
12. Frog Bayou	404	Arkansas	Little Rock
13. Little Mulberry	404	Arkansas	Little Rock
14. Mulberry River	10/404	Arkansas	Little Rock
15. White Oak Creek	404	Arkansas	Little Rock
16. Spadra	404	Arkansas	Little Rock
17. Little Piney	404	Arkansas	Little Rock
18. East Fork Horsehead Creek	404	Arkansas	Little Rock
19. Horsehead Creek	404	Arkansas	Little Rock
20. Gum Log Creek	404	Arkansas	Little Rock
21. Big Piney Creek	404	Arkansas	Little Rock
22. Illinois Bayou	404	Arkansas	Little Rock
23. Point Remove Creek(2)	10/404	Arkansas	Little Rock
24. Arkansas River	10/404	Arkansas	Little Rock
25. West Fork Point Remove Creek	404	Arkansas	Little Rock
26. East Fork Point Remove Creek	404	Arkansas	Little Rock
27. North Fork Cadron Creek	404	Arkansas	Little Rock
28. Greers Ferry Lake	10/404	Arkansas	Little Rock
29. Little Red River	404	Arkansas	Little Rock
30. Big Creek	404	Arkansas	Little Rock
31. White River (Newport terminal)	10/404	Arkansas	Little Rock
32. Cypress Creek	404	Arkansas	Little Rock
33. Fourche La Fave River	10/404	Arkansas	Little Rock
34. Harris Brake Lake	404	Arkansas	Little Rock
35. Big Maumelle River	404	Arkansas	Little Rock
36. Fourche Creek	404	Arkansas	Little Rock
37. Saline River	10/404	Arkansas	Vicksburg

TABLE D-2 (Concluded)

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: MARKET ALTERNATIVE

Waterway Name	Type Permit	State	Corps District
38. Saline River	10/404	Arkansas	Vicksburg
39. *Bayou Bartholomew	10/404	Louisiana	Vicksburg
40. Ouachita River	10/404	Louisiana	Vicksburg
41. *Little River	10/404	Louisiana	New Orleans
42. Red River	10/404	Louisiana	New Orleans
43. Bayou Boeuf	10/404	Louisiana	New Orleans
44. Bayou Boeuf and Cocodrie Diversion Channel	10/404	Louisiana	New Orleans
45. *Spring Creek	10/404	Louisiana	New Orleans
46. Bayou Cocodrie	10/404	Louisiana	New Orleans
47. Calcasieu River	10/404	Louisiana	New Orleans
INDEPENDENCE LATERAL			
48. White River	10/404	Arkansas	Little Rock
NEW ROADS-WILTON LATERAL			
49. Bayou des Glaises Diversion Channel	404	Louisiana	New Orleans
50. Atchafalaya River	10/404	Louisiana	New Orleans
51. Bayou Fordoche	404	Louisiana	New Orleans
52. Mississippi River	10/404	Louisiana	New Orleans
53. Gulf Intracoastal Waterway-Port Allen Canal		Louisiana	New Orleans
54. Bayou Plaquemine	10/404	Louisiana	New Orleans
55. Bayou Lafourche	10	Louisiana	New Orleans
56. Mississippi River	10	Louisiana	New Orleans

*Scenic or recreational waterway.

TABLE D-3

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: CYPRESS BEND PIPELINE-BARGE ALTERNATIVE

Waterway Name	Type Permit	State	Corps District
1. North Platte River	404	Nebraska	Omaha
2. South Platte River	404	Nebraska	Omaha
3. Republican River	404	Nebraska	Omaha
4. Saline River	404	Kansas	Kansas City
5. South Fork Solomon River	404	Kansas	Tulsa
6. Smokey Hill River	404	Kansas	Tulsa
7. Verdigris River	404	Oklahoma	Tulsa
8. Neosho (Grand) River	404	Oklahoma	Tulsa
9. *Illinois River	10/404	Oklahoma	Tulsa
10. *Barren Fork River	10/404	Oklahoma	Tulsa
11. *Lee Creek	10/404	Oklahoma	Tulsa
12. Frog Bayou	404	Arkansas	Little Rock
13. Little Mulberry	404	Arkansas	Little Rock
14. Mulberry River	10	Arkansas	Little Rock
15. White Oak Creek	404	Arkansas	Little Rock
16. Spadra	404	Arkansas	Little Rock
17. Little Piney	404	Arkansas	Little Rock
18. East Fork Horsehead Creek	404	Arkansas	Little Rock
19. Horsehead Creek	404	Arkansas	Little Rock
20. Gum Log Creek	404	Arkansas	Little Rock
21. Big Piney Creek	404	Arkansas	Little Rock
22. Illinois Bayou	404	Arkansas	Little Rock
23. Point Remove Creek(2)	10/404	Arkansas	Little Rock
24. Arkansas River	10/404	Arkansas	Little Rock
25. West Fork Point Remove Creek	404	Arkansas	Little Rock
26. East Fork Point Remove Creek	404	Arkansas	Little Rock
27. North Fork Cadron Creek	404	Arkansas	Little Rock
28. Greers Ferry Lake	10/404	Arkansas	Little Rock
29. Little Red River	404	Arkansas	Little Rock
30. Big Creek	404	Arkansas	Little Rock
31. White River (Newport terminal)	10/404	Arkansas	Little Rock
32. Cypress Creek	404	Arkansas	Little Rock

TABLE D-3 (Concluded)

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: CYPRESS BEND PIPELINE-BARGE ALTERNATIVE

Waterway Name	Permit	State	Corps District
33. Fourche La Fave River	10/404	Arkansas	Little Rock
34. Harris Brake Lake	404	Arkansas	Little Rock
35. Big Maumelle River	404	Arkansas	Little Rock
36. Fourche Creek	404	Arkansas	Little Rock
CYPRESS BEND LATERIAL			
37. Mississippi River, Barge Loading Facility	10/404	Louisiana	New Orleans

*Scenic or recreational waterway.

TABLE D-4

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS: COLORADO ALTERNATIVE

Waterway Name	Type Permit	State	Corps District
1. North Platte River	404	Wyoming	Omaha
2. South Platte River	404	Colorado	Omaha
3. Arkansas River	404	Kansas	Albuquerque

TABLE D-5

RIVERS AND STREAMS REQUIRING INDIVIDUAL PERMITS:
OAHE ALTERNATIVE WATER SUPPLY SYSTEM

Waterway Name	Type Permit	State	Corps District
1. Willow Creek	404	South Dakota	Omaha
2. Deep Creek	404	South Dakota	Omaha
3. Cheyenne River	404	South Dakota	Omaha
4. Elk Creek	404	South Dakota	Omaha
5. Whitehead Creek	404	South Dakota	Omaha
6. False Bottom Creek	404	South Dakota	Omaha
7. Spearfish Creek	404	South Dakota	Omaha
8. Sand Creek[a]	404	Wyoming	Omaha
9. Rocky Ford Creek	404	Wyoming	Omaha
10. Sundance Creek	404	Wyoming	Omaha
11. Inyan Kara Creek	404	Wyoming	Omaha
12. Belle Fourche River	404	Wyoming	Omaha

[a]State of Wyoming Blue Ribbon Trout Stream

APPENDIX D-7

CORPS OF ENGINEERS GENERAL MEASURES

The U.S. Army Corps of Engineers (COE) has prescribed management practices that should be followed to the maximum extent practical, for discharges covered by the Nationwide Permit (items 1-8 below). Additionally, certain conditions must be met under the Nationwide permit authority (items 9-17 below). A detailed list of crossings to which these measures will be applicable is found in Appendix D-6.

1. Discharges of dredged or fill material into waters of the United States should be avoided or minimized through the use of other practical alternatives;

2. Discharges in spawning areas during spawning seasons should be avoided;

3. Discharges should not restrict or impede the movement of aquatic species indigenous to the waters, impede the passage of normal or expected high flows, or cause the relocation of the waters (unless the primary purpose of the fill is to impound waters).

4. If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow should be minimized;

5. Discharges in wetland areas should be avoided;

6. Heavy equipment working in wetlands should be placed on mats;

7. Discharges into breeding and nesting areas for migratory waterfowl should be avoided;

8. All temporary fills should be removed in their entirety;

9. There cannot be any change in preconstruction bottom contours (excess material must be removed to an upland disposal area);

10. The discharge cannot be located in the proximity of a public water supply intake;

11. The discharge cannot occur in areas of concentrated shellfish production;

12. The discharge cannot destroy a threatened of endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species;

13. The discharge cannot disrupt the movement of those species of aquatic life indigenous to the waterbody;

14. The discharge must consist of suitable material free from toxic pollutants in other than trace quantities;

15. The fill created by the discharge must be properly maintained to prevent erosion and other nonpoint sources of pollution;

16. The discharge must not occur in a component of the National Wild and Scenic River System or in a component of a state wild and scenic river system; and

17. No access roads, fills, dikes, or other structures can be constructed below the ordinary high water mark of the streams under the Nationwide Permit (these structures would require separate Section 404 permits).

In addition, the COE will require an easement for those portions of the pipeline crossing the federal government's fee ownership. A consent to easement will be required for those portions crossing lands administered by the COE over which the United States acquired only an easement interest. Processing would be concurrent with that of the permit application.

Wetland crossings may be eligible for a nationwide permit provided they meet these conditions:

1. That the excavated material will be placed on either bank above the ordinary high water line and not in the stream or wetland area;

2. That there is no change in the preconstruction bottom contours by backfilling. (Any excess excavated material not used for backfill must be wasted above the ordinary high water line so as not to reenter the stream or wetland area;

3. That the fill will not be located in proximity to public water supply intake;

4. That the fill will not destroy a threatened or endangerd species as identified under the Endangered Species Act or endanger the critical habitat of such species;

5. That the fill will not disrupt the movement of those species of aquatic life indigenous to the water body;

6. That the fill will consist of suitable material free from toxic pollution in other than trace quantities.

7. That the fill created by the discharge will be properly maintained to prevent erosion and other nonpoint sources of pollution; and

8. That the discharge will not occur in a component of the National Wild and Scenic River System nor in a component of a state wild and scenic river system.

APPENDIX D-8

BUREAU OF INDIAN AFFAIRS GENERAL GENERAL MEASURES

General conditions would have to be agreed to by ETSI before the Bureau of Indian Affairs (BIA) would grant a right of-way:

1. To construct and maintain the right-of-way in a workmanlike manner.

2. To pay promptly all damages and compensation, in addition to the deposit made pursuant to Section 161.4, determined by the Secretary to be due the landowners and authorized users and occupants of the land on account of the survey, granting, construction, and maintenance of the right-of-way.

3. To indemnify the landowners and authorized users and occupants against any liability for loss of life, personal injury, and property damage arising from the construction, maintenance, occupancy, or use of the lands by the applicant, his employees, contractor and their employees, or subcontractors and their employees.

4. To restore the lands as nearly as may be possible to their original condition upon the completion of construction to the extent compatible with the purpose for which the right-of-way was granted.

5. To clear and keep clear the lands within the right-of-way to the extent compatible with the purpose of the right-of-way; and to dispose of all vegetative and other material cut, uprooted, or otherwise accumulated during the construction and maintenance of the project.

6. To undertake soil and resource conservation and protection measures, including weed control on the land covered by the right-of-way.

7. To do everything reasonably within its power to prevent and suppress fires on or near the lands to be occupied under the right-of-way.

8. To build and repair such roads, fences, and trails as may be destroyed or injured by construction work and to build and maintain necessary and suitable crossings for all roads and trails that intersect the works constructed, maintained, or operated under the right-of-way.

9. That upon revocation or termination of the right-of-way, the applicant shall, so far as is reasonably possible, restore the land to its original condition.

10. To at all times keep the Secretary informed of its address, and in case of corporations, of the address of its principal place of business and of the names and addresses of its principal officers.

11. That the applicant will not interfere with the use of the lands by or under the authority of the landowners for any purpose not inconsistent with the primary purpose for which the right-of-way is granted.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

AIR QUALITY DIVISION

HATHAWAY BUILDING CHEYENNE, WYOMING 82002 TELEPHONE 777-7391

January 15, 1980

Mr. Frank B. Odasz
Energy Transportation Systems, Inc.
212 Petroleum Building
111 West 2nd Street
Casper, WY 82601

RE: Permit No. CT-274

Dear Mr. Odasz:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of Energy Transportation Systems, Inc.'s application to construct coal slurry preparation facilities for the processing of 10 million tons of coal per year in Section 12, T.51N., R.72W., at the Carter North Rawhide Mine in Campbell County, Wyoming. Following this agency's tentative approval of the request as published December 7, 1979, and in accordance with Section 21(m) of the Wyoming Air Quality Standards and Regulations, the public was afforded a 30-day period in which to submit comments concerning the proposed new source, and an opportunity for a public hearing. Comments were received and evaluated in reaching a final decision. Therefore, on the basis of the information provided to us, approval to construct coal slurry preparation facilities as described in the application is hereby granted pursuant to Sections 21 and 24 of the regulations with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for purpose of investigating actual or potential sources of air pollution, and for determining compliance or non-compliance with any rules, regulations, standards, permits or orders.

2. That all access roads and generally trafficked areas be treated with asphalt, oil or other suitable chemical dust suppressants in addition to water to control fugitive dust emissions. As a minimum, access roads shall have a stabilized base topped with a chip and seal surface. All treated road surfaces shall be maintained on a continuous basis to the extent that surface treatment remains viable as a control measure.

Mr. Frank B. Odasz
Page 2
January 15, 1980

3. That particulate emissions from processing units shall not exceed indicated amounts:

SOURCE	NUMBER OF EMISSION POINTS	ALLOWABLE EMISSIONS lb/hr	ALLOWABLE EMISSIONS tons/yr
Feed conveyor, sampling point, screens	1	1.29	5.5
Clean coal conveyor, sample station, shuttle conveyor to top of surge bins	1	2.57	11.0
Discharge from surge bins and variable speed conveyors	1	2.57	11.0
Cage mills, primary slurry tank	6	51.42 (8.57 ea)	220.8 (36.8 ea)
Boiler - 68.8 x 10^6 BTU/hr	1	1.72	4.0
TOTAL		59.57	252.3

It must be noted that this approval does not relieve you of your obligation to comply with all applicable local, county, state and federal standards, regulations or ordinances. Special attention must be given to Section 21 of the Wyoming Air Quality Standards and Regulations. Section 21(a) requires that a permit to operate is required in order to operate a facility after a 120-day start-up period, Section 21(i) requires notification of initial start-up, and Section 21(j) requires that performance tests be conducted within 90 days of initial start-up.

If we may be of further assistance to you, please feel free to contact this office.

Sincerely,

Randolph Wood
Administrator
Air Quality Division

Robert E. Sundin
Director
Dept. of Environmental Quality

RW:RES/ct

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

AIR QUALITY DIVISION

HATHAWAY BUILDING CHEYENNE, WYOMING 82002 TELEPHONE 777-7391

January 15, 1980

Mr. Frank B. Odasz
Energy Transportation Systems, Inc.
212 Petroleum Building
111 W. 2nd Street
Casper, WY 82601

Permit No. CT-275

Dear Mr. Odasz:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of Energy Transportation Systems, Inc.'s application to construct coal slurry preparation facilities for the processing of 10 million tons of coal per year in Section 11, T.43N., R.70W., at the Jacob's Ranch Mine in Campbell County, Wyoming. Following this agency's tentative approval of the request as published December 7, 1979, and in accordance with Section 21(m) of the Wyoming Air Quality Standards and Regulations, the public was afforded a 30-day period in which to submit comments concerning the proposed new source, and an opportunity for a public hearing. No comments have been received. Therefore, on the basis of the information provided to us, approval to construct coal slurry preparation facilities as described in the application is hereby granted pursuant to Sections 21 and 24 of the regulations with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for purpose of investigating actual or potential sources of air pollution, and for determining compliance or non-compliance with any rules, regulations, standards, permits or orders.

2. That all access roads and generally trafficked areas be treated with asphalt, oil or other suitable chemical dust suppressants in addition to water to control fugitive dust emissions. As a minimum, access roads shall have a stabilized base topped with a chip and seal surface. All treated road surfaces shall be maintained on a continuous basis to the extent that surface treatment remains viable as a control measure.

3. That particulate emissions from processing units shall not exceed indicated amounts:

SOURCE	NUMBER OF EMISSION POINTS	ALLOWABLE EMISSIONS lb/hr	ALLOWABLE EMISSIONS tons/yr
Feed conveyor, sampling point, screens	1	1.29	5.5
Clean coal conveyor, sample station, shuttle conveyor to top of surge bins	1	2.57	11.0
Discharge from surge bins and variable speed conveyors	1	2.57	11.0
Cage mills, primary slurry tank	6	51.42 (8.57 ea)	220.8 (36.8 ea)
Boiler - 68.8×10^6 BTU/hr	1	1.72	4.0
TOTAL		59.57	252.3

It must be noted that this approval does not relieve you of your obligation to comply with all applicable local, county, state and federal standards, regulations or ordinances. Special attention must be given to Section 21 of the Wyoming Air Quality Standards and Regulations. Section 21(a) requires that a permit to operate is required in order to operate a facility after a 120-day start-up period, and Section 21(j) requires that performance tests be conducted within 90 days of initial start-up.

If we may be of further assistance to you, please feel free to contact this office.

Sincerely,

Randolph Wood
Administrator
Air Quality Division

Robert E. Sundin
Director
Dept. of Environmental Quality

RW:RES/ct

JAN 2

ETS

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

AIR QUALITY DIVISION

HATHAWAY BUILDING CHEYENNE, WYOMING 82002 TELEPHONE 777-7391

January 15, 1980

Mr. Frank B. Odasz
Energy Transportation Systems, Inc.
212 Petroleum Building
111 W. 2nd Street
Casper, WY 82601

Permit No. CT-276

Dear Mr. Odasz:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of Energy Transportation Systems, Inc.'s application to construct coal slurry preparation facilities for the processing of 5 million tons of coal per year in Section 15, T.14N., R.70W., at the North Antelope Mine in Campbell County, Wyoming. Following this agency's tentative approval of the request as published December 7, 1979, and in accordance with Section 21(m) of the Wyoming Air Quality Standards and Regulations, the public was afforded a 30-day period in which to submit comments concerning the proposed new source, and an opportunity for a public hearing. No comments have been received. Therefore, on the basis of the information provided to us, approval to construct coal slurry preparation facilities as described in the application is hereby granted pursuant to Sections 21 and 24 of the regulations with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for purpose of investigating actual or potential sources of air pollution, and for determining compliance or non-compliance with any rules, regulations, standards, permits or orders.

2. That all access roads and generally trafficked areas be treated with asphalt, oil or other suitable chemical dust suppressants in addition to water to control fugitive dust emissions. Permanent access roads not subject to travel by over weight haul trucks or mining equipment shall be surfaced with a semi-permanent material. As a minimum, access roads shall have a stabilized base topped with a chip and seal surface. All treated road surfaces shall be maintained on a continuous basis to the extent that surface treatment remains viable as a control measure.

Mr. Frank B. Odasz
Page 2
January 15, 1980

3. That particulate emissions from processing units shall not exceed indicated amounts:

SOURCE	NUMBER OF EMISSION POINTS	ALLOWABLE EMISSIONS lb/hr	ALLOWABLE EMISSIONS tons/yr
Feed conveyor, sampling point, screens	1	0.77	3.3
Clean coal conveyor, sample station, shuttle conveyor, surge bins, variable speed conveyors	1	2.57	11.0
Cage mills, primary slurry tank	3	25.71 (8.57 ea)	110.4 (36.8 ea)
Boiler - 34.4 x 10^6 BTU/hr	1	0.86	2.0
TOTAL		29.91	126.7

It must be noted that this approval does not relieve you of your obligation to comply with all applicable local, county, state and federal standards, regulations or ordinances. Special attention must be given to Section 21 of the Wyoming Air Quality Standards and Regulations. Section 21(a) requires that a permit to operate is required in order to operate a facility after a 120-day start-up period, Section 21(i) requires notification of initial start-up, and Section 21(j) requires that performance tests be conducted within 90 days of initial start-up.

If we may be of further assistance to you, please feel free to contact this office.

Sincerely,

Randolph Wood
Administrator
Air Quality Division

Robert E. Sundin
Director
Dept. of Environmental Quality

RW:RES/ct

APPENDIX E

ENERGY EFFICIENCY

APPENDIX E-1

INTRODUCTION

This appendix summarizes the methodology and assumptions used in the calculation of energy consumption components and the energy consumption and efficiency matrices described in Chapter 2. In addition, a reference section is included to identify sources of data for the calculations. The sections that follow are identified by the following energy consumption component descriptions:

- Slurry preparation and coal cleaning
- Weight loss and heat value improvement
- Slurry pipelines and pump stations
- Slurry dewatering, drying, and cooling
- Boiler feed moisture correction
- Water treatment at dewatering plants
- Losses from pipeline spills
- Railroad loading, unloading, and unit trains
- Railroad windage losses
- Fuel consumed by vehicles waiting at railroad crossings
- Losses from railroad accidents
- Barge loading and transportation
- Other barge-related losses
- Niobrara well field and pipelines
- Crook well field and pipelines
- Oahe Reservoir pipelines (purchase from state of South Dakota - ETSI & SD users)
- Oahe Reservoir pipelines (purchase from Water and Power Resources Service-ETSI only)
- Mississippi River pipelines
- Complete recycle line pipelines
- Combined well field (Niobrara and Crook well fields) and pipelines
- Treated wastewater pipelines
- Gillette water supply and pipelines
- Coal consumption at Cypress Bend

Table E-1 summarizes energy consumptions for the components listed above. Water supply energy debits are summarized in Table E-2. These component energy consumptions were used to determine the overall comparative energy consumption figures for the alternate scenarios as displayed in Table 2-1 of Chapter 2.

The components that comprise each of the proposed action and alternative scenarios are:

1. Proposed Action
   - Three preparation plants with no coal cleaning.
   - Slurry pipelines and pump stations.
   - Nine dewatering facilities.
   - Boiler feed moisture correction.
   - Water treatment at dewatering facilities.
   - Losses from spills.
   - Water supply and pipelines.

2. Proposed Action - Colorado Route
   (Includes the same components as proposed action, but slurry pipeline follows the Colorado route.)

3. Market Alternative
   (Includes the same components as proposed action, but coal is delivered to different markets.)

4. Market Alternative - Colorado Route
   (Includes the same components as market alternative, but pipeline follows the Colorado route.)

TABLE E-1

SUMMARY OF COMPONENT AND ENERGY CONSUMPTION

Component	Energy Consumption (Btu/ton)
Slurry preparation	23,775
Coal cleaning	24,329
Cleaning weight loss - Btu's lost	427,049
Cleaning weight loss adjustment	a
Slurry pipelines and pump stations	
Proposed action	244,869
Proposed action - Colorado route	249,499
Market alternative	259,828
Market alternative - Colorado route	267,308
Pipeline-barge alternative	201,238
Slurry dewatering, drying, cooling	
Proposed action scenarios	251,768
Market alternative scenarios	251,802
Pipeline-barge alternative	339,944
Boiler feed moisture correction	109,175
Water treatment at dewatering plants	994
Losses from pipeline spills	
Proposed action	758
Proposed action - Colorado route	767
Market alternative	748
Market alternative - Colorado route	766
Pipeline-barge alternative	556
Railroad loading and unloading	19,094
Railroad transportation	
No-action (all-rail) alternative	579,442
No-action (rail-barge) alternative	502,243
Railroad windage losses	16,660

TABLE E-1 (concluded)

SUMMARY OF COMPONENT AND ENERGY CONSUMPTION

Component	Energy Consumption (Btu/ton)
Fuel consumed by vehicles at crossings	
No-action (all-rail) alternative	19,825
No-action (rail-barge) alternative	16,059
Losses from railroad accidents	
No-action (all-rail) alternative	14,973
No-action (rail-barge) alternative	12,982
Barge loading	
No-action (rail-barge) alternative	4,925
Pipeline-barge alternative	5,121
Barge transportation	
No-action (rail-barge) alternative	171,987
Pipeline-barge alternative	69,159
Coal consumption at Cypress Bend	b

[a]Multiply preparation, pumping, dewatering, boiler feed moisture, water treatment and spills components by 0.974.

[b]Multiply all components except boiler feed moisture component by 1.008.

TABLE E-2

SUMMARY OF WATER SUPPLY ENERGY CONSUMPTIONS (Btu/ton)

Water Supply System	Proposed Action Scenarios	Market Alternative Scenarios	Pipeline-Barge Alternative
Niobrara Well Field	33,821	33,821	35,620
Crook Well Field	41,017	30,493	25,996
Oahe Reservoir (ETSI and SD users)	78,436	67,912	63,415
Oahe Reservoir (ETSI only)	89,860	79,336	74,838
Mississippi River	218,183	218,183	219,982
Complete Recycle Line[a]	302,592	-	256,178
Combined Well Field[b]	18,350	16,371	15,741
Treated Wastewater[c]	47,853	37,329	32,832

Note: Gillette water supply is for emergency or surplus purposes, supplementing the other supply systems and, therefore, is not included in the analysis.

[a] The dewatering plant water treatment energy consumption of 994 Btu/ton is not included when the total energy consumption for the complete recycle line cases are determined.

[b] Half the water obtained from the Niobrara well field and half from the Crook well field.

[c] This case was based solely on a conceptual study by the South Dakota Sixth District Council of Local Governments (1979). If chosen, this alternative would have to be evaluated in detail before implementation.

5. Pipeline-Barge Alternative
   - Three preparation plants with no coal cleaning.
   - Slurry pipelines and pump stations.
   - Five dewatering facilities.
   - Boiler feed moisture correction.
   - Water treatment at dewatering facilities.
   - Losses from spills.
   - Barge loading.
   - Barge transportation to three markets.
   - Water supply and pipelines.
   - Coal consumption at Cypress Bend.

6. Proposed Action with Coal Cleaning Alternative

   Same components as proposed action, but add the following:
   - Coal cleaning facilities.
   - Cleaning weight loss - Btu's lost.
   - Cleaning weight loss adjustment.

   The rationale for including the energy lost in the coal cleaning refuse as an energy consumption component is that this coal is assumed to be irretrievable with both present and future commercial technology and would be available for shipment if not returned to the mine. Debatably enough, this is theoretically available at some later date, given technology and economic incentive changes. Without this penalty of 427×10^3 Btu/ton, the coal cleaning alternatives only consume about 8×10^3 Btu/ton more than the proposed action scenarios. But, from a realistic energy efficiency standpoint, it is a loss to the system and is considered a debit.

7. No-Action (All-Rail) Alternative
   - Railroad loading and unloading facilities.
   - Railroad unit trains to nine markets.
   - Railroad windage losses.
   - Fuel consumed by vehicles waiting at railroad crossings.
   - Losses from railroad accidents.

8. No-Action (Rail-Barge) Alternative
   - Railroad loading and unloading facilities.
   - Railroad unit trains to four markets.
   - Railroad windage losses.
   - Fuel consumed by vehicles waiting at railroad crossings.
   - Losses from railroad accidents.
   - Barge loading.
   - Barge transportation to three markets.

One component worth mentioning is the steam supplied to the dewatering plants. It poses a penalty to the power plants under normal load conditions; however, it is an incremental steam requirement and does not require a proportional increase in coal burned by the power plants because part of this steam energy is waste heat. Therefore, the Btu's in the additional coal consumed to provide steam for slurry dewatering have been debited to the slurry pipeline scenarios.

Eight different water supply cases (excluding Gillette because it is a reserve source only) were evaluated for the different slurry pipeline scenarios. It must be noted that the figures for the wastewater supply case were based solely on the conceptual information given by the South Dakota Sixth District Council of Local Governments (1979). If this alternative is chosen, it must be evaluated in detail before implementation.

The following are components that have been excluded from the energy consumption analysis, because they are either equivalent for all alternatives and/or make a relatively insignificant contribution:

1. Human labor.

2. Energy consumed in manufacturing or fabricating pipeline physical plant and railroad track and cars.

3. Energy used in transporting fuels to railroad fuel depots or electricity to pipeline power sources.

4. Energy benefits associated with burning coal that has lower sulfur and ash content at the power plant (pipeline cleaned coal).

5. Energy required to mine the coal.

6. Energy consumed by small vehicles used in pipeline or railroad general transportation, maintenance, or cleanup of spills and accidents.

7. Coal grinding energy.

Table E-3 shows the Btu equivalents and conversion efficiencies used to determine the energy consumptions of the components.

TABLE E-3

ENERGY CONVERSION FACTORS

Coal, as-mined, 29.49% moisture	16.7×10^6 Btu/ton
Coal, cleaned, 29.49% moisture	17.1×10^6 Btu/ton
Electrical energy (input)[a]	10.4×10^3 Btu/kWh
Electrical energy (output)[b]	3414 Btu/kWh
Crude oil-to-diesel and gasoline conversion thermal efficiency[c]	0.85
Coal-to-crude oil conversion thermal efficiency[d]	0.52
Railroad locomotive alternative power source conversion factors[e]	
Diesel engine to coal-fired	0.76
Diesel engine to electrically powered	1.29

[a]Electric energy (input) has been converted to theoretical inputs based on average heat rates for fossil-fueled steam electric power plants (Electric Power Research Institute 1979).

[b]Electric energy (output) is the mean physical equivalent, disregarding any thermal losses in conversion.

[c]Based on calculations from API data (American Petroleum Institute 1974, Tables 2 and 4).

[d]From "H-Coal" synthetic oil process (Bechtel 1980).

[e]Based on Btu source to Btu rail ratios from test work performed by California Institute of Technology, Jet Propulsion Laboratory for the U.S. Department of Energy (Liddle 1981).

Component energy consumption was totaled at the raw energy level (i.e., the quantity of coal entering the power plant boiler for generating electrical energy, or crude oil entering the refinery to produce diesel fuel for locomotives and tugboats). The raw energy level was used to establish a consistent basis with other energy efficiency studies (Banks 1977, pp. 6-2, 6-4; Cucek and Wasp 1977, pp. 7,8), and to give a truer picture of the raw resources needed to supply the energy consumed in transport.

Currently, unit trains are almost exclusively powered by diesel locomotives. Other means of locomotion are being considered, but these are only speculative at the moment. Crude oil was chosen as the diesel fuel source, because no positive information or decisive political policies could be found that stated coal would be the dominating diesel fuel source for the lifetime of the ETSI project (Traylor 1980), although the technology does exist. Hence, the use of coal for generating electricity and the use of crude oil for manufacturing diesel fuel are the most likely occurrences for the lifetime of the ETSI project.

However, this dual basis does not allow direct comparison of energy consumptions on an equivalent basis, since the slurry pipeline scenarios use primarily electricity (from coal) for power generation, and the rail scenarios use primarily diesel fuel for power generation. And, diesel fuel made from crude oil is much more efficient (85% conversion at the refinery) than electricity generation (3414/10,400 = 33% at the power plant) at the raw energy level (see Table E-3).

Therefore, in order to put the energy consumption figures on an equivalent basis, of using coal as the main energy source, the following bases were explored:

Diesel Fuel Made From Coal:

The premise of diesel fuel made from coal was determined by using the coal-to-crude-oil conversion factor of 0.52 (see Table E-3 for conversion factors). (This actually means that it requires 1/0.52 = 1.92 times more energy to produce diesel fuel from coal than from crude oil.)

The energy consumed due to diesel fuel usage is divided by the coal-to-crude-oil thermal efficiency factor to obtain the energy consumed if the diesel fuel were produced from coal. This is added to the rest of the energy consumption components to obtain the revised total figure (see Table E-1 for energy consumption components). Taking the case of the no-action (all-rail) alternative:

Diesel fuel portion:

$$\frac{579,442}{0.52} = 1,114,312 \text{ Btu/ton}$$

Electrical and losses portion:

70,552 Btu/ton

Total:

$$1,114,312 + 70,552 = 1,184,864 \text{ Btu/ton} = 1,185 \times 10^3 \text{ Btu/ton}$$

Similar numbers were obtained for the no-action (rail-barge) alternative and pipeline-barge alternative, taking into account railroad and barge diesel fuel consumption. These numbers are denoted by footnote (c) on Table 2-1.

Coal-fired Locomotives:

The premise of coal-fired locomotives has been considered by the railroads and was assessed. (It should be noted that coal-fired tugboats for barges have not been included, because this is an extremely unlikely consideration within the lifetime of the ETSI project (Meece 1981). Hence, the energy consumption for barges remains on a diesel fuel-made-from-crude-oil basis.)

The same methodology as shown above was employed, using the diesel engine to coal-fired locomotive conversion factor of 0.76 on the railroad transportation consumption component. (The conversion factor takes into account the idea that an evolutionary process would probably occur in using progressively more efficient engines such as reciprocating steam engines, then steam turbine engines, then gas turbine engines.) These numbers are denoted by footnote (e) on Table 2-1 for the no-action (all-rail) and no-action (rail-barge) alternatives.

Electrically Powered Locomotives:

Rail electrification has been considered by the railroads and was assessed. (An electrified tugboat system is rather impractical and was not included (Meece 1981.))

Again the same methodology was used, employing the diesel engine to electrically powered locomotive conversion factor of 1.29 on the railroad transportation consumption component. (The conversion factor takes into account a 2 to 3% efficiency gain derived from regenerative braking; or putting power back into the rail electrical power line when a train is descending a grade.) These numbers are denoted by footnote (f) on Table 2-1 for the no-action (all-rail) and no-action (rail-barge) alternatives.

The comparative percentages shown in Table 2-2 of Chapter 2 were determined as the ratio of comparative effective energy available after transport to the total energy transported. Or:

[(energy contained in coal - comparative energy consumed transporting coal) $\div$ (energy contained in coal)] x 100

Each ton of coal contains approximately 16.7×10^6 Btu. Taking the proposed action with the Niobrara water supply system as an example, the percentage is:

$[(16.7 \times 10^6 \text{ Btu/ton} - 665 \times 10^3 \text{ Btu/ton})\ \ 16.7 \times 10^6 \text{ Btu/ton}] \times 100 = 96.0\%$ (see Table 2-1 for Btu/ton consumption figures).

Of course, the comparative energy consumed could likewise be stated as a percentage:

$$\left[\frac{665 \times 10^3 \text{ Btu/ton consumed}}{16.7 \times 10^6 \text{ Btu/ton transported}}\right] \times 100 = 4.0\% \text{ consumed}$$

which is also 100 - percentage of energy consumed in transport (100 - 4.0 = 96.0%).

Finally, it must be recognized that the numbers presented are estimates. Although great care was taken to ensure that these estimates are as accurate as possible, some reasonable omissions, assumptions and contingencies were necessary. The degree of precision shown in Table 2-1 was chosen to allow differentiation between the various scenarios. In many cases the numbers are so similar that one cannot state with confidence that one scenario is more, less, or equal to another in energy efficiency, because some of the estimates used have a great influence on the final values. For instance, a good estimate of windage losses of coal from unit trains is not available, although most knowledgable people agree that some losses occur. A 0.1% windage loss is used in the analysis, which equals 16.7×10^3 Btu/ton. Figures as high as 1% are found in the literature. (See Appendix E-3, Railroad Windage Losses.) Use of a higher estimate would change the ranking of the scenarios without improving their accuracy.

APPENDIX E-2
SLURRY PIPELINE

Slurry Preparation and Coal Cleaning

The following are the items included in the slurry preparation and coal cleaning operations:

Preparation	Cleaning
Receiving hopper with feeder	Separators
Reclaim conveyor	Coarse coal cleaning jig
Cage mills	Hammer mill
Mixing tank	Cyclones
Screens	Fine coal cleaning jig
Rod mill	Dewatering screen centrifuges
Feed conveyors	Thickener
Miscellaneous loads	Clarifier
	Drum filter
	Miscellaneous loads

ETSI has determined that approximately 427.5×10^6 kilowatt-hours (kWh) annually are required in the preparation plants, and that 85.3×10^6 kWh annually are required in the cleaning plants for a throughput of 37.4 million (short) tons annually (MMTA) (ETSI 1980a).

The preparation energy consumption is converted to Btu/ton units using the following calculations based on the electrical energy input conversion factor.

$$\text{Preparation energy} = \frac{(427.5 \times 10^6 \text{ kWh})\ (10{,}400 \text{ Btu/kWh})}{37.4 \times 10^6 \text{ tons}} = 118{,}887 \text{ Btu/ton}$$

However, an estimated 80 percent of the energy used for slurry preparation is required for the rod and cage mills during the coal grinding operations (Banks 1977, p. 6-5; Weston 1980a,b). Because equal grinding is also required for the railroad- and barge-transported coal before it can be fed into the power plant boiler, grinding energy cannot be charged to the pipeline alone. For the purpose of equal comparison, grinding energy is excluded from the analysis:

$$\text{Preparation energy less grinding} = (1.0 - 0.8)(118{,}887 \text{ Btu/ton}) = 23{,}775 \text{ Btu/ton}$$

The cleaning energy consumption is calculated using the electrical input conversion factor as follows:

$$\text{Cleaning energy} = \frac{(85.3 \times 10^6 \text{ kWh})\ (10{,}400 \text{ Btu/kWh})}{37.4 \times 10^6 \text{ tons}} = 23{,}720 \text{ Btu/ton}$$

However, this figure must be corrected for weight loss and heat value improvement, as shown below:

Weight Loss And Heat Value Improvement

It is estimated by ETSI that an average of 5 percent of the original weight of as-mined coal is lost during the coal cleaning process (Weston 1980c). With cleaning, however, the dry basis heat value is improved from 11,814 Btu/lb to 12,125 Btu/lb (Bechtel 1979a).

The Btu content of one ton of the mined coal (29.49 percent total moisture) before cleaning is:

$$\text{Btu as-mined coal} = (1.0 - 0.2949)(2000 \text{ lb/ton})(11{,}814 \text{ Btu/lb}) = 16{,}660{,}103 \text{ Btu}$$

If 95 percent of the original coal weight undergoes an improvement in heat value from 11,814 Btu/lb to 12,125 Btu/lb, this cleaned coal has a Btu content of:

$$\text{Btu}_{\text{cleaned coal}} = (0.95)(1.0 - 0.2949)(2000 \text{ lb/ton})(12{,}125 \text{ Btu/lb}) = 16{,}243{,}741 \text{ Btu}$$

The total Btu's lost in cleaning one ton of coal is then:

$$\text{Btu}_{\text{loss}} = 16{,}660{,}103 - 16{,}243{,}741 = 416{,}362 \text{ Btu/ton}$$

To transport the equivalent Btu's as contained in 37.4 MMTA of contracted as-mined coal, the mining and cleaning throughputs must be increased to:

$$\frac{16{,}660{,}103 \text{ Btu}}{16{,}243{,}741 \text{ Btu}} (37.4 \text{ MMTA}) = 38.36 \text{ MMTA}$$

The cleaning energy consumption shown above is then increased:

$$(23{,}720 \text{ Btu/ton}) \frac{38.36 \text{ MMTA}}{37.4 \text{ MMTA}} = 24{,}329 \text{ Btu/ton}$$

Likewise, the Btu loss figure must be increased:

$$(416{,}362 \text{ Btu/ton}) \frac{38.36 \text{ MMTA}}{37.4 \text{ MMTA}} = 427{,}049 \text{ Btu/ton}$$

But downstream from the cleaning plant the throughput is less: (0.95)(38.36 MMTA) = 36.44 MMTA. Hence, all energy consumptions downstream, except for water supply, must be adjusted by a factor of: 36.44/37.4 = 0.974.

The components to be adjusted are: slurry preparation, slurry pumping, slurry dewatering, boiler feed moisture, water treatment and spills. The rationale for not adjusting the water supply energy consumption is that although less water is required for slurry preparation, more water is required in the plant for coal cleaning. These offsetting differences will have an overall balancing effect on the water supply.

These corrections on the component energy consumptions bring the overall summed Btu/ton figure for the coal cleaning scenarios to a basis of 37.4 MMTA of as-mined specification coal (29.49 percent moisture and 11,814 Btu/lb).

It should be noted that debiting the coal cleaning cases for the heat content lost in the refuse is somewhat debatable. Although no present or future commercial technology exists for recovering this energy, the refuse is returned to the mine and, theoretically, would be available at some later date, given changes in technology and economic incentives. However, from a realistic point of view, in all probability, because of the lack of technology, it would not be recovered during the lifetime of the project (if ever, because of the very high ash and sulfur content). Also, after being mined, it is available for shipment, were it not returned. Hence, from an energy efficiency point of view, it is lost from the system and considered a debit.

On the other hand, the Btu's lost in the refuse may be offset by some indirect and undetermined energy benefits, such as reduced solid waste disposal energy requirements and reduced flue gas treatment energy requirements at the power generating plant. Although studies have been performed that examine the cost effects of coal cleaning (Buder and Clifford 1979), the energy trade-offs have not yet been fully explored, and were not included.

Slurry Pipelines and Pump Stations

The following items are included in the slurry pumping energy requirement (Sandhu 1980):

Main-line slurry pumps	Slurry tank agitators
Slurry centrifugal charge pumps	Inhibitor tank agitators
Inhibitor pumps	Motorized valve operators
Small-horsepower auxillary pumps	Miscellaneous loads and heating

ETSI (1980b) has supplied the slurry pumping horsepowers for the different scenarios, as listed below:

Scenario	Operating Horsepower
Proposed action	137,500
Proposed action - Colorado route	140,100
Market alternative	145,900
Market alternative - Colorado route	150,100
Pipeline-barge alternative	113,000

These operating horsepowers include the losses and mechanical efficiencies of the pumps and agitators. Energy consumption in units of Btu/ton is derived as follows:

$$\text{Slurry pumping energy} = (\text{horsepower})(0.98\ \text{availability})(8760\ \text{hr/yr})(0.746\ \text{kWh/hp-hr})$$

$$\times\ (10{,}400\ \text{Btu/kWh})(1/37.4 \times 10^6\ \text{tons/yr})$$

$$= (1.780864)(\text{horsepower})\ \text{in Btu/ton}$$

For example, the proposed action energy consumption would be:

$$(137{,}500\text{hp})(1.780864) = 244{,}869\ \text{Btu/ton}$$

The slurry pumping energies for the different scenarios are:

Scenario	Btu/ton
Proposed action	244,869
Proposed action - Colorado route	249,499
Market alternative	259,828
Market alternative - Colorado route	267,308
Pipeline-barge alternative	201,238

Slurry Dewatering, Drying, and Cooling

The following items are included in the slurry dewatering, drying and cooling operations:

- Slurry transfer pumps
- Water pumps
- Screen bowl centrifuges
- Clarifloccul ator agitators
- Filter cake presses
- Conveyor motors
- Vibrator motors
- Standby steam boilers
- Disc coolers

The proposed action scenarios, market alternative scenarios, and pipeline-barge alternative would include dewatering facilities at each of the pipeline terminals. ETSI has supplied the operating horsepowers for each facility (Bechtel 1979b). These are listed in Tables E-4, E-5, and E-6 for the three scenarios respectively. The operating horsepowers take into account the losses and mechanical efficiencies of all the dewatering and cooling equipment.

Given the total operating horsepower, the Btu/ton consumption is calculated using the same formula as the slurry pumping energy formula, e.g.:

$$(\text{horsepower})(1.780864) = \text{Btu/ton}$$

TABLE E-4

DEWATERING, COOLING, AND DRYING ENERGY
PROPOSED ACTION SCENARIOS

Facility	Volume (MMTA)	Dewatering & Cooling Horsepower	Drying Steam (Btu/hr x 10^8)
Ponca City	6.6	8,240	2.5
Pryor	3.0	4,330	1.1
Muskogee	5.0	6,330	1.9
Independence	5.0	6,330	1.9
White Bluff	5.0	6,330	1.9
Boyce	1.8	3,250	0.7
Lake Charles	4.0	5,360	1.5
New Roads	2.0	3,360	0.8
Wilton	5.0	6,330	1.9
TOTAL		49,860	14.2
Btu/ton		88,794	162,974

Total Btu/ton: 251,768

Sample Calculation:

Horsepower -

(49,860 hp) (1.780864) = 88,794 Btu/ton

Drying Steam -

(14.2×10^8 Btu/hr) (8760) (0.98)(1/2) ($1/37.4 \times 10^6$) = 162,974 Btu/ton

Total -

88,794 + 162,974 = 251,768 Btu/ton

TABLE E-5

DEWATERING, COOLING, AND DRYING ENERGY
MARKET ALTERNATIVE SCENARIOS

Facility	Volume (MMTA)	Dewatering & Cooling Horsepower	Drying Steam (Btu/hr x 10^8)
Oologah	3.5	4,845	1.3
Pryor	5.3	6,720	2.0
Independence	5.0	6,330	1.9
White Bluff	5.0	6,330	1.9
Boyce	1.8	3,250	0.7
Lake Charles	4.0	5,360	1.5
New Roads	2.0	3,360	0.8
Baton Rouge	5.8	7,354	2.2
Wilton	5.0	6,330	1.9
TOTAL		49,879	14.2
Btu/ton		88,828	162,974

Total Btu/ton: 251,802

TABLE E-6

DEWATERING, COOLING, AND DRYING ENERGY
PIPELINE BARGE ALTERNATIVE

Facility	Volume (MMTA)	Dewatering & Cooling Horsepower	Drying Steam (Btu/hr x 10^8)
Oologah	3.5	4,845	1.3
Pryor	5.3	6,720	2.0
Independence	5.0	6,330	1.9
White Bluff	5.0	6,330	1.9
SUBTOTAL		24,225	7.1
Cypress Bend	18.6	22,088	6.9
TOTAL		46,313	14.0
Btu/ton		82,477	257,467[a]

Total Btu/ton: 339,944

[a]Calculated as follows:

Drying Steam Annual Consumption at Power Plant Locations:

$$(7.1 \times 10^8 \text{ Btu/hr})(8760)(0.98)(1/2) = 3.0476 \times 10^{12} \text{ Btu/yr}$$

Cypress Bend Drying Steam Annual Consumption:

$$(6.9 \times 10^8 \text{ Btu/hr})(8760)(.98/.9) = 6.5817 \times 10^{12} \text{ Btu/yr}$$

Total Drying Steam Energy Intensity:

$$\frac{(3.0476 + 6.5817) \times 10^{12} \text{ Btu/yr}}{37.4 \times 10^6 \text{ tons/yr}} = 257{,}467 \text{ Btu/ton}$$

The dewatering and cooling Btu/ton energy intensity results are shown in Tables E-4, E-5, and E-6.

The steam requirements for the drying facilities have been supplied by ETSI (1980a) and are also listed in Tables E-4, E-5, and E-6. It has been stated that except at Cypress Bend, all steam requirements would be supplied by the utilities receiving the coal causing an incremental increase in power plant coal consumption under normal generating loads. The effect of the dewatering steam load on the power plants is to increase their fuel requirement by 59 Btu/kWh (ETSI 1980c). Said another way, since the dewatering plant can use heat that would otherwise be wasted by the power plant, the power plant need only consume an additioal 1 Btu to provide 2 Btu for dewatering steam. Because all drying steam is supplied by the power plants in the proposed action and market alternative scenarios their required Btu/ton input energy is:

(steam Btu/hr)(8760 hr/yr)(0.98 availability)(1/37.4 x 10^6 tons/yr)
(1 Btu coal/2 Btu steam)

The pipeline-barge alternative must be calculated in a different manner to account for the steam generated by ETSI at Cypress Bend. Calculating the energy consumption on an annual basis, the Btu consumption for the power plant locations is determined by:

(steam Btu/hr)(8760 hr/yr)(0.98 availability)(1 Btu coal/2 Btu steam)

The energy consumed at Cypress Bend must all be debited and corrected for a boiler efficiency of 0.9 (Holleran 1980). The Btu/yr consumption is calculated by:

(steam Btu/yr)(8760 hr/yr)(0.98 availability/0.9 boiler efficiency)

To obtain the Btu-per-ton energy intensity, the annual energy consumptions are added and divided by 37.4 MMTA.

The drying steam Btu/ton results of these calculations are shown in Tables E-4, E-5, and E-6.

Boiler Feed Moisture Correction.

The coal delivered by the railroads to the power plants is assumed to have a composite total moisture content of 29.49 percent, while the pipeline coal would be fed to the power plant boilers with a 32.73 percent total moisture content. The higher moisture content of the pipeline coal would cause a reduction in the boiler steam efficiency due to energy losses in vaporizing the unwanted moisture to steam. The difference in energy consumed can be found by using steam tables. If we assume a $72^{O}F$ entering temperature and a $280^{O}F$ stack gas exit (Banks 1977, p. 6-4), the change in enthalpy of the water is:

$$(1173.7 \text{ Btu/lb at } 280^{O}) - (40.0 \text{ Btu/lb at } 72^{O}) = 1133.7 \text{ Btu/lb water}$$

The energy required for moisture correction to maintain constant boiler efficiency then is calculated:

(1133.7 Btu/lb water)(additional lbs water in dewatered coal/ton of as-mined coal) = Btu/ton

Using 1 ton of as-mined coal as a basis, the additional pounds of water in dewatered coal is:

(lbs of water in dewatered coal)-(lbs of water in as-mined coal)

Pounds of water in dewatered coal is calculated as follows:

(1.0 - 0.2949)(2000) = 1410.2 lb bone dry (bd) coal

Let X equal total lbs of dewatered coal, then

$$(1410.2 \text{ lb bd coal}) + (0.3273)(X) = X$$

$$X = \frac{1410.2}{0.6727} = 2096.3 \text{ total lb dewatered coal}$$

$$(0.3273)(2096.3) = 686.1 \text{ lb water in dewatered coal}$$

Pounds of water in as-mined coal is:

$$(0.2949)(2000) = 589.8 \text{ lb water in as-mined coal}$$

Additional water in dewatered coal is then:

$$686.1 - 589.8 = 96.3 \text{ lb additional water}$$

Hence, the boiler feed moisture correction energy consumption becomes:

$$\begin{array}{l}\text{Boiler efficiency} \\ \text{energy correction}\end{array} = (1133.7)(96.3) = 109{,}175 \text{ Btu/ton}$$

Water Treatment At Dewatering Plants

The energy required to provide secondary water treatment for the effluent of the slurry dewatering plants is estimated to be 95,600 kWh per million tons of as-mined coal (Plummer 1980). This is converted to Btu/ton by the formula:

$$\begin{array}{l}\text{Water} \\ \text{treatment} \\ \text{energy}\end{array} = (95{,}600 \text{ kWh}/10^6 \text{ tons})(10{,}400 \text{ Btu/kWh}) = 994 \text{ Btu/ton}$$

The elements included in water treatment are aeration equipment, sludge pumps, and settling basin mechanisms.

Losses From Pipeline Spills

The average spill size estimated for the proposed action is 8,241 barrels of slurry and the estimated annual frequency rate is 0.001 spills per mile as stated in the Ruptures and Spills Technical Report (WCC 1981j, pp. 7 and 5). Based on the slurry containing 41.7% bone dry coal having a specific gravity of 1.45 as shown in the Project Description Technical Report (WCC 1981a, Figure 1-4, Note 2 and p. 1-46) yielding a slurry specific gravity of 1.149, the Btu/ton-mile energy intensity figure is calculated as follows:

(8241 bbls slurry/spill)(.001 spills/mile-yr)(42 gal/bbl slurry) x
(8.33 x 1.149 S.G. lb slurry/gal)(.417 lb bd coal/lb slurry) x
(1 lb as-mined coal/ (1.0 - .2949) lb bd coal)(1 ton/2000 lb) x
(1/37.4 x 10^6 tons/year)(16.7 x 10^6 Btu/ton) = 0.4374 Btu/ton-mile

The Btu/ton energy consumption is obtained by multiplying 0.4374 Btu/ton-mile times the number of slurry pipeline miles for a scenario. For example, the proposed action has 1733 miles of slurry pipelines, thereby yielding (0.4374 Btu/ton-mile)(1733 miles) = 758 Btu/ton.

Based on the slurry pipelines distances (ETSI 1980b), the pipeline spill energy consumptions for the different scenarios become:

Scenario	Slurry Pipelines Distance (miles)	Btu/ton
Proposed action	1733	758
Proposed action - Colorado route	1754	767
Market alternative	1709	748
Market alternative - Colorado route	1752	766
Pipeline-barge alternative	1271	566

APPENDIX E-3

RAILROAD AND BARGE TRANSPORTATION

Railroad Loading, Unloading, and Unit Trains

A typical unit train consists of several diesel-powered locomotives pulling 100 hopper cars, each having a capacity of 100 net tons, giving a total of 10,000 net tons per unit train. Transportation energy debited to the railroad scenarios begins at the railroad car loading facility and includes the fuel consumed by the unit trains and the energy required to unload the trains upon arrival at the final market destination or barge loading facility.

The major equipment required for loading and unloading of railroad unit trains consists of conveyor belts, coal stockpile stacker/reclaimers, and coal feeders for transferring coal to the loading/unloading conveyor belts. An estimate of 153,000 kWh per month for each two million tons is used to determine the Btu's required for loading and unloading each ton of coal (Meece 1979):

$$\left[\underbrace{153{,}000 \text{ kWh/mo} - 2\text{x}10^6 \text{tons}}_{\text{loading}} + \underbrace{153{,}000 \text{ kWh/mo} - 2\text{x}10^6 \text{ tons}}_{\text{unloading}}\right] \text{x}$$
$$(10{,}400 \text{ Btu/kWh})(12 \text{ mo/yr}) = 19{,}094 \text{ Btu/ton}$$

Leilich et al. (1976, p. 4-28) have estimated the railroad energy intensity for coal transportation to be 366 Btu per net ton-mile. Burlington-Northern's published fuel requirement for coal transportation is 387 net ton-miles per gallon (Williams 1980). Assuming 145,000 Btu per gallon of diesel fuel yields an energy intensity of:

$$(145{,}000 \text{ Btu/gal})(1/387 \text{ net ton-mile/gal}) = 375 \text{ Btu/net ton-mile}$$

which is in close agreement with Leilich et al.'s estimate. These figures include allowances for the empty return trip and idling times. For this analysis, an average energy intensity of 370 Btu/net ton-mile is used.

Rail transportation energy consumption in units of Btu/ton is calculated as follows, after calculating and summing the net ton-miles (miles x tons):

Railroad
transportation = (total net ton-miles)(370 Btu/net ton-mile)(1/total tonnage)(1/0.85)
energy

The 0.85 factor in the above equation is the conversion efficiency for refining crude oil into diesel fuel (see Table E-3).

Tables E-7 and E-8 show the unit train energy intensities for the no-action (all-rail) and no-action (rail-barge) alternatives, respectively.

Railroad Windage Losses

It has been suggested that a unit train can lose 1 percent of its coal on a haul of 1000 miles (Faddick 1979), but this loss has not been substantiated or quantified by any complaints from buyers of railroad-shipped coal (OTA 1978, pp. 116, 117; Rogozen and Margler 1978, p. 22). It is the opinion of others that a coal "windage" loss of less than 1 percent would be undetectable within the accuracy of existing belt scales (Meece 1980; OTA 1978, p. 117).

However, the Office of Technology Assessment has estimated a "rough approximation" of 0.1 percent (OTA 1977, p.88), which is used for this analysis, although this value might well be low. On this basis, the amount of energy consumed through losses is:

$$\frac{0.1}{100} \text{ (16,660,103 Btu/ton of as-mined coal) = 16,660 Btu/ton}$$

TABLE E-7

UNIT TRAIN TRANSPORTATION ENERGY
NO-ACTION (ALL-RAIL) ALTERNATIVE

Origin	Market	Miles[a]	Tonnage (MMTA)	Net Ton-Miles ($x 10^6$)
N. Rawhide	Pryor	1038	3.0	3,114
Black Thunder	Ponca City	1100	6.6	7,260
Black Thunder	Muskogee	1121	5.0	5,605
Jacobs Ranch	White Bluff	1365	5.0	6,825
N. Antelope	Independence	1217	5.0	6,085
Jacobs Ranch	Boyce	1651	1.8	2,972
Jacobs Ranch	Lake Charles	1574	4.0	6,296
Buckskin	New Roads	1724	2.0	3,448
Antelope	Wilton	1636	5.0	8,180
		TOTAL	37.4	49,785
			Btu/ton	579,442

[a]WCC 1981i;, p. 23

Sample Calculation:

N. Rawhide to Pryor, Net Ton-Miles-
(1038 miles)(3 MMTA) = 3,114 x 10^6 net ton-miles

Railroad Transportation Energy, Total-
(49,785 x 10^6 net ton-miles) (370) (1/37.4 x 10^6 tons/yr) (1/0.85)
= 579,442 Btu/ton

TABLE E-8

UNIT TRAIN TRANSPORTATION ENERGY

NO-ACTION RAIL-BARGE ALTERNATIVE

Origin	Market/ Barge Facility	Miles[a]	Tonnage (MMTA)	Net Ton-Miles (x 10^6)
N. Rawhide	Pryor	1038	5.3	5,501
Jacobs Ranch	Oologah	1056	3.5	3,696
Jacobs Ranch	White Bluff	1365	5.0	6,825
N. Antelope	Independence	1217	5.0	6,085
Buckskin	St. Louis[b]	1133	2.0	2,266
N. Rawhide	St. Louis[c]	1133	11.3	12,803
Antelope	St. Louis[d]	1126	5.0	5,630
		TOTAL	37.1	42,806
			Btu/ton	502,243

[a]Rand McNally and Co. 1978; Fleischauer undated; Fleischauer 1980; WCC 1981i, p.23.

[b]Via barge to New Roads.

[c]Via barge to Baton Rouge.

[d]Via barge to Wilton.

The same losses are assumed for both the no-action (all-rail) alternative and the no-action (rail-barge) alternative, because they primarily occur at the outset of the journey (OTA 1978, p. 117).

Fuel Consumed by Vehicles Waiting at Railroad Crossings

While trains are passing through grade crossings, automobile traffic will be stopped, and consume fuel while idling. From data received from the Aerospace Corporation studies - BETC (Rosslar 1981), on the average, each stopped vehicle consumes an estimated 0.500 gallons of gasoline per hour. Converting this to the raw energy level at 85% conversion efficiency yields 0.500/0.85 = 0.588 gallons per hour of crude oil. This figure is multiplied by the annual vehicle delays hours to obtain the annual amount of fuel consumed.

A train moves through a crossing in approximately two minutes (WCC 1981i, p. 90). A further allowance for switching, maintenance, crew changes, and stopping (WCC 1981i, p. 91) must be added--say one additional minute to cover these contingencies. Hence, the average estimated traffic delay time is three minutes, or 0.002083 days, for each train. When this is multiplied by the number of trains passing in a day, and the average daily highway traffic, it yields the daily vehicle delay hours.

Tables III-7 through III-10 and III-13 through III-19 of the No-Action Alternative Technical Report (WCC 1981i) give average daily highway traffic (ADHT) figures for grade crossings in some major cities along the routes. Using these and the number of trains per day at these crossings from Table III-1 of the same report, the daily traffic delay is calculated.

For instance, in Alliance, Nebraska, the ADHT is 3,000 cars/day at the two crossings listed (Table III-7) and 20 trains are expected daily (Table III-1). Hence, (3,000 ADHT)(20 trains)(0.002083 days) = 125 traffic delay hours/day.

Tables E-9 and E-10 summarize the daily vehicle delay hours calculations. However, this data only covers a selected numbers of grade crossings (i.e. 520 for the no-action (all-rail) alternative), and Burlington Northern has indicated that there are over 1,300 grade crossings along this route (Boyce 1981). Hence, an allowance of 50% (or a factor of 1.5) is added to the calculations to cover the unspecified crossings. The annual amount of fuel consumed at the raw energy level then becomes:

(17,380 hours/day)(365 days/yr)(0.588 gal/hr)(1.5) =
5.60×10^6 gallons/yr for the no-action (all-rail) alternative, and
(13,972)(365)(0.588)(1.5) = 4.50×10^6 gallons/yr for the no-action (rail-barge) alternative.

Multiplying the fuel consumption by the heating value of 1.324×10^5 Btu/gal for gasoline (Combustion Engineering, Inc. 1977) and dividing by the annual tonnage yields the Btu/ton energy consumptions:

(5.60×10^6 gal/yr)(1.324×10^5 Btu/gal)(1/37.4×10^6 tons/yr)
= 19,825 Btu/ton for the no-action (all-rail) alternative, and

(4.50×10^6)(1.324×10^5)(1/37.1×10^6)
= 16,059 Btu/ton for the no-action (rail-barge) alternative.

Losses From Railroad Accidents

Historical coal train accident data was furnished by Burlington Northern which gave the following "accidents per million coal train miles" ratios, and an average of 79.4% of the accidents involved loaded coal trains (Boyce 1981):

TABLE E-9

DAILY VEHICLE DELAY HOURS
NO-ACTION (ALL-RAIL) ALTERNATIVE

State	City	Number of Crossings	ADHT	Trains Per Day	Traffic Delay (Hrs)
Section North of Kansas City, Missouri:					
Nebraska	Alliance	2	3,000	20	125
	Lincoln	21	67,555	20	2,814
Missouri	Kansas City	127	149,375	20	6,223
	Independence	61	60,442	20	2,518
Kansas	Kansas City	9	23,620	20	984
	Totals:	220	303,992		12,664
Sections South of Kansas City, Missouri:					
Kansas	Coffeyville	40	79,826	8	1,330
	Emporia	19	38,235	4	319
	Osawatomie	4	5,125	10	107
	Parsons	31	62,820	2	262
Missouri	Carthage	60	30,755	5	320
	Joplin	146	228,367	5	2,378
	Totals:	300	445,128		4,716
			Daily Vehicle Delay Hours		17,380

TABLE E-10

DAILY VEHICLE DELAY HOURS
NO-ACTION (RAIL-BARGE) ALTERNATIVE

State	City	Number of Crossings	ADHT	Trains Per Day	Traffic Delay (Hrs)
Section North of Lincoln, Nebraska:					
Nebraska	Alliance	2	3,000	20	125
	Lincoln	21	67,555	20	2,814
	Totals:	23	70,555		2,939
Sections South of Lincoln, Nebraska:					
Missouri	Kansas City	127	149,375	10	3,111
	Independence	61	60,442	10	1,259
	St. Louis[a]	197[a]	233,437[a]	10	4,862
Kansas	Kansas City	9	23,620	10	492
	Coffeyville	40	79,826	5	831
	Osawatomie	4	5,125	8	85
	Parsons	31	62,820	3	393
	Totals:	469	614,645		11,033
			Daily Vehicle Delay Hours		13,972

[a]Assumed similar to Kansas City area (i.e., total of Kansas City, Kansas, plus Kansas City, Missouri, plus Independence, Missouri).

Year	Ratio - Accidents Per Million Coal Train Miles
1976	12.84
1977	9.70
1978	9.49
1979	8.77
1980	6.07

Because of the downward trend, this data was fitted to a power law equation and projected to the mid-1980's, and indicated an accident frequency rate of 5.5 accidents per million coal train miles. Based on 79.4% of these accidents involving loaded coal trains and thereby sustaining coal losses, this rate becomes (5.5)(0.794) = 4.4 accidents per million coal train miles.

Coal losses of 803 tons per accident have been reported by Burlington Northern (Beley 1981b). Multiplying this by the projected frequency rate and coal Btu content yields the amount of energy in Btu's lost per train mile:

$$(803 \text{ tons/accident})(4.4 \text{ accidents}/10^6 \text{ miles})(16.7 \times 10^6 \text{ Btu/ton})$$
$$= 59{,}004 \text{ Btu/train mile}$$

Multiplying this by 9,490,625 annual train miles (WCC 1981i) for the no-action (all-rail) alternative and 8,162,877 annual train miles for the no-action (rail-barge) alternative (Fleischauer 1981), and dividing by the annual tonnages, yields the energy consumptions:

$$\frac{(59{,}004 \text{ Btu/train mile})(9{,}490{,}625 \text{ train miles/yr})}{37.4 \times 10^6 \text{ tons/yr}}$$

= 14,973 Btu/ton for the no-action (all-rail) alternative, and

$$\frac{(59{,}004)(8{,}162{,}877)}{37.1 \times 10^6} = 12{,}982 \text{ Btu/ton for the no-action (rail-barge) alternative.}$$

Barge Loading and Transportation

Barge loading and transportation is a component in both the pipeline-barge alternative and no-action (rail-barge) alternative. In the pipeline-barge alternative, 18.3 MMTA of coal would be shipped from a barge loading facility at Cypress Bend. In the no-action (rail-barge) rail-barge alternative, 18.3 MMTA of coal would be shipped from a barge loading facility in St. Louis. The barge delivery destinations and one-way mileages from the barge loading facilities are shown in Table E-11.

TABLE E-11

BARGE DELIVERY MILEAGES

Destination	One-way Miles from: Cypress Bend	One-way Miles from: St. Louis
New Roads, LA	328	892
Baton Rouge, LA	338	902
Wilton, LA	407	971

Source: American Continental Barge Line Co. Undated.

The major energy-consuming items of a barge loading facility and transportation system are:

Conveyors

Stacker/reclaimer

Barge loader

Diesel-powered tugboats (5,600 hp)

Barge loading facilities for pipeline-delivered and railroad-delivered coal are assumed to be similar in design. The estimated energy consumption is 80,000 kWh/mo for each million tons of coal loaded (Meece 1979). This consumption translates into a Btu/ton energy intensiveness of:

$$\frac{(80{,}000 \text{ kWh/mo} - 10^{6} \text{ tons})(18.3 \times 10^{6} \text{tons loaded})(12 \text{ mo/yr})(10{,}400 \text{ Btu/kWh})}{37.1 \times 10^{6} \text{ tons/yr}}$$

= 4925 Btu/ton for the no-action (rail-barge) alternative

and

(4925 Btu/ton)(37.1/37.4)=4886 Btu/ton for the pipeline-barge alternative

because all figures are initially calculated on a 37.4 MMTA basis and later corrected (see Appendix E-5, Coal Consumption at Cypress Bend).

However, dewatered coal from the pipeline has more moisture than as-mined coal. The additional 96.3 lb of water per as-mined ton of coal is also loaded and shipped. Hence, this figure must be further corrected by (see Appendix E-2, Moisture Feed Correction):

$$\frac{2096.3}{2000} (4886 \text{ Btu/ton}) = 5121 \text{ Btu/ton for the pipeline-barge alternative}$$

A typical barge tow would consist of 20 barges carrying 1500 tons each, yielding a total capacity of 30,000 tons of coal per tow. Thus each delivery site would have the following number of tows per year:

New Roads, LA	2.0 MMTA ÷ 30,000 = 66.67 tows/yr
Baton Rouge, LA	11.3 MMTA ÷ 30,000 = 376.67 tows/yr
Wilton, LA	5.0 MMTA ÷ 30,000 = 166.67 tows/yr

Tow speed downstream is estimated at 8 mph and upstream, at 6 mph, yielding an average round-trip speed of 7 mph (Meece 1979).

Assuming one gallon of diesel fuel per horsepower per day (Meece 1979) and 145,000 Btu/gallon of diesel fuel, the formula for calculating the annual Btu consumption for each barge transportation segment is:

$$(\text{tows/yr})(1\ \text{gal/hp-day})(145{,}000\ \text{Btu/gal})(5600\ \text{hp})(1/24\ \text{hr/day}) \times$$

$$(2 \times \text{one-way miles})(1/7\ \text{miles/hr})$$

$$= (\text{tows/yr})(\text{one-way miles})\ (9{,}666{,}667)\ \text{in Btu/yr}$$

This calculation allows for the return trip by virtue of the (2 x one-way miles) factor.

The energy-intensiveness is found by simply dividing the above Btu result by the annual total tonnage of 37.4 MMTA for the pipeline-barge alternative and 37.1 MMTA for the no-action (rail-barge) alternative. However, a correction for the increased tons of dewatered coal is made for the pipeline-barge alternative. As mentioned for barge loading, this factor of (2096.3/2000) = 1.048 is multiplied by the crude oil figure for the pipeline-barge alternative to get the actual energy consumption.

Table E-12 lists the energy-intensiveness of the barge transportation system for both diesel and unrefined crude oil, using the 0.85 crude-oil-to-diesel-fuel conversion efficiency.

Other Barge-Related Losses

Although it has been suggested that some coal may be lost during barge handling, the results of an inquiry indicate that these losses are negligible and not detectable within the accuracy of existing belt scales (Meece 1980).

Also, no coal barge sinkings have been recorded on the lower Mississippi River in recent years, and when these have occurred in the past, the barge was raised and repaired, and the product was recovered. Hence, losses from barge accidents are insignificant (Meece 1981).

TABLE E-12

ENERGY-INTENSIVENESS OF BARGE TRANSPORTATION (Btu/ton)

Destination	Pipeline-Barge Alternative: Diesel Fuel	Pipeline-Barge Alternative: Crude Oil[a]	No-Action (Rail-Barge) Alternative: Diesel Fuel	No-Action (Rail-Barge) Alternative: Crude Oil[a]
New Roads, LA.	5,652	6,650	15,495	18,230
Baton Rouge, LA.	32,907	38,714	88,526	104,148
Wilton, LA.	17,533	20,627	42,168	49,609
TOTAL	56,092	65,991	146,189	171,987
		(x 1.048)		
		= 69,159		

[a]Conversion efficiency = 0.85 (see Table E-3)

Sample Calculation:

Pipeline-Barge Alternative, Cypress Bend to New Roads -

$(66.67 \text{ tows/yr})(328 \text{ one-way miles})(9{,}666{,}667) = 2.11 \times 10^{11}$ Btu/yr

$(2.11 \times 10^{11} \text{ Btu/yr})(1/37.4 \times 10^{6} \text{ tons/yr}) = 5{,}652$ Btu/ton (diesel fuel)

$(5{,}652 \text{ Btu/ton})(1/0.85) = 6{,}650$ Btu/ton (crude oil)

Pipeline-Barge Alternative, Total Energy Consumption -

(crude oil) $6{,}650 + 38{,}714 + 20{,}627 = 65{,}991$ Btu/ton

$(65{,}991)(1.048 \text{ dewatered coal correction}) = 69{,}159$ Btu/ton

APPENDIX E-4

WATER SUPPLY ALTERNATIVES

Nine different water supply cases were considered:

1. Niobrara well field to Jacobs Ranch preparation plant and then further distribution from there to North Rawhide and North Antelope plants.

2. Crook well field to North Rawhide preparation plant, then to Jacobs Ranch plant, and then to North Antelope preparation plant.

3. Oahe Reservoir to North Rawhide preparation plant, then to Jacobs Ranch plant, and then to North Antelope plant, with supply of water to South Dakota residents (water purchase from South Dakota).

4. Oahe Reservoir - the same as Item 3 but water (purchased from Water and Power Resources Service) for ETSI only (without supply to South Dakota residents).

5. Water originates from the Mississippi River following the coal slurry pipeline route to the Niobrara well field, and from there a pipeline system identical to the Niobrara supply case.

6. Complete recycle line from all dewatering terminals back to Jacobs Ranch preparation plant, then to North Rawhide and North Antelope plants.

7. Combined well field, with half the water obtained from the Niobrara well field and half from the Crook well field.

8. Treated wastewater from 10 South Dakota locations to North Rawhide preparation plant, then to Jacobs Ranch plant, and then to North Antelope plant.

9. City of Gillette well field supply tying into one of the other cases. This is for emergency or surplus purposes only.

The overall water supply quantities differ slightly for the various scenarios, but the differences are insignificant. Hence, 20,000 acre-feet per year (ac-ft/yr) was used for the first eight water supply cases.

For cases 1,2,3,4,6,7, and 8, the following horsepowers were furnished (Weston 1980c, 1981a, and 1981b; ETSI 1981; South Dakota Sixth District Council of Governments 1979):

Niobrara Supply:		
Well field	8,000	hp
Niobrara to Jacobs Ranch	10,200	
Total	18,200	hp
Crook Supply:		
Well field	3,600	hp
Crook to North Rawhide	7,600	
Total	11,200	hp
Oahe Reservoir Supply (ETSI & SD users):		
Oahe to North Rawhide (debited to ETSI)	32,000	hp
Oahe Reservoir Supply (ETSI only):		
Oahe to North Rawhide	38,350	hp
Complete Recycle Line Supply to Jacobs Ranch:		
Proposed action scenarios	167,600	hp
Pipeline-barge alternative	140,800	hp

Combined Well Field Supply:

Niobrara well field	2,700	hp
Niobrara to Jacobs Ranch	2,250	
Niobrara Total	4,950	hp
Crook well field	1,600	hp
Crook to North Rawhide	1,800	
Crook Total	3,400	hp
Combined Total	8,350	hp

Treated Wastewater Supply:

10 South Dakota locations to North Rawhide	15,000	hp

The water distribution horsepowers for the different scenarios were also furnished (Weston 1981b):

	Proposed Action Scenarios	Market Alternative Scenarios	Pipeline-Barge Alternative
Jacobs Ranch to N. Rawhide	200	200	1,200
Jacobs Ranch to N. Antelope	400	400	400
North Rawhide to Jacobs Ranch	11,200	5,350	2,850
North Rawhide to Jacobs Ranch (Combined Supply)	1,450	350	0

From these and a calculation of the Mississippi River line horsepower, the energy intensities for the alternate water supply cases are determined according to the formula:

$$(\text{horsepower})(8760\ \text{hr/yr})(0.99\ \text{availibility})(0.746\ \text{kWh/hp-hr})$$
$$\times(10{,}400\ \text{Btu/kWh})(1/37.4 \times 10^6\ \text{tons/yr}) = (1.799)(\text{horsepower})\ \text{in Btu/ton}$$

For summations of horsepowers in the water sections below, the following abbreviations are used:

Jacobs Ranch	= JR
North Rawhide	= NR
North Antelope	= NA
Niobrara	= Nio
Crook	= CC
Oahe Reservoir	= Oahe
Well Field	= WF
Mississippi River	= Miss R.
South Dakota	= SD

Niobrara Well Field and Pipelines

Horsepowers are summed and energy consumptions are calculated as follows:

Proposed action scenarios:

Nio WF and to JR	18,200	hp
JR to NR	200	
JR to NA	400	
Total	18,800	hp

Energy consumption = (1.799)(18,800) = 33,821 Btu/ton

Market alternative scenarios:

Nio WF and to JR	18,200	hp
JR to NR	200	
JR to NA	400	
Total	18,800	hp

Energy consumption = (1.799)(18,800) = 33,821 Btu/ton

Pipeline-barge alternative:

Nio WF and to JR	18,200	hp
JR to NR	1,200	
JR to NA	400	
Total	19,800	hp

Energy consumption = (1.799)(19,800) = 35,620 Btu/ton

Crook Well Field and Pipelines

Horsepowers and energy consumptions are as follows:

Proposed action scenarios:

CC WF and to NR	11,200	hp
NR to JR	11,200	
JR to NA	400	
Total	22,800	hp

Energy consumption = (1.799)(22,800) = 41,017 Btu/ton

Market alternative scenarios:

CC WF and to NR	11,200	hp
NR to JR	5,350	
JR to NA	400	
Total	16,950	hp

Energy consumption = (1.799)(16,950) = 30,493 Btu/ton

Pipeline-barge alternative:

CC WF and to NR	11,200	hp
NR to JR	2,850	
JR to NA	400	
Total	14,450	hp

Energy consumption = (1.799)(14,450) = 25,996 Btu/ton

Oahe Reservoir Pipelines (ETSI & SD users)

The Oahe Reservoir pipeline would originate at Oahe Reservoir in South Dakota and extend to the North Rawhide preparation plant. In addition to supplying the ETSI slurry pipeline with 20,000 ac-ft/yr of water, the Oahe pipeline would also have the potential to deliver 7,125 ac-ft/yr of water to the residents of the state of South Dakota.

Proposed action scenarios:

Oahe to NR		32,000	hp
NR to JR		11,200	
JR to NA		400	
	Total	43,600	hp

Energy consumption = (1.799)(43,600) = 78,436 Btu/ton

Market alternative scenarios:

Oahe to NR		32,000	hp
NR to JR		5,350	hp
JR to NA		400	
	Total	37,750	hp

Energy consumption = (1.799)(37,750) = 67,912 Btu/ton

Pipeline-barge alternative:

Oahe to NR		32,000	hp
NR to JR		2,850	
JR to NA		400	
	Total	35,250	hp

Energy consumption = (1.799)(35,250) = 63,415 Btu/ton

Oahe Reservoir Pipelines (ETSI only)

This pipeline would supply the 20,000 ac-ft/yr of water from the Oahe Reservoir to the North Rawhide preparation plant for the ETSI project only (no potential for supply to the residents of South Dakota), using a smaller diameter pipe.

Proposed action scenarios:

Oahe to NR		38,350	hp
NR to JR		11,200	
JR to NA		400	
	Total	49,950	hp

Energy consumption = (1.799)(49,950) = 89,860 Btu/ton

Market alternative scenarios:

Oahe to NR		38,350	hp
NR to JR		5,350	
JR to NA		400	
	Total	44,100	hp

Energy consumption = (1.799)(44,100) = 79,336 Btu/ton

Pipeline-barge alternative:

Oahe to NR		38,350	hp
NR to JR		2,850	
JR to NA		400	
	Total	41,600	hp

Energy consumption = (1.799)(41,600) = 74,838 Btu/ton

Mississippi River Pipelines

Because the hydraulic horsepower requirement was not furnished by ETSI for the segment from the Mississippi River to Niobrara, it was calculated on the following basis:

Elevation = 4200 feet at Niobrara - 200 feet at Miss R. = 4000 feet

Pipeline length = 1120 miles

Pipe sizing velocity = 6 feet per second

Pipe diameter = 28 inches

Pumping efficiency = 0.70

Friction loss per 100 feet = 0.350 ft (Cameron Hydraulic Data 1977, p. 328)

$$\text{Brake hp} = \frac{(\text{ac-ft/yr})(0.62\ \text{gpm/ac-ft/yr})(\text{elevation} + \text{friction loss})}{(3960\ \text{gallon-ft/hp-min})(0.70\ \text{eff.})}$$

$$= \frac{(20{,}000)\ (0.62)\left[4000 + \frac{0.350}{100}(1120)(5280)\right]}{(3960)(0.70)}$$

$$= 110{,}480\ \text{hp}$$

Then the horsepower for pumping from Niobrara to Jacobs Ranch is added:

Miss R. to Nio		110,480	hp
Nio to JR		10,200	
	Total	120,680	hp

For the different scenarios, the horsepowers and energy consumptions become:

Proposed action scenarios:

Miss R. to JR		120,680	hp
JR to NR		200	
JR to NA		400	
	Total	121,280	hp

Energy consumption = (1.799)(121,280) = 218,183 Btu/ton

Market alternative scenarios:

Miss R. to JR		120,680	hp
JR to NR		200	
JR to NA		400	
	Total	121,280	hp

Energy consumption = (1.799)(121,280) = 218,183 Btu/ton

Pipeline-barge alternative:

Miss R. to JR		120,680	hp
JR to NR		1,200	
JR to NA		400	
	Total	122,280	hp

Energy consumption = (1.799)(122,280) = 219,982 Btu/ton

Complete Recycle Line Pipelines

All water is returned from the pipeline terminals to the Jacobs Ranch preparation plant in pipelines adjacent to the slurry pipelines. This was assessed for the proposed action scenarios and pipeline-barge alternative only (Beley 1981a). (The dewatering plant water treatment energy consumption is not included when the totals for the complete recycle line cases are determined.)

Proposed action scenarios:

Recycle lines to JR	167,600	hp
JR to NR	200	
JR to NA	400	
Total	168,200	hp

Energy consumption = (1.799)(168,200) = 302,592 Btu/ton

Pipeline-barge alternative:

Recycle lines to JR	140,800	hp
JR to NR	1,200	
JR to NA	400	
Total	142,400	hp

Energy consumption = (1.799)(142,400) = 256,178 Btu/ton

Combined Well Field and Pipelines

Water would be supplied from the Niobrara well field and the Crook well field, averaging an equal split (i.e., 10,100 ac-ft/yr from each). The well field horsepowers are less than those for the Niobrara and Crook individual base cases, because less water is being extracted from the individual fields so the average pump lift heads are less over the lifetime of the project (Beley 1981c). The supply and distribution pipeline horsepowers are also reduced due to the reduced throughputs (especially the frictional head losses at reduced throughputs). Also, since 10,000 ac-ft/yr comes to Jacobs Ranch and 10,000 to North Rawhide, the water distribution requirements to the preparation plants are less.

Proposed action scenarios:

Well fields to preparation plants	8,350	hp
NR to JR	1,450	
JR to NA	400	
Total	10,200	hp

Energy consumption = (1.799)(10,200) = 18,350 Btu/ton

Market alternative scenarios:

Well fields to preparation plants	8,350	hp
NR to JR	350	
JR to NA	400	
Total	9,100	hp

Energy consumption = (1.799)(9,100)) = 16,731 Btu/ton

Pipeline-barge alternative:

Well fields to preparation plants	8,350	hp
NR to JR	0	
JR to NA	400	
Total	8,750	hp

Energy consumption = (1.799)(8,750)) = 15,741 Btu/ton

Treated Wastewater Pipelines

Approximately 20,000 ac-ft/yr of treated wastewater would be collected from ten sources in northwest South Dakota and pumped to the North Rawhide preparation plant for distribution. This case is based solely on the conceptual information suggested in the draft copy of the South Dakota "Wastewater Reuse Alternatives for the Black Hills Region" report of August 1979 (South Dakota Sixth District Council of Local Governments 1979). However, if this alternative is selected, a full detailed evaluation system and energy requirements would be necessary before implementation.

Proposed action scenarios:

SD to NR	15,000	hp
NR to JR	11,200	
JR to NA	400	
Total	26,600	hp

Energy consumption = (1.799)(26,600)) = 47,853 Btu/ton

Market alternative scenarios:

SD to NR	15,000	hp
NR to JR	5,350	
JR to NA	400	
Total	20,750	hp

Energy consumption = (1.799)(20,750)) = 37,329 Btu/ton

Pipeline-barge alternative:

SD to NR	15,000	hp
NR to JR	2,850	
JR to NA	400	
Total	18,250	hp

Energy consumption = (1.799)(18,250)) = 32,832 Btu/ton

Gillette Water Supply and Pipelines

The city of Gillette could furnish up to 11,200 ac-ft/yr of emergency or surplus water to ETSI. This system would consist of 14 wells and tie into the normal water supply distribution pipelines.

Because the demand for Gillette water would be irregular and because water would normally be supplied to ETSI from other sources, the energy contribution of the Gillette water supply system is excluded from the analysis.

APPENDIX E-5
COAL CONSUMPTION AT CYPRESS BEND

The pipeline-barge alternative delivers 18.6 MMTA of coal to Cypress Bend, of which 0.3 MMTA is consumed directly in the dewatering plant. Because this 0.3 MMTA is consumed entirely within the pipeline system, it must be charged as a debit to the pipeline energy budget. All energy intensities were calculated on a basis of 37.4 MMTA of delivered coal for the pipeline-barge alternative, except the boiler feed moisture correction consumption.

Therefore, they must be corrected by a factor of (37.4/37.1) = 1.008 to give the proper Btu/ton energy intensity figure for relating to 37.1 MMTA of delivered, as-mined specification coal. The boiler feed moisture correction consumption is on a Btu/ton-of-delivered-coal basis, so this component is not corrected.

APPENDIX E-6

REFERENCES

NOTE: Refer to Final EIS Reference section, page R-1, for meaning of superscripts at end of each entry.

American Continental Barge Line Co. Undated. Inland waterways mileage guide.[a]

American Petroleum Institute. 1974. Basic petroleum data book.[a]

Banks, W. 1977. Energy consumption in the pipeline industry. Technical Report, Task 1, contract EY-76-C-03-1171 DOE, December 31,1977.[a]

Bechtel Inc. 1979a. Heat-value improvement of cleaned coal. (Letter 10680-BSF-L-ESF-288.) H.E. Miller, Pipeline Systems Inc. November 19, 1979.[c]

______. 1979b. Operating horsepowers for dewatering facilities. (Letter 10680-BSF-L-ESF-289.) H.E. Miller, Pipeline Systems Inc. November 21, 1979.[c]

______. 1980. Coal-to-crude oil conversion efficiency. (Letter 10680-BSF-L-ESF-338.) H.E. Miller, Pipeline Systems Inc. April 2, 1980.[c]

Beley, J., Woodward-Clyde Consultants, Inc. 1981a. No recycle for market alternative. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. March 4, 1981.[c]

______. 1981b. Coal train losses. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. March 9, 1981.[c]

_______. 1981c. Combination water lift heads. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. April 8, 1981.[c]

Boyce, A.R., Burlington Northern. 1981. Railroad energy consumptions and accidents data. (Letter.) J. Beley, Woodward-Clyde Consultants Inc. March 12, 1981c.

Buder, M.K. and K.L. Clifford. 1979. Cost effects of coal cleaning on utility power generation. Conference paper. Coal Technology 1:265-84.[a]

Cameron hydraulic data. 1977. Ingersoll-Rand, Westaway and Loomis.[a]

Combustion Engineering, Inc. 1977. Engineering handbook of conversion factors. p. 35[a]

Cucek, E. and E. Wasp. 1977. Energy efficiency of alternate modes of large volume movements of coal. December 1977.[a]

Electric Power Research Institute. 1979. Coal-fired power plants: Efficient or reliable? EPRI Journal. December 1979. pp. 18 to 24.[a]

ETSI. 1980a. Preparation and cleaning plant kWh and stream flow rates. (Transmittal.) H.E. Miller, Pipeline Systems Inc. June 10, 1980.[c]

_______. 1980b. Slurry pumping horsepowers and coal-water balance. (Transmittal. H.E. Miller, Pipeline Systems Inc. June 5, 1980.[c]

_______. 1980c. Dewatering plant steam costs. (Transmittal.) J. Beley, Woodward-Clyde Consultants Inc. October 8, 1980.[c]

______. 1981. Complete recycle line and ETSI Oahe line. (Transmittal.) J. Beley, Woodward-Clyde Consultants Inc. February 27, 1981.[c]

Faddick, R. R. 1979. Environmental and pollution aspects of coal slurry pipelines. US EPA-600/2-79-067.[a]

Fleischauer, P., Woodward-Clyde Consultants, Inc. 1980. Mileage for railroad barge-alternative scenario. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. June 11, 1980.[c]

______. 1981. Train miles. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. April 1, 1981.[c]

______. Undated. Railroad routes. (Letter.) H.E. Miller, Pipeline Systems Inc.

Holleran, J., Combustion Engineering. 1980. Boiler efficiency estimate. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. June 12, 1980.[c]

Leilich, R.H., R.D. Cohen, A. Gezen, and M.J. Kendrick. 1976. Energy and economic impacts of projected freight transportation improvements. Washington, D.C.: Peat, Marwick, Mitchell, and Co.[a]

Liddle, S., California Institute of Technology, Jet Propulsion Laboratory. 1981. Railroad locomotive alternative power source ratios. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. March 19, 1981.[c]

Meece, L. 1979. Energy estimates for coal transport. (Letter.) H.E. Miller, Pipeline Systems Inc. December 19, 1979.[c]

_______. 1980. Estimation and detection of coal loss during shipment. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. May 22, 1980.[c]

_______. 1981. Barge losses and coal-fired or electrical tugboats. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. March 12, 1981.[c]

OTA. See Office of Technology Assessment.

Office of Technology Assessment. 1977. Environmental impacts of coal slurry pipelines and unit trains. Draft final report. Project No. C-108, SAI-1-064-03-029. (Prepared by Science Applications Inc.) October 10, 1977.[c]

_______. 1978. A technology assessment of coal slurry pipelines. March 1978.[a]

Plummer, A., wastewater treatment consultant. 1980. Energy estimate for secondary water treatment. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. June 18, 1980.[c]

Rand McNally and Co. 1978. Handy railroad atlas of the United States.[a]

Rogozen, M., and L. Margler 1978. Environmental impacts of coal slurry pipelines and unit trains. Proceedings, Third International Conference of STA, March 1978.[a]

Rosslar, W., Aerospace Corp. 1981. BETC study. (Telephone conservation.) J.P. Chapman, Pipeline Systems Inc. March 20, 1981.[c]

Sandhu, A., Bechtel, Inc. 1980. Energy required for slurry pumping. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. February 12, 1980.[c]

South Dakota Sixth District Council of Governments. 1979. Wastewater reuse alternatives for the Black Hills region. Draft copy. August 1979.[b]

Traylor, R. 1980. Energy efficiency results basis. (Telephone conversation) H.E. Miller, Pipeline Systems Inc. June 20, 1980.[c]

WCC. See Woodward-Clyde Consultants, Inc.

Weston, M., Bechtel, Inc. 1980a. Energy use in slurry preparation. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. June 11, 1980.[c]

______. 1980b. Weight loss during coal cleaning. (Telephone conversation.) H.E. Miller, Pipeline Systems Inc. June 20, 1980.[c]

______. 1980c. Water-supply energy requirement estimates. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. July 11, 1980.[c]

______. 1981a. Combination and Oahe water supply hp's. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. April 9, 1981.[c]

______. 1981b. Water pumping hp's. (Telephone conversation.) T.J. Dowd, Pipeline Systems Inc. May 13, 1981.[c]

Williams, H., Railroad Consultant. 1980. Railroad fuel requirement for coal transport. (Telephone conservation.) H.E. Miller, Pipeline Systems Inc. February 13, 1980.[c]

Woodward-Clyde Consultants, Inc. 1981a. Project description technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)

_______. 1981i. No-action alternative technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)

_______. 1981j. Ruptures and spills technical report. San Francisco. (Prepared for the ETSI proposed coal slurry pipeline EIS.)

Appendix F

CULTURAL RESOURCES

TABLE F-1

SITES INCLUDED IN THE NATIONAL REGISTER OF HISTORIC PLACES: PROPOSED ACTION

Name of Site (Site Number)	County, State	Distance/Direction from Proposed Action
Wagenson Stone Circle Site (48CA89)	Campbell Co., Wyoming	2 mi NW of Rawhide Preparation Plant
Site of Ferdinand Branstetter Post No. 1, American Legion (PH0069787)	Niobrara Co., Wyoming	2.5 mi NE of PMB-97
Agate Fossil Beds NM	Sioux Co., Nebraska	3 mi N of PMB-122
Harold J. Cook Homestead Cabin (Bone Cabin)	Sioux Co., Nebraska	3.0 mi NE of PMB-123
Ash Hollow Historic District	Garden Co., Nebraska	1-5 mi NE of PMB-246
Ash Hollow Cave NHL	Garden Co., Nebraska	4 mi NE of PMB-244
California Hill (PH0039314)	Keith Co., Nebraska	4 mi SW of PMB-258
Leonidas A. Brandhoefer Mansion (PH0039306)	Keith Co., Nebraska	5.0 mi E of PMB-265
Diamond Springs Stage Station Site (PH0039322)	Keith Co., Nebraska	4 mi W of PMB-267
Lovitt Site (25CH1)	Chase Co., Nebraska	0.5 mi N of PMB-315
Senator George William Norris House NHL (PH0103691)	Red Willow Co., Nebraska	4.0 mi NE of PMB-363
H.P. Stutton House (Wright House)	Red Willow Co., Nebraska	4.0 mi NE of PMB-363
Walter P. Chrysler House (PH0088013)	Ellis Co., Kansas	2.0 mi E of P-471
Pawnee Rock (PH0066966)	Barton Co., Kansas	3.5 mi SW of P-529
Salter House (PH0055751)	Sumner Co., Kansas	4.0 mi NE of P-630

TABLE F-1 Continued

Name of Site (Site Number)	County, State	Distance/Direction from Proposed Action
Electric Park Pavilion	Kay Co., Oklahoma	4.0 mi NE of P-672
Nez Perce Reservation	Kay Co., Oklahoma	0.5 mi NE of P-680.5
101 Ranch NHL	Kay Co., Oklahoma	3.0 mi NE of P-688
Hominy Osage Round House (0790001801)	Osage Co., Oklahoma	2.0 mi S of P-738
Will Rogers Birthplace (PH0079278)	Rogers Co., Oklahoma	4.0 mi NE of PMB-778
Union Mission Site (PH0100072)	Mayes Co., Oklahoma	2.0 mi E of P-814
Fort Gibson NHL (PH0140660)	Muskogee Co., Oklahoma	1.5 mi. E of P-838
Seawell-Ross-Isom House	Muskogee Co., Oklahoma	1.5 mi E of P-838
Fort Davis (PH0079111)	Muskogee Co., Oklahoma	2.0 mi W of P-838
Cherokee National Cemetery	Muskogee Co., Oklahoma	4.0 mi E of P-838.5
Grant Foreman House (PH0079103)	Muskogee Co., Oklahoma	2.0 mi W of P-839
Dwight Mission (PH0079308)	Sequoyah Co., Oklahoma	3.5 mi N of P-881
Sequoyah's Cabin NHL	Sequoyah Co., Oklahoma	1.0 mi N of P-892
Lee Creek NR District: 38 sites; 1 site, Parris Mound, is in NRHP	Sequoyah Co., Oklahoma	4 mi N of P-900
Dr. Charles Fox Brown House	Crawford Co., Arkansas	4.0 mi S of P-910
Bryan House	Crawford Co., Arkansas	4.0 mi S of P-910

TABLE F-1 Continued

Name of Site (Site Number)	County, State	Distance/Direction from Proposed Action
Bob Burns House	Crawford Co., Arkansas	4.0 mi S of P-910
Drennen-Scott House	Crawford Co., Arkansas	4.0 mi S of P-910
Joseph Starr Dunham House	Crawford Co., Arkansas	4.0 mi S of P-910
Henry Clay Mills House	Crawford Co., Arkansas	4.0 mi S of P-910
Mount Olive United Methodist Church	Crawford Co., Arkansas	4.0 mi S of P-910
Van Buren Historic District	Crawford Co., Arkansas	4.0 mi S of P-910
Wilhauf House (PH0075876)	Crawford Co., Arkansas	4.0 mi S of P-910
The Cabins (Deane Summer House)	Franklin Co., Arkansas	4.0 mi S of PMB-940
Capt. Archibald S. McKennon House	Johnson Co., Arkansas	0.5 mi S of PMB-963
Cleburne County Courthouse	Cleburne Co., Arkansas	0-1 mi N of (I) 53-54
Dearing House	Independence Co., Arkansas	3 mi NW of (I) 93
Aycock House	Conway Co., Arkansas	4.0 mi E of PMB-1011
Conway County Library	Conway Co., Arkansas	4.0 mi E of PMB-1011
Cox House (Col. H.W. Burrow House) (PH0075833)	Conway Co., Arkansas	4.0 mi E of PMB-1011
Moose House (PH0075841)	Conway Co., Arkansas	4.0 mi E of PMB-1011
Morrilton Railroad Station	Conway Co., Arkansas	4.0 mi E of PMB-1011
Morrilton Male and Female College (079004007)	Conway Co., Arkansas	4.0 mi E of PMB-1011
Ten Mile House (Stagecoach House)	Pulaski Co., Arkansas	2.0 mi NE of PMB-1057
Harris House	Pulaski Co., Arkansas	2.0 mi NE of PMB-1074
Dollarway Road (PH0069809)	Jefferson Co., Arkansas	1 mi SW of PMB-1077

TABLE F-1 Continued

Name of Site (Site Number)	County, State	Distance/Direction from Proposed Action
Plum Bayou Homesteads (Wright Plantation)	Jefferson Co., Arkansas	4.5 mi ENE of PMB-1077.6
Dilley House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Dubocage (PH0076031)	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Ferguson House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Hudson-Grace-Borreson House (PH0076040)	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
R.M. Knox House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
MacMillan-Dilley House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Masonic Temple	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Merchants and Planters Bank Building	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Roth-Rosenzweig House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Trinity Episcopal Church (PH0076058)	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Trulock-Gould-Millis House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Union Station	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Yauch-Ragar House	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Boone-Murphy House (00790006613)	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Hotel Pines (00790004010)	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Trulock-Cook House (0790000506)	Jefferson Co., Arkansas	4.0-8.0 mi E of PM-1092
Cleveland County Clerk's Building	Cleveland Co., Arkansas	3.0 mi W of PM-1111
Cleveland County Courthouse	Cleveland Co., Arkansas	3.0 mi W of PM-1111
Mount Olivet Methodist Church	Cleveland Co., Arkansas	3.0 mi W of PM-1111
Adams-Leslie House	Bradley Co., Arkansas	E of PM-1138

TABLE F-1 Continued

Name of Site (Site Number)	County/Parish, State	Distance/Direction from Proposed Action
Bailey House	Bradley Co., Arkansas	1.0 mi E of PM-1136
Bradley County Courthouse and Clerk's Office	Bradley Co., Arkansas	1.0 mi E of PM-1136
Warren and Ouachita Valley Railway Station	Bradley Co., Arkansas	1.0 mi E of PM-1136
16OU35 and 16OU36 (part of Filhiol Mound NR Complex)	Ouachita Parish	PM-1228
Boscobel Cottage	Ouachita Parish, Louisiana	1.5 mi W of PM-1230.5
Kent Plantation	Rapides Parish, Louisiana	W of PM-1300-1315
Rosalie Plantation Sugar Mill	Rapides Parish, Louisiana	1 mi E of PM-1313
Bayouside	Rapides Parish, Louisiana	Vicinity of PM(B)-15
Loyd Hall Plantation	Rapides Parish, Louisiana	3 mi SW of PM(NW)-10
Bennett Plantation House and Store	Rapides Parish, Louisiana	1.5 mi SW of PM(NW)-17
Bailey Theatre	Avoyelles Parish, Louisiana	1.5 mi SW of PM(NW)-21.5
Bonnie Glen	Pointe Coupee Parish, Louisiana	5.0 mi S of PM(NW)-69
LeJeune House,	Pointe Coupee Parish, Louisiana	1.5 mi S of PM(NW)-72
St. Francis Chapel (0790002083)	Pointe Coupee Parish, Louisiana	1.0 mi S of PM(NW)-72
St. Francisville Historic District	West Feliciana Parish, Louisiana	3.5 mi N of PM(NW)-75.6
Grace Espicopal Church	West Feliciana Parish, Louisiana	3.5 mi N of PM(NW)-75.6
Propinquity	West Feliciana Parish, Louisiana	3.5 mi N of PM(NW)-75.6
Bayou Plaquemine Lock (PH0047899)	Iberville Parish, Louisiana	2.0 mi E of PM(NW)-106.6

TABLE F-1 Concluded

Name of Site (Site Number)	Parish, State	Distance/Direction from Proposed Action
St. Louis Plantation	Iberville Parish, Louisiana	3.0 mi E of PM(NW)-108
Nottaway Plantation	Iberville Parish, Louisiana	E of PM(NW)-117
Tally-Ho Plantation	Iberville Parish, Louisiana	2 mi NE OF PM(NW)-117
Hermitage	Ascension Parish, Louisiana	3.0 mi N of PM(NW)-133.6
Palo Alto Plantation	Ascension Parish, Louisiana	1.0 mi N of PM(NW)-131.6
Belmont Site (16SJ1)	Saint James Parish	4 mi ESE of Wilton Dewatering Plant

NHL = National Historic Landmark.

TABLE F-2

SITES INCLUDED IN THE NATIONAL REGISTER OF HISTORIC PLACES: MARKET-BARGE ALTERNATIVE

Name of Site (Site Number)	County/Parish, State	Distance/Direction from Market Alternative (MB Segment)
Tobias-Thompson Complex NHL	Rice Co., Kansas	1-3 mi SW of MB-175 to 178
Bernhard Warkentin Homestead (PH0088226)	Harvey Co., Kansas	2.0 mi SW of MB-2274
C.N. James Cabin (PH0066982)	Butler Co., Kansas	3.0 mi NE of MB-261
Nellie Johnstone No. 1 (PH0079359)	Washington Co., Oklahoma	3.5 mi NE of MB-350
Frank Phillips House	Washington Co., Oklahoma	3.0 mi NE of MB-350
Price Tower (PH0079367)	Washington Co., Oklahoma	2.0 mi NE of MB-350
Union Mission Site (PH0100072)	Mayes Co., Oklahoma	3.5 mi SW of MB-410
Cherokee Female Seminary (PH0039624)	Cherokee Co., Oklahoma	2.0 mi W of MB-436
Cherokee National Capitol NHL	Cherokee Co., Oklahoma	2.0 mi W of MB-436
Cherokee National Jail	Cherokee Co., Oklahoma	2.0 mi W of MB-436
Cherokee Supreme Court (PH0039659)	Cherokee Co., Oklahoma	2.0 mi W of MB-436
Indian University of Tahlequah	Cherokee Co., Oklahoma	2.0 mi W of MB-436
Dr. Irwin D. Loeser Log Cabin	Cherokee Co., Oklahoma	2.0 mi W of MB-436
First Cherokee Female Seminary Site (PH0039667)	Cherokee Co., Oklahoma	2.0 mi SW of MB-438
Murrell Home (Hunter's Home) NHL (PH0039675)	Cherokee Co., Oklahoma	4.0 mi SW of MB-439
Lee Creek NR District: 38 sites; 1 site, Parris Mound, is in NRHP	Sequoyah Co., Oklahoma	MB-850
Baton Rouge Water Works Company Standpipe (PH0047732)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Beauregard Town Historic District	East Baton Rouge Parish, Louisiana	Vicinity of M-24

TABLE F-2 (Concluded)

Name of Site (Site Number)	County/Parish, State	Distance/Direction from Market Alternative (MB Segment)
Florence Coffee House	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Louisiana State Capitol Building and Grounds	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Magnolia Mound Plantation (PH0047741)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Old Arsenal Museum (Powder Magazine) (PH0047783)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Old Louisiana Governor's Mansion	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Old Louisiana State Capitol NHL (PH0047759)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Pentagon Barracks (PH0047767)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Potts House (PH0047775)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Reiley-Reeves House (0790002081)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
St. James Episcopal Church	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Spanish Town (0780050357)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Stewart-Dougherty House (PH0047791)	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Tessier Buildings	East Baton Rouge Parish, Louisiana	Vicinity of M-24
Warden's House-Old Louisiana State Penitentiary (PH0047805)	East Baton Rouge Parish, Louisiana	Vicinity of M-24

NHL = Historic Landmark

TABLE F-3

SITES INCLUDED IN THE NATIONAL REGISTER OF HISTORIC PLACES:
PIPELINE-BARGE ALTERNATIVE

Name of Site (Site Number)	County, State	Distance/Direction from Barge Alternative (B)
Dollarway Road (PH0069809)	Jefferson Co., Arkansas	2.0 mi W of B-0
Dilley House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Dubocage (PH0076031)	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Ferguson House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Hudson-Grace-Borreson House (PH0076040)	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
R.M. Knox House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
MacMillan-Dilley House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Masonic Temple	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Merchants and Planters Bank Building	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Roth-Rosenzweig House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Trinity Episcopal Church (PH0076058)	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Trulock-Gould-Millis House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Union Station	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Yauch-Ragar House	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Boone-Murphy House (00790006613)	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Hotel Pines (00790004010)	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Trulock-Cook House (0790000506)	Jefferson Co., Arkansas	2.0-6.0 mi NE of B-20
Rohwer Relocation Center (Nisei Camp) (PH0075892)	Desha Co., Arkansas	2.0 mi NE of B-75

TABLE F-4

SITES INCLUDED IN THE NATIONAL REGISTER OF HISTORIC PLACES: COLORADO ALTERNATIVE

Name of Site (Site Number)	County, State	Distance/Direction from Colorado Alternative (C)
Fort Laramie National Historic Site (PH0069329)	Goshen Co., Wyoming	0.5 mi E of C-114.5
Fort Laramie Three-Mile Hog Ranch	Goshen Co., Wyoming	2 mi W of C-115
Tobias-Thompson Complex NHL	Rice Co., Kansas	0.0 mi at C-597 to 599

NHL = National Historic Landmark

TABLE F-5

SITES INCLUDED IN THE NATIONAL REGISTER OF HISTORIC PLACES: CROOK COUNTY WATER SUPPLY SYSTEM

Name of Site (Site Number)	County, State	Distance/Direction
Bush/Bunger Site (48CK69)	Crook Co., Wyoming	4 mi N of Well Field

TABLE F-6

SITES INCLUDED IN THE NATIONAL REGISTER OF HISTORIC PLACES: OAHE ALTERNATIVE

Name of Site (Site Number)	County, State	Distance/Direction from Oahe Alternative Water System (O)
La Verendrye Site (PH0092550)	Stanley Co., South Dakota	5 mi SSE of O-1
Old Fort Pierre School	Stanley Co., South Dakota	5 mi SSE of O-1
Stockgrowers Bank Building	Stanley Co., South Dakota	5 mi SSE of O-1
Gaylord Sumner House	Stanley Co., South Dakota	5 mi SSE of O-1
United Church of Christ, Congregational	Stanley Co., South Dakota	5 mi SSE of O-1
Fort Pierre Chouteau Site	Stanley Co., South Dakota	4 mi SSE of O-1
Bear Butte (39MD33)	Meade Co., South Dakota	Adjacent to and N of O-156
Fort Meade District (PH0092461)	Meade Co., South Dakota	2-5 mi SW of O-162
Sturgis Commercial Block	Meade Co., South Dakota	5 mi SW of O-163
Annie Tallent House	Meade Co., South Dakota	5 mi SW of O-163
Poker Alice Tubbs House	Meade Co., South Dakota	5 mi SW of O-163
John G. Wenke House	Meade Co., South Dakota	5 mi SW of O-163
Bear Butte (PH0092452)	Meade Co., South Dakota	0.0 mi at O-163-166
Frawley Historic Ranch NHL (PH0092436)	Lawrence Co., South Dakota	3-5 mi SSW of O-175
Episcopal Church of All Angels	Lawrence Co., South Dakota	3 mi S of O-186
Halloran-Matthews-Brady House	Lawrence Co., South Dakota	3 mi S of O-186
William Ernest Lown House	Lawrence Co., South Dakota	3 mi S of O-186
Spearfish Historic Commercial District	Lawrence Co., South Dakota	3 mi S of O-186
Vore Buffalo Jump (48CK302)	Crook Co., Wyoming	At O-201

NHL = National Historic Landmark.

APPENDIX G-AIR QUALITY

Emission factors used to estimate emissions from construction and operation of the various project components are discussed below. In all cases, conservative assumptions were made so that resulting estimates are an overestimate of what would actually occur.

For construction areas, an emission factor of 1.2 tons per acre per month has been published (EPA 1978a). This factor was developed from data collected in the vicinity of construction sites in a semiarid climate, with soils of moderate silt content, and assuming medium levels of construction activity. The climatic conditions, soil composition, and construction activity levels along the proposed pipeline path are expected to be conservatively approximated by conditions used in establishing this emission factor.

Construction activities related to pipeline digging and burial operations would be a major source of pollutant emissions during construction. At the present time there are no emission factors specifically applicable to pipeline digging and burial operations. An estimate of the amount of fugitive dust that might be generated can be obtained by using emission factors derived for storage pile operations. Both operations—storage pile maintenance and pipeline digging and burial—generate dust from the initial disturbance of material when a pile of earth is formed, from wind erosion of the exposed site, and from the final disturbance during backfilling operations.

Storage pile operation factors have been published by Cowherd et al. (1974). These factors are as follows:

Activity	Correction Parameter	Emission Factor (lb/ton)
Loading onto piles	PE index[a]	0.04
Vehicle traffic	Rainfall frequency	0.13
Loadout from piles	PE index[a]	0.05

[a]Thornwaite's precipitation-evaporation index (from Cowherd et al. 1974).

Cowherd et al. also present a factor for wind erosion; however, a different factor was chosen for use here and is discussed later. The factors for loading and unloading from piles were accordingly modified by Thornwaite's precipitation-evaporation (PE) index, using the following expression:

$$E_{\text{loading + unloading}} = \frac{0.05 + 0.04}{(PE/100)^2}$$

The average PE index along the proposed pipeline route is about 85. Thus $E_{\text{loading + unloading}}$ = 0.12 pound of dust per ton of soil cycled, and adding in the 0.13 lb/ton cycled for vehicle travel (rainfall frequency was not considered, to be conservative) yields a total factor for pipeline digging and burial of 0.25 lb/ton cycled.

Wind erosion from actively exposed areas such as construction sites and pipeline rights-of-way is a function of many environmental conditions. PEDCO (1976) presents the following expression:

$$Ew = AICKL'V'$$

where

- Ew = suspended particulate emissions (tons/acre/year)
- A = portion of total wind erosion losses that would be measured as suspended particulate = 0.025 (assumed)
- I = soil erodibility (an average value of 86 was used)
- C = climatic factor (an average value of 0.5 was used)
- K = surface roughness factor = 1.0 (maximum value assumed)
- L' = unsheltered field width factor = 0.7 (assumed, based on PEDCO report)
- V' = vegetative cover factor = 1.0 (maximum value assumed)

Using the above values, Ew = 0.75 ton/acre/year.

Various emission factors for emissions from construction equipment, locomotive engine operation, and tugboat engine operation were taken from the EPA publication AP-42 (1978a) and from an Office of Technology Assessment (1977) report. These factors will be identified when they are used.

Appendix G-2

FUGITIVE DUST EMISSIONS FROM CONSTRUCTION OF THE COAL PREPARATION PLANTS

The proposed action calls for three coal slurry preparation plants to be located in Wyoming. Each plant would occupy a site which would be a maximum of 45 acres in size. Emissions have been estimated by applying the previously derived emission factor for construction activity of 1.2 tons of dust per acre per month of construction. Although the plants would be constructed in phases over a period of years, a period of one year was assumed for initial construction. Thus fugitive dust emissions from construction would be:

1.2 tons/acre/month x 45 acres x 12 months x 0.5[a]
= 324 tons of dust (uncontrolled)

Emissions would be less for construction of the other plant sites.

Emissions of gaseous pollutants from construction equipment would depend on the size and makeup of the construction fleet. However, these emissions should be similar to those calculated for construction of the slurry pipeline system (see Appendix G-5).

---

[a] Assumed that one-half of the total area would be actively worked at any one time.

Appendix G-3

DISPERSION MODELING OF THE PROPOSED JACOBS RANCH COAL PREPARATION PLANT

Because the Jacobs Ranch plant would be more than twice as large as any other plant, impacts from its operation were estimated using dispersion models developed by the U.S. Environmental Protection Agency. Impacts from operation of the other two plants would be less than those from the Jacobs Ranch plant. The Jacobs Ranch plant would have 22 emission points; 21 of these points would emit only particulates, and point 22, which represents the boiler stack, would emit both particulates and gaseous pollutants. Particulate emissions would be controlled by wet Venturi scrubbers, and sulfur dioxide would be controlled by adding limestone to the coal to be burned. Controlled pollutant emission data have been provided by ETSI (1980), along with stack parameters for each emission point. A detailed description of methods used to estimate these emissions is presented in ETSI's March 1980 revision to the Prevention of Significant Deterioration permit application for the coal preparation plants (ETSI 1979).

The emission points were modeled with a modified version of the EPA VALLEY model in order to estimate the impact of coal preparation plant operation on ambient air quality. The VALLEY model algorithms are discussed by Burt (1977).

The coal preparation plants would be located in areas of gently rolling terrain at elevations of 4300 to 4700 feet above mean sea level. Thus the model was run in the rural, flat-terrain mode. The required joint frequency distribution of wind speed, wind direction, and stability was taken from data gathered at a meteorological monitoring station located about 9 miles south-southwest of the Jacobs Ranch plant. Terrain features at the monitoring site and the plant site are fairly similar, and the joint frequency distribution should be representative of the plant site. The joint frequency distribution, based on a full year of data, is presented in ETSI's permit application (ETSI 1979).

Emissions from sources 1 through 21 are nonbuoyant plumes. To account for the effluents' initial upward momentum, jet plume rise was estimated with the following formula (Briggs 1969):

$$W = 3D\,(w/u)$$

where

W = jet plume rise (meters)
D = internal diameter of the stack (meters)
w = effluent velocity (meters per second)
u = average wind speed (meters per second)

Plume rise for emission point 22 was calculated by the model using the Briggs buoyant plume rise method.

The VALLEY model was also run in the short-term (24-hour) mode with maximum short-term emission rates for input. In the short-term mode, VALLEY assumes that a given wind speed, wind direction, and stability scenario persist for 6 hours out of a 24-hour period. Worst-case scenarios were identified with the EPA PTMAX model (Turner and Busse 1973). PTMAX results indicated that the maximum short-term concentrations would be produced by Class A stability and a wind speed of 2.5 meters per second and by Class B stability and a wind speed of 3.0 meters per second. These conditions were then input to the VALLEY model. The results are shown in Table G-1.

TABLE G-1

EXISTING AND PREDICTED AIR QUALITY VALUES ($\mu g/m^3$)

	TSP	SO_2	NO_2
Annual			
Existing	20	6	26
Predicted Maximum Increase			
Within plant boundary	36	6	3
Beyond plant boundary	21	6	3
Predicted Annual Average	41	12	29
Federal Average Standard	60	80	100
Wyoming Average Standard	60	60	100
24-Hour			
Existing	20	28	a
Predicted Maximum	65	39	a
Federal Standard	150	365	a
Wyoming Standard	150	260	a

TSP = total suspended particulates

SO_2 = sulfur dioxide

NO_2 = nitrogen dioxide

[a] No standards established for this category.

Appendix G-4

EMISSIONS FROM CONSTRUCTION OF PROPOSED WATER SUPPLY SYSTEM

The proposed water supply system would consist of a maximum of 45 wells, gathering lines, and 68 miles of 26-inch-diameter main water pipeline. The system would also require construction of some new access roads. Emissions were estimated by applying the emission factors discussed in Appendix G-1 to construction data.

ACCESS ROADS

Construction

1.2 tons/acre/month x 72 feet[a] x 15,840 feet[b] x (1 acre/43,560 feet^2) x (1 month/30 days) x (0.5 active area/total area)[c]
= 0.52 ton per active construction day

Wind Erosion

(0.75 ton/acre/year) x 15,840 feet x 72 feet x (1 acre/43,560 feet^2) x (0.5 active area/total area) x (1 year/365 days)
= 0.027 ton per active day

Total emissions would depend on the amount of construction time.

---

[a] Assumed width of 72 feet.

[b] Assumed that 3 miles of road would be actively worked at any one time

[c] Assumed that half of the total area would be actively worked at any one time

WATER GATHERING LINES

Construction

(1.2 tons/acre/month) x 50-foot right-of-way x 15840 feet[a] x (1 acre/43,560 feet^2) x (1 month/30 days) x (0.5 active area/total area)[b] x (62 days construction time)[c] = 22.5 tons of dust (uncontrolled)

Pipeline Digging and Burial

(0.25 lb of dust/ton of soil cycled) x (100 lb soil/ft^3)[d] x (3 feet)[e] x (4 feet)[f] x (5280 feet/day)[c] x (1 ton soil/2000 lb soil) x 62 days x (1 ton dust/2000 lb dust) = 24.5 tons of dust (uncontrolled)

Wind Erosion

(0.75 ton/acre/year) x 15,840 feet x 50-foot right-of-way x (1 acre/43,560 feet^2) x (0.5 active area/total area) x (1 year/365 days) x 62 days

= 1.2 tons of dust (uncontrolled) = 0.019 ton/day =

MAIN WATER PIPELINE

Emissions for the main water pipeline were computed using the same techniques as for the gathering lines, except for the following changes: (1) the ditch was assumed to be 4 feet wide and 5 feet deep; and (2) the construction time would be 70 days (a rate of one mile per day).

These methods yield the following uncontrolled emissions:

Construction:	25.2 tons
Pipeline digging and burial:	46.2 tons
Wind erosion:	6.8 tons/year

[a] Assumed 3 miles of pipeline would be actively worked at any one time.

[b] Assumed that one-half of the total area would be actively worked at any one time.

[c] Assumed construction rate of one mile per day.

[d] Assumed soil density.

[e] Assumed ditch width.

[f] Assumed ditch depth.

WELL FACILITIES

Construction

(1.2 tons/acre/month) x (2 acres/well)[a] x 45 wells

= 108.0 tons of dust per construction month (uncontrolled)

Wind Erosion

(0.75 ton/acre/year) x (2 acres/well) x 45 wells = 67.5 tons (uncontrolled)

Gaseous air pollutants would be emitted by construction equipment and vehicles during construction of the water supply system. These emissions would depend on the size and composition of the construction fleet. Although exact quantification of emissions is not possible, emissions would be expected to be similar to those for main slurry pipeline construction, which are presented in Appendix G-5.

---

[a] Assumed that each well facility would occupy 2 acres during construction.

EMISSIONS FROM CONSTRUCTION OF PROPOSED SLURRY PIPELINE SYSTEM

The proposed slurry pipeline system would consist of 55 miles of 24-inch-diameter gathering line, 16 miles of 16-inch-diameter gathering line, and 1664 miles of main slurry pipeline having a diameter as large as 46 inches. Emissions were estimated by applying the emission factors discussed in Appendix G-1 to construction data.

I. 24-INCH GATHERING LINES

Construction

(1.2 tons/acre/month) x 100-foot right-of-way x 15,840 feet[a] x (1 acre/ 43,560 feet^2) x (1 month/30 days) x (0.5 active area/total area)[b] x 55 days[c]
= 40.0 tons of dust (uncontrolled)

Pipeline Digging and Burial

(0.25 lb of dust/ton of soil cycled) x (100 lb soil/ft^3)[d] x 4 feet[e] x
5 feet[f] x (5280 feet/day)[c] x 55 days x (1 ton soil/2000 lb soil) x
(1 ton dust/2000 lb dust)
= 36.3 tons of dust (uncontrolled)

---

[a] Assumed 3 miles of pipeline would be actively worked at any one time.

[b] Assumed that one-half of the total area would be actively worked at any one time.

[c] Assumed construction rate of 1 mile per day.

[d] Assumed soil density.

[e] Assumed ditch width.

[f] Assumed ditch depth.

Wind Erosion

0.75 ton/acre/year x 15,840 feet[a] x 100-foot right-of-way x (1 acre/ 43,560 ft^2) x (0.5 active area/total area)[b] x (1 year/365 days) x 55 days
= 2.1 tons of dust (uncontrolled)

II. 16-INCH GATHERING LINE

Construction

(1.2 tons/acre/month) x 100-foot right-of-way x 15,840 feet[a] x (1 acre/ 43,560 $feet^2$) x (1 month/30 days) x (0.5 active area/total area)[b] x 16 days[c]
= 11.6 tons of dust (uncontrolled)

Pipeline Digging and Burial

(0.25 lb of dust/ton of soil cycled) x (100 lb soil/ft^3)[d] x 3 feet[e] x 4 feet[f] x (5280 feet/day)[c] x 16 days x (1 ton soil/2000 lb soil) x (1 ton dust/2000 lb dust)
= 6.3 tons of dust (uncontrolled)

Wind Erosion

0.75 ton/acre/year x 15,840 feet x 100-foot right-of-way x (1 acre/ 43,560 $feet^2$) x (0.5 active area/total area) x (1 year/365 days) x 16 days
= 0.6 ton of dust (uncontrolled)

---

[a] Assumed that 3 miles of pipeline would be actively worked at any one time.
[b] Assumed that one-half of the total area would be actively worked at any one time.
[c] Assumed construction rate of 1 mile per day.
[d] Assumed soil density.
[e] Assumed ditch width.
[f] Assumed ditch depth.

III. MAIN SLURRY PIPELINE

Construction

(1.2 tons/acre/month) x 100-foot right-of-way x 15,840 feet[a] x (1 acre/43,560 feet^2) x (1 month/30 days) x (0.5 active area/total area)[b] x 1664 days[c]

= 1210.2 tons of dust (uncontrolled)

Pipeline Digging and Burial

(0.25 lb of dust/ton of soil cycled) x (100 lb soil/ft^3)[d] x 5 feet[e] x 6 feet[f] x (5280 feet/day)[c] x (1 ton soil/2000 lb soil) x (1 ton dust/2000 lb dust) x 1664 days[c]

= 1674.4 tons of dust (uncontrolled)

Wind Erosion

(0.75 ton/acre/year) x 15,840 feet[a] x 100-foot right-of-way x (1 acre/43,560 feet^2) x (0.5 active area/total area) x (1 year/365 days) x 1664 days

= 62.2 tons of dust (uncontrolled)

IV. PUMP STATIONS

Construction of the 30 pump stations would disturb about 600 acres.

Construction

(1.2 tons/acre/month) x (20 acres/station) x (0.5 active area/total area)[a]

= 12 tons per station per month of construction

Thus emissions would depend on the amount of construction time.

---

[a] Assumed a 3-mile stretch of pipeline route would be worked at any one time by a given construction spread.

[b] Assumed that one-half of the total area would be actively worked at any one time.

[c] Assumed construction rate of 1 mile per day.

[d] Assumed soil density.

[e] Assumed ditch width.

[f] Assumed ditch depth.

Wind Erosion

0.75 ton/acre/year x 20 acres/station x 1 year/365 days x (0.5 active area/total area)[a]

= 0.02 ton per pump station per construction day

Thus emissions would depend on the amount of construction.

V. GASEOUS EMISSIONS FROM CONSTRUCTION

Air pollutant emission factors for heavy-duty construction equipment were obtained from the EPA publication AP-42 (EPA 1978a), Table 3.2.7-1. These emission factors (in pounds of pollutant per hour of equipment operation) are presented for various types of equipment. These factors and a breakdown of ETSI's construction fleet by equipment type for a typical spread are presented below:

Equipment Type	Number of Units	Emission Factors (lb/hr)				
		CO	HC	NO_x	SO_2	TSP
Track laying tractors	37	0.386	0.110	1.47	0.137	0.112
Wheeled loaders	6	0.553	0.187	2.40	0.182	0.172
Motor graders	2	0.215	0.054	1.05	0.086	0.061
Miscellaneous	17	0.414	0.157	2.27	0.143	0.139

Note: CO = carbon monoxide, HC = hydrocarbons, NO_x = nitrogen oxides, SO_2 = sulfur dioxide, TSP = total suspended particulates.

---

[a] Assumed that one-half of the total area would be actively worked at any one time.

The following formula was used in the calculation of emissions:

$$E = \frac{NFT}{2000}$$

where

E = pollutant emission, in tons

N = number of equipment units

F = emission factor

T = hours of operation

Emissions were calculated for a construction year, assuming that the fleet would operate 6 days per week, 10 hours per day, but that any given piece of equipment would be active 50 percent of the time. Thus active operating time during a year would be 1560 hours. Results of the calculations are presented below.

Equipment Type	Pollutant Emission (tons/year)				
	CO	HC	NO_x	SO_2	TSP
Track-laying tractors	11.1	3.2	42.4	4.0	3.2
Wheeled loaders	2.6	0.9	11.2	0.9	0.8
Motor graders	0.3	0.1	1.6	0.1	0.1
Miscellaneous	5.5	2.1	30.1	1.9	1.8
Total	19.5	6.3	85.3	6.9	5.9

AIR QUALITY IMPACTS OF OPERATION OF A COAL-FIRED BOILER AT THE CYPRESS BEND DEWATERING FACILITY

The dewatering facility at Cypress Bend would process 18.6 MMTA of coal. According to ETSI, the boiler needed to do this would require 300,000 tons of coal fuel per year. To estimate air quality impacts of this operation it was assumed that only one boiler unit (package) would be operated, that it would be of the general pulverized industrial type, and that it would use coal from the slurry pipeline as fuel. The slurry pipeline coal would have a sulfur content of 0.5 percent and an ash content of 6.4 percent.

Emissions from the burning of 300,000 tons of this coal per year were estimated using the emissions factor presented by the U.S. Environmental Protection Agency (EPA) in Table 1.1-2 of publication AP-42 (EPA 1978a). All emissions presented below are uncontrolled except for total suspended particulates (TSP) and sulfur dioxide (SO_2). For TSP, a control efficiency of 99 percent was assumed for bag filters; and for SO_2 a control efficiency of 70 percent was assumed for adding limestone to the coal being burned. These control measures were taken from ETSI's March 31, 1980, revision to the May 1979 Prevention of Significant Deterioration (PSD) permit application for the coal slurry preparation plants.

Emission estimates are as follows:

- Total suspended particulates (TSP) = 153.6 tons/year
- Sulfur dioxide (SO_2) = 855.0 tons/year
- Carbon monoxide (CO) = 150.0 tons/year
- Hydrocarbons (HC) = 45.0 tons/year
- Nitrogen dioxide (NO_2) = 2700.0 tons/year

Stack characteristics for the boiler were assumed to be the same for the largest boilers to be used at the coal slurry preparation plants. These are as follows.

- Stack height = 27.0 meters
- Gas exit temperature = 450.0 degrees K
- Gas exit velocity = 15.2 m/sec
- Stack diameter = 0.78 meters

Because emissions of TSP, SO_2, NO_x, and CO are estimated to be over the emissions significance level presented in Chapter 4, these pollutants were modeled, as a screening approach, with EPA's PTMAX model (Turner and Busse 1973). Using an emission rate of 1.0 gram per second, the maximum predicted χ/Q (seconds per cubic meter) value of 1.31×10^{-5} was predicted to occur under Class A stability and wind speed of 2.5 meters per second. This value is representative of a 3-minute average and was multiplied by the various emission rates (in grams per second) to get the following predicted 3-minute concentrations:

o TSP	57.7 $\mu g/m^3$
o SO_2	321.9 $\mu g/m^3$
o CO	56.5 $\mu g/m^3$

The above concentrations were converted to 1- and 3-hour values according to the following formula suggest by Gifford (1976) and recommended by the American Meteorology Society's Workshop on Stability Classification Schemes and Sigma Curves (1977):

$$\sigma y / \sigma y_{P-G} = (\tau/\tau_0)^R \qquad R = 0.20,\ 3 \text{ min.} < \tau < 1 \text{ hour}$$
$$R = 0.25,\ 1 \text{ hour} \leq \tau$$

where σy_{P-G} is the Pasquill-Gifford horizontal dispersion

coefficient appropriate to time τ_0 and σy is the coefficient appropriate to time τ. Thus to convert to 1-hour values:

$$\sigma y / \sigma y_{P-G} = (60/3)^{0.25} = 2.11 \text{ and}$$

$$\chi_{1\text{-hour}} = (\chi_{3\text{-min}})(1/2.11)$$

Therefore:

TSP = 27.3 $\mu g/m^3$
SO_2 = 152.6 $\mu g/m^3$
CO = 26.8 $\mu g/m^3$

Using the same approach yields the following estimates of 3-hour concentrations (R=0.25):

- TSP = 20.7 $\mu g/m^3$
- SO_2 = 115.9 $\mu g/m^3$
- CO = 20.4 $\mu g/m^3$

These results indicate that predicted 1-hour concentrations of CO are below the EPA 1-hour significance level of 2000 $\mu g/m^3$. Predicted 3-hour SO_2 concentrations are well below the federal standard of 1300 $\mu g/m^3$ and the class II PSD increment of 512 $\mu g/m^3$. The 3-hour predicted TSP concentration is well below even the 24-hour standard of 260 $\mu g/m^3$. Because the "worst case" meteorology assumed above would not be likely to persist for periods longer than 3 hours, and because the resulting 3-hour concentrations are predicted to be low, 24-hour concentrations should also be well below standards.

Annual averages were not modeled because no representative meteorological data were available for the boiler site. Short-term SO_2, TSP, and CO concentrations of these pollutants would be below standards. However, the impact of NO_2 emissions is uncertain.

Sources of emissions related to barge transport of coal would include wind erosion from stockpiles, barge loading operations, and pollutant emissions from tugboat engines.

Wind Erosion from Stockpiles

Stockpiles with a total capacity of about 90,000 tons would be located at the barge loading facility. Cowherd et al. (1974) present the following expression applicable to coal stockpiles:

$$E = 1.2\,U \times 0.75$$

where

E = wind erosion emission (lb/acre/hr)

U = mean windspeed

This factor can be adjusted to take into account the number of days each year having precipitation in excess of 0.01 inch. In the area of the barge loading sites, the mean annual windspeed is about 10 miles per hour (4.5 meters per second) and the number of "wet days" is about 110. This yields:

$$E = 1.2\,(4.5)\,(0.75)\ \ [(365 - 110)/365] = 2.8 \text{ lb/acre/hr}$$

Thus actual emissions would depend on the size of the stockpile area. Also, any control measures to be used would reduce emissions.

Loading Emissions

Particulate matter would be emitted during loading of the barges. Gaseous pollutants would be emitted from tugboats used to tow the barges. The EPA (1978b) has estimated pollutant emissions for barge loading and transport of 20,000 tons of coal. These emissions should be similar to those that would occur during operation of the pipeline-barge alternative and are presented below.

SUMMARY OF ATMOSPHERIC EMISSIONS IN BARGE TRANSPORT OF COAL

Pollutant	Air Emissions (lb/day)
Particulates	135
SO_2[a]	280
NO_2	3850
HC	447
CO	2340
Particulate, during loading	8000 lb/trip

[a] Based on diesel fuel sulfur content of 0.2 percent.

These emissions would occur over the entire barge route, except for loading emissions, which would occur at the loading site.

Appendix G-8

EMISSIONS FROM CONSTRUCTION OF THE CROOK COUNTY ALTERNATIVE WATER SUPPLY SYSTEM

This alternative water supply system would consist of approximately 24 wells, one pump station and surge tank on a 20-acre site, 47 miles of 26-inch-diameter pipeline, and 55 miles of 24-inch-diameter pipeline. The pipeline would be constructed adjacent to existing roads where possible; thus access road construction would be minimal.

WATER WELLS

Construction

1.2 tons/acre/month x 2 acres/well[a] x 24 wells = 57.6 tons of dust per construction month

Wind Erosion

0.75 ton/acre/year x 2 acres/well[a] x 24 wells x 1 year/365 days = 0.10 ton per day

Thus total emissions would depend on the amount of construction time required.

PUMP STATION AND SURGE TANK

Construction

1.2 tons/acre/month x 20 acres = 24.0 tons of dust per construction month

Wind Erosion

0.75 ton/acre/year x 20 acres x 1 year/365 days = 0.04 ton of dust per day

---

[a]Assumed each well facility would occupy 2 acres during construction.

Thus total emissions would depend on the amount of construction time required.

26-INCH PIPELINE

Construction

1.2 tons/acre/month x 50-foot right-of-way x 15,840 feet[a] x (1 acre/43,560 feet^2 x (1 month/30 days) x (0.5 active area/total area)[b] x 47 days construction time[c] = 17.1 tons of dust (uncontrolled)

Pipeline Digging and Burial

0.25 lb dust/ton soil cycled x (100 lb soil/ft^3)[d] x (3 feet)[e] x (4 feet)[f] x (5280 feet/day)[c] x (1 ton soil/2000 lb soil) x (1 ton dust/2000 lb dust) x 47 days[c] = 18.6 ton of dust (uncontrolled)

Wind Erosion

0.75 ton/acre/year x 15,840 feet[a] x 50-foot right-of-way x (1 acre/43,560 feet^2) x (0.5 active area/total area)[b] x (1 year/365 days) x 47 days[c] = 0.90 ton of dust (uncontrolled)

---

[a] Assumed 3 miles of pipeline would be actively worked at any one time.

[b] Assumed that one-half of the total area would be actively worked at any one time.

[c] Assumed construction rate of one mile per day.

[d] Assumed soil density.

[e] Assumed ditch width.

[f] Assumed ditch depth.

24 INCH PIPELINE

Emissions for construction of the 24-inch pipeline were computed using the same method as above except the construction time would be 55 days (a rate of one mile per day. This yields the following uncontrolled fugitive dust emissions:

Construction: 20.0 tons per year
Pipeline digging and burial: 21.8 tons per year
Wind erosion: 1.0 ton per year

Gaseous air pollutants would be emitted by construction equipment and vehicles. These emissions would depend on the size and composition of the construction fleet, and would be similar to those presented for the main slurry pipeline construction in Appendix G-5.

EMISSIONS FROM CONSTRUCTION OF THE OAHE RESERVOIR ALTERNATIVE WATER SUPPLY SYSTEM

This alternative would involve construction of 276 miles of 28-inch-diameter pipeline to supply water for the proposed slurry pipeline.

Construction

1.2 tons/acre/month x 100-foot right-of-way x 15,840 feet[a] x (1 acre/43560 $feet^2$) x (1 month/30 days) x (0.5 active area/total area)[b] x 276 days[c]

= 200.7 tons of dust (uncontrolled)

Pipeline Digging and Burial

0.25 lb of dust/ton of soil cycled x (100 lb soil/ft^3)[d] x 4 feet[e] x 5 feet[f] x (5280 feet/day)[c] x 276 days x (1 ton soil/2000 lb soil) x (1 ton dust/2000 lb dust)

= 182.2 tons of dust (uncontrolled)

Wind Erosion

0.75 ton/acre/year x 15,840 feet[a] x 100-foot right-of-way x (1 acre/43,560 $feet^2$) x (0.5 active area/total area)[b] x (1 year/365 days) x 276 days

= 10.3 tons of dust (uncontrolled)

---

[a] Assumed that 3 miles of pipeline would be actively worked at any one time.

[b] Assumed that one-half of the total area would be actively worked at any one time.

[c] Assumed construction rate of 1 mile per day.

[d] Assumed soil density.

[e] Assumed ditch width.

[f] Assumed ditch depth.

REFERENCES

American Meteorological Society, Committee on Atmospheric Turbulence and Diffusion. 1977. Bulletin of the American Meteorological Society 59:1025.

Briggs, G.A. 1969. Plume rise. TID-25075. Oak Ridge, Tenn.: U.S. Atomic Energy Commission, Division of Technical Information.

Burt, E.W. 1977. VALLEY model user's guide. EPA-450/2-77-018. Research Triangle Park, N.C.: U.S. Environmental Protection Agency.

Cowherd, C., K. Axetell, C. Guenther, and G. Jutze. 1974. Development of emission factors for fugitive dust sources. EPA 450/013-74-037.

Energy Transportation Systems Inc. (ETSI). 1979. Prevention of Significant Deterioration permit applications for the North Antelope plant, North Rawhide plant, and Jacobs Ranch plant in Campbell County, Wyoming. Submitted to U.S. EPA, Region VIII.

_______. 1980. Air emissions - Wyoming preparation plant. (Memo from H. Troy). E. Schuert, Woodward-Clyde Consultants, San Francisco, Calif. March.

EPA. See U.S. Environmental Protection Agency.

ETSI. See Energy Transportation Systems Inc.

Gifford, F.A. 1976. Turbulent diffusion typing schemes: a review. Nuclear Safety 17:68.

Office of Technology Assessment. 1977. Environmental impacts of coal slurry pipelines and unit trains. Draft final report. Prepared by Science Applications Inc. Project No. C-108, SAI-1-064-03-029.

PEDCO Environmental Specialists Inc. 1976. Evaluation of fugitive dust emissions from mining. Prepared for U.S. Environmental Protection Agency, Contract No. 68-02-1321.

Turner, D.B., and A.D. Busse. 1973. User's guides to the interactive versions of three point source programs: PTMAX, PTDIS, and PTMTP. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, Office of Research and Monitoring.

U.S. Environmental Protection Agency. 1978a. Compilation of air pollutant emission factors. Publication No. AP-42.

_____. 1978b. Environmental assessment of coal transportation. EPA-600/7-78-081.

Appendix H

METHODOLOGY FOR DETERMINING PROJECTED SOCIOECONOMIC BASELINE

This appendix discusses the basic procedure used to determine future employment and population in Campbell County, Wyoming, and the Gillette Planning Area. The analysis and projections were performed by Woodward-Clyde Consultants (WCC) to estimate the existing and potential socioeconomic impacts of a proposed energy development project in Campbell County. Since the study has not yet been published, it will be referenced as an internal WCC document with only the following information provided:

- Discussion of the methodology used in the study.

- Summary of the employment and population projections for two time periods, 1984 and 1990, which are described in Section 3.A.2 of the text.

The methodology used to determine the future employment and population is as follows:

- All major energy-related projects were reviewed with respect to the levels of employment for both construction and operating work force. To modify the study for this particular effort, all ETSI-related components were excluded from these projections.

- Total employment was projected by applying sectoral multipliers to the projected change in mining and associated construction employment. Based on an examination of the existing relationships between basic and induced employment in Campbell County, by sectors, the following multipliers were used to determine basic/nonbasic employment: 1.2 for permanent workers; 0.6 for construction workers.

- Conversion of employment to place of residence was based on the assumption that all basic and nonbasic workers would be new to the area. There would be enormous demands for construction workers during this period, and there would not be sufficient supply from the local labor market. Even if these firms hired workers who were employed locally, these individuals would have to be replaced, and consequently there would still be a net increase in inmigrants.

- Labor force estimates were based on an assumed 3.0 percent unemployment rate. Statistics provided by the Wyoming Employment and Security Commission indicate that the unemployment rate has remained close to an average of 3 percent over the past five years.

- Household estimates were derived by dividing the total labor force by a ratio of 1.45 workers per household, based on observations of workers and households in Campbell County over the past several years.

- Population estimates were based on a factor of 3.18 persons per new household, again based on observations of population and household statistics and discussions with staff members of the Campbell County and Gillette planning departments.

APPENDIX I

COMMENT LETTERS ON THE DRAFT EIS

4

United States Department of the Interior
HERITAGE CONSERVATION AND RECREATION SERVICE
MID-CONTINENT REGION
POST OFFICE BOX 25387
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:

DES-80/69

JAN 7 1981

Memorandum

To: Office of Special Projects, BLM, Denver

From: Assistant Regional Director, Land Use Coordination

Subject: Review of draft environmental statement for the ETSI Coal Slurry Pipeline

Nationwide Rivers Inventory (NRI)

The consultation list of the NRI in Oklahoma, Arkansas, and Louisiana has not been finalized. The final list will contain rivers in addition to those listed for these states in the draft NRI report. A final copy will be provided as soon as it is available. We anticipate that every effort will be made to minimize harm to any streams added to the NRI and existing river crossings will be utilized whenever possible. Also, the corridor alignment should be routed close to the beginning or end of identified river segments.

The final list of NRI streams in Wyoming, Nebraska, South Dakota, Colorado, and Kansas has recently been developed. This draft statement and accompanying map volume now enable us to evaluate effects of the proposed action on identified stream segments in these states. These comments supercede those of our memorandum of October 27 on the subject of "Inter-agency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory."

The Proposed Action alignment would not cross any NRI streams in those states where the NRI list has been finalized. Other project alternatives, however, would cross the following Inventory streams:

Cheyenne River, South Dakota - crossed by the Oahe Alternative Water Supply System at approximately mile 0-103

Arikaree River, Colorado - crossed by the Colorado Alternative at approximately mile C-348

Saline River, Kansas - crossed by the Market Alternative at mile MB-127

Grouse Creek, Kansas - crossed by the Market Alternative at mile MB-291

Caney River, Kansas - crossed by the Market Alternative at mile MB-308

The description of the project suggests that there would be temporary impacts on any stream which is crossed by either the water supply or the slurry pipeline. Our position is that neither the buried pipeline nor the disturbed vegetation along the right-of-way, as described in the environmental statement would have lasting adverse effects on identified river segments, with the possible exception of stream banks. Techniques to be employed in reclaiming and stabilizing banks at stream crossing points are not specified in Appendix C-1 beyond the statement that "banks would be stabilized to prevent erosion." Adding a mitigating proviso ensuring that said banks would then be replanted in native vegetation would allay our concern that disturbance of the banks might constitute more than a temporary adverse impact on stream values.

Review of the map volume indicates that no pump stations or ancillary facilities (power supply and communications systems) will be constructed along, across, or within one-quarter mile of any stream identified through the inventory process in those states where the NRI list has been finalized.

A possible indirect adverse effect of the project on Nationwide Inventory rivers could result from the annual 20,500 acre-foot requirement for water to operate the system. The deep wells of the Niobrara County field, or the alternative Crook County field, would have an effect on surface water, estimated at from 1 to 4 c.f.s. by the end of the project period, at points on the Little Missouri, Cheyenne, and Belle Fourche Rivers. Though these points are well upstream from segments of the rivers identified in the NRI, it should be determined whether such deficits would significantly affect downstream flow in the Inventory streams.

References to the NRI in the text are somewhat inconsistent and sometimes misleading. For instance, it is stated on p. 3-106 that HCRS has "inventoried [the Arikaree River] for consideration . . . as a possible National Wild and Scenic River." It is also stated that the Cheyenne River has been "inventoried . . . for national protection" (p. 3-117) and been "identified for study by the Heritage Conservation and Recreation Service" (p. 4-106, 4-107). It should be made clear that rivers included in the Inventory possess values that have been identified as being nationally significant, and they may be eligible for inclusion in the National System. These rivers are not afforded protected status nor are they now being studied for inclusion in the National Wild and Scenic Rivers System.

We do not subscribe to the statement on pp. 4-106 and 4-107 referencing the Oahe Alternative Water Supply System: "The crossing of the Cheyenne

2

River (identified for study by the Heritage Conservation and Recreation Service) would not have impacts because human access is not accommodated at that point." There would certainly be impacts, but we do not believe the crossing will have lasting adverse effects.

For the states where the NRI list has been finalized, the list is markedly different from the draft list on which information in the environmental statement is based; therefore, there are errors in some text and table references to specific Inventory components. We are not concerned that the statement be revised on account of rivers that have been dropped from the Inventory, but it is important to note that Grouse Creek in Kansas has been added to the Inventory and would be crossed by the Market Alternative Pipeline.

Other errors include:

Table 3-34 - The Caney River at MB-354, 373 is in Oklahoma. The river is crossed by the pipeline in Kansas at approximately MB-308, at which point the stream is included as an Inventory segment.

Page 3-87 - The microwave tower along the Saline River is not at MP PM-118, but at MP PM-1118.

Natural Areas

The States of Arkansas and Oklahoma are in the process of establishing and maintaining natural heritage programs that systematically locate and describe the state's significant natural features. The programs are designed to gather information on important plant and animal communities, land forms, and geologic features, which are helpful in planning for development and conservation. The environmental statement does not mention whether any features in these state systems have been impacted. The State Heritage Program contact in Arkansas is Mr. Harold Grimmett, Executive Director, Arkansas Natural Heritage Commission, Suite 500, Continental Building, Main and Markham, Little Rock, Arkansas 72201. In Oklahoma the contact is Mr. Abe L. Hesser, Executive Director, Oklahoma Tourism and Recreation Department, 500 Will Rogers Memorial Building, Oklahoma City, Oklahoma 73105. Coordination efforts with these two offices related to possible impacts should be indicated in the final statement.

Robert J. Arkins

Robert J. Arkins

cc: SCRO

3

5

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:
DAEN-CWO-N

24 NOV 1980

Mr. Richard E. Traylor
ETSI EIS Project Leader
Bureau of Land Management
Department of Interior
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

This is in response to your November 10, 1980, letter (your reference 1792(142) ETSI) requesting review of the "WATER QUALITY TECHNICAL REPORT" for the Energy Transportation Systems Inc. (ETSI) coal slurry pipeline project.

We have not received the draft environmental impact statement (EIS) but would appreciate the opportunity to review it when available.

The technical report, in Chapters 1 and 3 acknowledges the need for National Pollution Discharge Elimination System (NPDES) permits for point source discharges of dewatering plant effluent and hydrostatic test water respectively. Chapter 2, describing construction effects of the pipeline at stream crossings does not mention the possible need for Department of the Army permits (under Section 10 of the River and Harbor Act of 1899, and Section 404 of the Clean Water Act of 1977) for such crossings. A section should be added to Chapter 2 covering these requirements. In addition, Department of the Army permits may be required for the discharge structures mentioned in Chapters 1 and 3.

We note that in the report appendix, certain pipeline crossings are acknowledged to require Department of the Army permits. A brief review of the appendix suggests that many of these crossings may be covered by nationwide permits (for Section 404) under existing regulations inclosed for your information (inclosure 1). These permits, described at 323.4-2(a)(1) and 323.4-3(a)(1) are subject to conditions found at 323.4-2(b) (1-4) and 323.4-3(b) (1-7) respectively. There are additional management practices at 323.4(b) (1-8) which should be followed.

As you may know, the Department of the Army is in the process of amending its existing permit regulations. A copy is inclosed for your information (inclosure 2). This amendment, among other things, proposes changes to the existing nationwide permits. Changes of potential interest are described at 330.4(a), 330.5 (a)(7), 330.5(a)(12), 330.5(a)(18), 330.5(a)(19), and 330.5(a)(24).

DAEN-CWO-N
Mr. Richard E. Traylor

24 NOV 1980

As additional documentation on the project is developed for review, we would suggest copies be provided to the following U.S. Army Engineering Divisions: Lower Mississippi Valley, Missouri River, and Southwestern. Addresses are inclosed (inclosure 3). We appreciate the opportunity to comment.

Sincerely,

3 Incl
As stated

GEORGE F. BOONE
LTC, Corps of Engineers
Assistant Director of Civil Works,
Environmental Programs

2

TENNESSEE VALLEY AUTHORITY
NORRIS, TENNESSEE 37828

JAN - 2 1981

Mr. Richard E. Traylor
ETSI EIS Project Leader
U.S. Department of the Interior
Bureau of Land Management
Special Projects Staff
Third Floor, East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

The Tennessee Valley Authority appreciates the opportunity to review the Department of the Interior's draft environmental impact statement (DEIS) on the proposed Energy Transportation Systems, Inc. (ETSI) Coal Slurry Pipeline Transportation Project. We hope the enclosed comments on the DEIS will be of assistance to you in the preparation of the final statement.

If you have any questions concerning our comments or if we can be of any further assistance, please call me or Mr. Charles Langdon of my staff at FTS 856-6450 in Norris, Tennessee.

Sincerely,

Mohamed T. El-Ashry, Ph.D.
Director of Environmental Quality

Enclosure

An Equal Opportunity Employer

TENNESSEE VALLEY AUTHORITY
COMMENTS ON THE ETSI COAL SLURRY
PIPELINE TRANSPORTATION PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT

1. The DEIS correctly recognizes the Inyan Kara Group as an aquifer of regional importance (DEIS, page 3-22). It also acknowledges the probability of hydraulic communication between the Inyan Kara aquifer and the Madison formation, and the likelihood that the Inyan Kara receives a significant amount of recharge from the Madison (DEIS, page 3-10). However, there is no quantitative assessment of the potential drawdown impacts to the Inyan Kara aquifer. We do not believe that the statement that drawdown in confined portions of the Inyan Kara (and other aquifers overlying the Madison) may be ". . . as large as 90 percent of those calculated for the Madison . . . ." is adequate. In this regard, we recommend that the final EIS include: (1) explicitly computed water level declines in the Inyan Kara and other aquifers lying above the Madison, including the Sundance and Spearfish aquifers, as was done for the Madison; (2) identification of users of these aquifers (including the Madison) in the affected region; (3) evaluation of the impacts of water level declines in the aquifers; (4) development of a plan to mitigate potential impacts to these water users; and (5) development of a monitoring plan to provide an early warning of impending impacts so that the mitigation plan could be implemented before significant adverse impacts occur.

2. In view of the uncertainty associated with the data used in the numerical model for predicting regional water resource impacts, we recommend that the final EIS include a worst case analysis of impacts to each aquifer for each well field alternative. That is, in addition to the expected case given in the DEIS, water level declines should be predicted using the combination of model input parameters which will yield the most serious impacts for each aquifer. (Clearly, the data set which yields the maximum drawdown in the Madison will indicate the least drawdown in the Inyan Kara Group. Therefore, it will be necessary to examine the worst case impacts for each aquifer separately.)

   In addition, expected and worst case analysis of impacts to spring and stream flows in the affected region should be prepared. The impacts of surface flow reductions should be evaluated using these results. The method by which surface flows are simulated in the model should also be described (methods are not described in either the DEIS or the supporting "Well Field Nydrology Technical Report" prepared by the Woodward-Clyde Consultants, 1980) to permit the reviewer the opportunity to assess the reliability of these predictions.

3. We believe that it is difficult to assess the accuracy of the steady-state model calibration with only a comparison of observed and computed potentiometric levels at selected locations as given in Table 4-2 of the "Well Field Nydrology Technical Report." Since

-2-

the credibility of the predictive analyses rests on the accuracy of the numerical model, illustrations showing a comparison of computed and observed potentiometric contours over the modeled region would be more meaningful. We suggest that this information be included in the final EIS.

4. We believe that the U.S. Geological Survey's (USGS) Madison Aquifer Study represents the most extensive investigation of the Madison aquifer system undertaken to date and that the results of this study could greatly enhance the predictions of potential water resource impacts resulting from the proposed ETSI ground water exploitation. Inasmuch as the USGS study was initiated for the expressed purpose of providing hydrologic data for evaluating the impacts of future Madison aquifer development, we recommend that the final EIS assess the ETSI project utilizing the information obtained from this study.

5. Based upon the analyses presented in the DEIS, it is not readily apparent that the preferred Niobrara County, Wyoming, well field location is the most energy efficient or environmentally sound water supply alternative for the proposed ETSI coal slurry operation. We believe, therefore, that the final statement should consider alternative water supply systems (i.e., recycling options, alternative well field locations, etc.).

6. There appears to be a discrepancy between the DEIS text and maps concerning the proposed pipeline and alternative routes. Maps A-1 and 1-1 show the all-rail alternative as being routed through Edgemont, South Dakota, while the text (Sections 3.1.1 and 4.1.1) indicates a southerly route through Guernsey and Torrington, Wyoming. Clarification of this discrepancy is recommended and, if the all-rail alternative is indeed proposed to pass through Edgemont, an assessment of socioeconomic and other potential impacts to the town should be included in the final EIS.

22

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 90TH COMBAT SUPPORT GROUP (SAC)
FRANCIS E. WARREN AIR FORCE BASE, WY 82001

11 DEC 1980

REPLY TO ATTN OF: DEL (Dick Riddell/3226)

SUBJECT: ETSI Coal Slurry Pipeline

TO: Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
555 Zang Street, 3rd Floor East
Denver CO 80228

1. The ETSI coal slurry pipeline may pass through Laramie County, Wyoming. If it does, it will directly affect the Minuteman missiles in Wyoming and Colorado.

2. Because of the nature and content of the missile sites, clear zones and explosive safety criteria were established to insure the safety of people and facilities in the near vicinity of the missiles. Our concerns also include the many communication cable crossings which will occur, and the proximity of the proposed pipeline to the missile sites.

3. We will attend the meeting in Lusk, Wyoming on 17 December 1980. We do not intend to give any formal presentation. Should the Colorado Alternative be selected, we will require a meeting with ETSI representatives to discuss our concerns in detail.

4. Please send us the names of concerned people in BLM and ETSI so we will be prepared to discuss this matter with the proper people as events require.

Jack B. Knudson

JACK B. KNUDSON
Base Civil Engineer

Peace . . . . is our Profession

43

United States Department of the Interior
WATER AND POWER RESOURCES SERVICE
REGIONAL OFFICE, LOWER MISSOURI REGION
P.O. BOX 25247
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO: LM-150

DEC 19 1980

Memorandum

To: Project Leader, Special Projects Staff, Bureau of Land Management, 555 Zang Street, Denver, Colorado 80228

From: Regional Environmental Officer

Subject: Environmental Impact Statement Energy Transportation System, Inc., Coal Slurry Pipeline Transportation Project, BLM

Thank you for the opportunity to review the subject document; I have the following comments:

1. It appears that the buried main slurry pipeline would cross the project lands and canal of our Meeker-Driftwood Unit, Kansas. The lower end of our Cedar Bluff Unit lands and canal could also be affected. Specific comments on these features would have to be delayed until receipt of detailed plans.

2. The pipeline crosses several streams in our Kansas River Projects area. Although adverse effects due to pipeline spills would probably be quite localized, spill prevention should be a design consideration at stream crossings. The streams which would be crossed include: the Republican River and tributaries; Blackwood Creek, Driftwood Creek, Beaver Creek, and Sappa Creek; Prairie Dog Creek above Norton Reservoir; North Fork Solomon River above Kirwin Reservoir; South Fork Solomon above Webster Reservoir; Salina River above Wilson Reservoir; and Smoky Hill River below Cedar Bluff Reservoir.

3. As long as the terrain effected by construction is returned to its natural state and spill prevention is accommodated, I would not anticipate significant problems associated with the features and streams noted in items 1 and 2.

4. I still have reservations on the indirect effects associated with mining such a large quantity of water from the Madison Formation. This could have an adverse effect on streamflow in the North Platte Basin and the water supplies associated with some of our facilities. I feel that water depletions due to coal slurry pipelines in general is a significant

2

and insufficiently analyzed problem. It could have enormous impact on water projects which derive a significant supply from ground-water inflow. These potential impacts of slurry pipelines in general should be expanded in Section 5.8, page 5-15.

Please send a copy of the final environmental statement to this office, attention: LM-150, when it is completed.

61

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO: L7619 (RMR)PC

Memorandum

To: ETSI Project Leader, Special Projects Office, Bureau of Land Management, Denver, Colorado

From: Associate Regional Director, Planning and Resource Preservation, Rocky Mountain Region

Subject: Energy Transportation System, Inc. Coal Slurry Pipeline Draft Environmental Impact Statement

The National Park Service has reviewed the subject Energy Transportation System Inc. (ETSI) draft environmental impact statement (DEIS). The mitigation measures for impacts on cultural resources, if properly followed and supervised, should allay the concerns we expressed in the scoping process about the pipeline crossing national historic trails.

We continue to prefer that the Colorado Alternative not be utilized as having too much potential for impacting Fort Laramie National Historic Site.

The DEIS gives us much more information about the potential impacts on water resources. Page 2-8, Table 2-4 presents the 50-year groundwater drawdown that would occur at Devils Tower National Monument, Wyoming. Since page 3-2, Table 3-5 estimates the existing drawdown at Devils Tower to be 10 feet, and Table 2-4 includes existing drawdown, does the proposed action from the Niobrara supply mean there would be an additional drawdown of 10 feet? The much greater additional drawdown for the Crook County alternative is obvious.

The National Park Service is greatly concerned not only about the potential loss of water from Devils Tower, but also by the possibility that the DEIS has not adequately considered the other costs for all areas that will be incurred. At Devils Tower, for example, water usage rose 76 percent from 1977 to 1980 (from 2,104,300 gallons to 3,701,800 gallons). Pumping costs rose from $179.56 to $314.20 for electricity only. It also required the use

Year of the Visitor

of more chlorine and more man hours besides the increased wear on the pumps. The main pump was installed in 1965 and the average useful life of a submersible pump is 15 years. A replacement pump (including installation) would cost about $2,000.00 today. The greater drawdown would mean operating costs would increase, and the pump would work harder and have to be repaired and replaced more often. Similar costs and effects should be considered for all the alternatives.

Devils Tower National Monument obtains its water from the Minnelusa Formation that overlies and supplies some of the recharge to the Madison aquifer where the proposal's water would come from. Wind Cave National Park, South Dakota, also gets its water from the Minnelusa Formation. We have not been able to determine whether the Madison formation extends that far, but we believe there may be a good chance that the water level and thus, cave hydrology within the park, may be affected. Jewel Cave National Monument lies somewhat closer to the Madison formation than Wind Cave and thus could also be affected. The National Park Service therefore urges that the final EIS evaluate these potential consequences.

Richard A. Strait

2

83

United States Department of Agriculture | Soil Conservation Service | P.O. Box 2890 Washington, D.C. 20013

December 29, 1980

Mr. Richard E. Traylor
ETSI EIS Project Leader
U.S. Department of the Interior
Bureau of Land Management
Special Projects Staff, 3rd Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

The Soil Conservation Service comments concerning the Energy Transportation Systems, Inc. (ETSI) Environmental Impact Statement are as follows:

1. The topsoil in all disturbed areas, especially on prime farmland, should be returned in a manner that insures the position and thickness of each horizon equivalent to those in the adjacent undisturbed soils and that of the disturbed area prior to construction.

2. Local Soil and Water Conservation Districts, Natural Resource Districts, and the local Soil Conservation Service offices should be consulted and requested to provide technical assistance in the restoration of disturbed land (cropland, pastureland, timberland, rangeland, etc.) and disturbed conservation practices. These offices are usually located in the county seats. Their staff members are familiar with local conditions, soil types, practice specifications, etc.

3. Contact Mr. Lawrence Richards, Dighton, Kansas 67839, to determine the effects to the planned projects in the Wet Walnut Watershed District. Mr. Richards is president of the District Board.

4. Information contained in the EIS lacked sufficient detail to determine the impact in Colorado. Should the "Colorado route" be selected, even though a market alternative route, the same study detail as was completed for other routes would be necessary before any substantive comments could be provided.

5. Even though research has been completed on the effects of water withdrawal from the Madison formation, considerable concern exists. An adequate supply of water is obviously crucial to this project as well as to the livelihood of ranchers, farmers, citizens, and businesses in the Western United States, not excluding those in Wyoming and others downstream who increasingly depend on water for food production.

   Specifically, there will be a secondary effect on individuals, farmers and ranchers that withdraw ground water from formations overlying the

The Soil Conservation Service is an agency of the Department of Agriculture

WO-AS-1
10-79

Mr. Richard E. Traylor 2

   Madison limestone. On pages 3-10, the report states that formations overlying the Madison formation between the Black Hills monocline and the outcrop area around the Black Hills provides an environment that is conducive to upward recharge. The report states that the upward recharge is significant. Consequently, the drawdown of the water table in the Madison formation will decrease the discharge to the overlying aquifers.

6. The estimated drawdown in the Madison formation in Wyoming will have a significant effect on the farmers and ranchers that use groundwater for domestic and irrigation use. The increased cost, energy requirements, and associated economic and social effects of pumping the water from increased depths are not adequately addressed in the EIS. It is possible that some farmers and ranchers may be driven out of business by such increased costs.

You are to be complimented for the consideration given to problems associated with disturbing agricultural land. It is the food production base which is becoming more essential each day for this Nation and the world.

Thank you for the opportunity to comment.

Sincerely,

THOMAS N. SHIFLET
Director of Ecological Sciences

140

United States Department of the Interior
FISH AND WILDLIFE SERVICE

MAILING ADDRESS: Post Office Box 25486, Denver Federal Center, Denver, Colorado 80225
STREET LOCATION: 134 Union Blvd., Lakewood, Colorado 80228

IN REPLY REFER TO:
ENV

JAN 7 1981

MEMORANDUM

To: Project Leader, ETSI Coal Slurry Pipeline, BLM
Denver, CO

From: Regional Director, FWS, Region 6
Denver, CO

Subject: Comments on the Draft EIS for the ETSI Coal Slurry Pipeline

The Fish and Wildlife Service (FWS) reviewed the November 1980 Draft Environmental Impact Statement (EIS) for the ETSI Coal Slurry Pipeline for effects on fish and wildlife from the construction, operation, and maintenance of the project. The EIS was well written and fairly complete. The advanced coordination which occurred on this project obviously aided the quality of the document. However, there are still several items that should be addressed in the final document. I also have some concerns about the use of ground water.

My major concern is the use of the Madison Formation water and the resultant potential impacts to surface waters and fish and wildlife resources. The discussion about the impacts on surface waters from use of the ground water are not adequately covered. The impacts may be far greater than has been depicted in the draft EIS. In the draft EIS a much more thorough study of impacts from dewatering the Madison Formation is needed before this alternative can be selected.

The DEIS lists 28 individual springs (Table 3-1) in South Dakota that will have from a 1-4 cfs decrease in discharge rates; however, it does not identify which of these springs would experience the decrease nor to what extent. Of these 28 springs, the annual discharge of 20 of them is, at present, 4 cfs or less. A 1-4 cfs decrease in annual discharge may eliminate some of the springs. The DEIS also does not examine the impact that elimination of the springs would have on the terrestrial wildlife that depend on this water source. Also there is no discussion of measures to mitigate the impacts from the loss of water on either wildlife or agricultural interests. There are additional springs and seeps in the Black Hills which supply water to trout streams such as French Creek, Battle Creek, and Beaver Creek (to name only a few) that have not been mentioned in the DEIS. The DEIS does not identify whether such springs receive water recharge from the Madison Aquifer or whether these will be lost or affected. If these springs are adversely affected, the impact on wildlife in Custer State Park, Wind Cave National Monument, and the Norbeck Wilderness Area could possibly be severe.

Although the Aquatic Biology portion of the DEIS (Sec. 4.A.6) discusses the impact of the drawdown on Spearfish Creek and the Cheyenne River, it should also discuss the impact of a 1-4 cfs decrease in discharge to streams in the following drainages: Belle Fourche River, Redwater River, Bear Butte Creek, Morris Creek, Elk Creek, Boxelder Creek, Rapid Creek, Spring Creek, Battle Creek, French Creek, Lame Johnny Creek, Pleasant Valley Creek, and Stockade Beaver Creek. If, as noted in the DEIS, a decrease of 1 cfs discharge in the Cheyenne River (there will actually be a 7 cfs decrease) could cause the duration of a dry riverbed to increase from 14 to 33 days, what impact would a 1-4 cfs decrease have on the other streams in the Black Hills? The DEIS should address this question and discuss how the loss might be mitigated. Streams in the Black Hills are already under the stress of reduced flows as a result of various factors (enclosed canopy, irrigation, mining, and municipal withdrawals). Any further reduction in streamflows could seriously impair trout reproduction and stream holdover capacity for trout or other species. The minimum flow requirements for these streams should be identified, and the cumulative impacts of all the factors limiting water supply should be considered. The South Dakota Department of Game, Fish and Parks (SDGFP) has done some investigation of minimum flow requirements of some of these western South Dakota streams. I recommend that SDGFP be contacted so that the information can be included in the final EIS.

In Nebraska there are several streams in Sioux and Dawes Counties that sustain trout fisheries. Hat Creek and Monroe Creek in Sioux County support naturally reproducing populations of brown and brook trout. The Niobrara River provides a brown trout fishery above Box Butte Reservoir. Soldier Creek and White River in Sioux and Dawes Counties provide excellent put-and-take trout fisheries for visitors at Fort Robinson State Park. Streams capable of supporting trout are particularly valuable in Nebraska because of a scarcity of cold-water fishery resources in the State.

Crawford National Fish Hatchery, located in Crawford, Nebraska, is dependent upon ground water pumped from wells in Fort Robinson State Park in order to maintain their fish production operation. The hatchery currently operates on approximately 500 gallons of water per minute. This amount is considered to be the minimal level for maintaining a viable fish hatchery operation. Any reduction in ground water availability to the hatchery could seriously jeopardize their operation. Also, the hatchery utilizes springs flowing into Soldier Creek to provide water to several trout-rearing ponds adjacent to the creek. Reductions in the spring flow into these rearing ponds could seriously impact their fish production capability.

Also, any reduction in ground water availability in the Fort Robinson area could affect the present water supply for the State Park. The Park is dependent upon wells to provide water for domestic use, recreation facilities that include a swimming pool, and put-and-take trout ponds in the Park.

In contrast to the uncertainties associated with impacts of the proposed action, the impact of removing 20,000 acre-feet/year from the Oahe Reservoir is known and would be minimal. Therefore, the FWS recommends that the Oahe Alternative be selected as the primary source of water.

Specific Comments

Page 5, Col. 2, Para. 3. The Colorado butterfly weed has not been officially proposed for listing. It may be proposed in the near future, possibly before the final EIS is written.

Page 6, Col. 1, Para. 1. The loss of trees in many areas is considered significant, such as the woodlands of Oklahoma and the riparian zones of Wyoming, South Dakota, Nebraska, Colorado, and Kansas. Many of these areas have already been impacted by other projects. The cumulative effects from these projects and the addition of impacts from the ETSI pipeline can be highly significant.

Page 6, Col. 1, Para. 3. A statement is presented that the black-footed ferret, red-cockaded woodpecker, bald eagle, and American alligator would not be affected by the project. Until the surveys are completed for the black-footed ferret and the red-cockaded woodpecker, the impacts are not known.

Page 1-17, Col. 2, Para. 4. The 200 x 200 foot area for construction at stream crossings is excessive. This work should be done within the 100-foot right-of-way. The potential for significant cumulative impacts on riparian habitats exists. By confining the disturbance to a smaller area, impacts can be lessened.

Page 1-21, Col. 1, Para. 1. Excess dredged materials could have adverse impacts in riparian zones.

Page 1-23. The Bureau of Land Management (BLM) and Forest Service (FS) permits need further explanation. The BLM permits are for a 50-foot temporary use permit. The FS permits are for a 50-foot right-of-way and a 50-foot special use permit. How each of these permits relate to the total project cross sectional area should be diagrammed on Figure 1-5.

Page 1-23, Col. 2. The FWS has responsibility for providing recommendations for the Department of the Interior to the Corps of Engineers (CE) regarding Section 404 and Section 10 river and stream crossing permits. The statement lacks adequate measures for a full understanding of how the Section 10 and 404 permits from the CE may affect fish and wildlife resources. Accordingly, our comments do not preclude separate evaluation and comments by FWS when it reviews the permit applications. The FWS may concur, with or without stipulations, or object to the proposed permit work depending on effects. Based on available information and preliminary assessments, it would appear that the FWS probably would recommend as a minimum that the CE when issuing a permit require: (1) features to reduce turbidity during project construction, (2) any slight changes in crossing alignment needed to reduce destruction of important habitat, (3) stabilization of the shoreline area with plantings suitable for wildlife utilization and replacement of trees and shrubs that are unavoidably lost, and (4) such other measures as would be appropriate from the information available at that time.

Should the Slurry Pipeline Water Discharge Alternative be selected, permits for discharge of pollutants from dewatering plants into waters of the United States would be required under authority of Section 402 of the Clean Water Act from the Environmental Protection Agency (EPA). The FWS would review these permit applications and make recommendations regarding the discharge to protect the aquatic resources of receiving waters.

Page 1-54, Col. 1. Para. 2. The description of the intake structure is inadequate. A closeup diagram should be presented. In a memorandum dated August 8, 1980, we recommend that the intake structure should be moved some 12,000 feet west to avoid the West Shore Boat Launch Public Use and Wildlife Management Area and the emergency spillway. The entire discussion of the Oahe Alternative has received only minor attention; however, since this should be the water source, more discussion should be presented. The Hayes Lake area and Bear Butte State Park in South Dakota may be crossed. The route should be moved to ensure that these areas are not adversely impacted.

Page 3-59, Slurry Pipeline System. In Oklahoma the proposed action route would pass through the Fort Gibson Game Management Area between mileposts 819 and 827. This area is managed for upland game, white-tailed deer, and waterfowl by the Oklahoma Department of Wildlife Conservation.

Page 3-63, Col. 2, Para. 4. This statement characterizes the major Nebraska drainages as "generally sluggish and silted in nature." Most of Nebraska's major drainages are fairly swift-flowing, sand-bottomed streams. Only portions of a few drainages located primarily in the southeastern part of Nebraska could be characterized as sluggish and silted.

Page 3-90, Col. 1. Para. 5. The Market Alternative would also traverse the range of the greater prairie chicken in Oklahoma between mileposts 365 and 375.

Page 3-90, Col. 2, Para 2. The statement mentions the streams crossed by the Market Alternative that are considered important fisheries. However, the Illinois River and Barren Fork Creek contain aquatic resources of sufficient significance to warrant special mention. Both are high-quality streams which provide good fishing for smallmouth bass as well as a variety of other species. Also, the Neosho pearly mussel (Lamsilis refinesqueana) has been found in both streams. This mussel is very limited in occurrence and, although having no legal protection under the Endangered Species Act at this time, may be listed as proposed in the future.

Page 4-45, Col. 2. Para. 3. Remove the word "mitigation". Reword the sentence to indicate that actions to avoid impact to black-footed ferrets would be taken.

Page 4-48, Greater Prairie Chicken. The statement that "Temporary loss of strutting grounds would not affect the prairie chicken in Oklahoma" as referenced to Short, 1980 is taken somewhat out of context from the reference source. The referenced material only indicated that "the pipeline probably would not have

significant long-term impact on the tall grass habitat if the trench is backfilled with parent material first and topsoil on top." This referred to prairie chicken habitat in general, not specifically to strutting grounds.

Page 4-49, Insignificant Impacts. The maintenance of a 50-foot grassy right-of-way through forested areas is dismissed as causing "some small but permanent change" in wildlife habitat. Over the entire pipeline right-of-way almost 3200 acres of woodland habitat would be permanently lost. We disagree with classifying a loss of this magnitude as small, and also with listing it as insignificant. The long-term impacts of woodland clearing on wildlife should not be ignored. Woodland inhabitants such as squirrels, raccoons, several species of small mammals, and many bird species would be particularly affected. The loss of forested wetland habitat would be especially severe because of high value for many wildlife species.

Page 4-75, Market Alternative. Impacts of this alternative on aquatic resources appear to have been omitted.

Page 4-89, Col. 2, Para. 2. The Colorado butterfly weed has not yet been proposed. It is also not addressed in the Memorandum of Understanding that is referenced.

Page C-2. What will be the function of the environmental coordinators? Who will employ them? Will BLM have any input into their selection?

Page C-3. Will the onsite reclamation specialist have power to hold up the project if necessary? Who controls this person?

Page D-28 to D-37. The list of streams requiring CE permits is not clear. The streams should be listed by those requiring Section 10 permits, those under the Nationwide 404 permit for pipelines and those which require separate Section 404 permits.

The list is also incomplete. For example, in Kansas there are only two streams listed under the Proposed Route which the preparer states would require a Section 404 permit. There are a least eight additional streams which require a Section 404 permit. These are the South Fork Solomon River, Saline River, Smokey Hill River, Rattlesnake Creek, North Fork Ninnescah, Silver Creek, South Fork Ninnescah, and the Chikaskia River. The same holds true for the Market Alternative and the Pipeline-barge Alternative. We recognize that the CE has issued a Nationwide Section 404 permit for utility crossing of the type under consideration (33 CFR 323.4-3). Because of the number of stream crossings, the diversity of stream and associated riparian habitat being crossed, State and Federal endangered species which may be affected, the size of the pipe and associated access easement, and the potential for recurring maintenance in the stream, all the streams which need Section 10 or 404 approval should be addressed under individual permits. This way interested agencies and individuals could address specific concerns which may have adverse effects on these individual streams.

6

Page D-32, Table D-2. The Market Alternative would cross Lee Creek (Little and Big Lee Creek) in Oklahoma rather than in Arkansas. It also should be designated as a scenic river.

Page D-39. What Federal lands does the last statement refer to? It should only refer to lands administered by the CE.

In summary, the document is fairly well written, concise, and to the point. The FWS is particularly concerned about impacts to fish and wildlife resources from reduced stream flows caused by dewatering the Madison Formation. Because of these impacts, the Oahe Alternative should be selected as the water source.

If the FWS can be of further assistance, please let us know.

DON W. [illegible]

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

JAN 9 1981

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

The Department has reviewed the Draft Environmental Impact Statement (EIS) on the Energy Transportation Systems Inc. Coal Slurry Pipeline Transportation Project. The comments of the Department's respective administrations are enclosed.

We appreciate the opportunity to comment on the proposed EIS.

Sincerely,

Martin Convisser
Director, Office of
Environment and Safety

Enclosure

DOT Comments on EIS on ETSI
Coal Slurry Pipeline Transportation Project

Federal Railroad Administration

Comparative Costs

It is not clear from the DEIS how the relative costs of transporting coal via slurry and via rail were derived. It would be helpful if the final EIS included a fuller treatment of the costs of alternative systems, outlining capital, operating, and maintenance costs separately. This will give the reader the opportunity to see how all of these elements are incorporated into the rate structure.

Petroleum Consumption

The DEIS partly justifies the ETSI project on the basis of its independence from petroleum based energy. Although the rail mode is recognized in the DEIS as more energy efficient than the proposed pipeline, the DEIS observes that the source of power for the slurry pipeline system would be electricity produced by coal-fired power plants, whereas an all railroad system would require the use of 2.8 million barrels of diesel fuel annually. The EIS does not place this use in the context of total U.S. petroleum consumption, however. The railroads consume only 1-½ percent of the nation's petroleum and only 17 percent of the petroleum used for freight transportation. The 2.8 million barrels represent .07 percent of the fuel used by all the railroads in 1979.

Moreover, rail dependence on petroleum based fuel may change over the next decade. The FRA has proposed a project to electrify major freight rail lines in the United States, and the railroad industry is working with FRA to study and develop such a program. Many of the rail lines most heavily used in the movement of coal unit-trains would be among the first to be electrified, whether under an FRA-sponsored program or otherwise. Once electrified, railroads, like the proposed slurry pipeline, would not be dependent on diesel fuel for power since the electric generation would be powered by coal.

Capacity of the Railroads

The DEIS concludes that if ETSI is not built, the Burlington Northern, Inc. (BN) could handle the 37.4 MMTA without any capacity improvements beyond those included in their current investment plans (see p. 1-57). Based on the BN's five year plans for improvements to coal lines, by 1985 BN will be able to move approximately 150 million tons annually from the Powder River Coal Region. As long as total coal transportation demand does not exceed 150 million by 1985, (including the 37.4 MMTA that would otherwise move on ETSI), the DEIS is probably correct in its assessment of rail capacity.

2

The assumptions behind this conclusion deserve close scrutiny, however. According to some sources (including the Department of Interior), coal production in the Powder River Region could reach levels substantially above 150 million tons in the next decade. Under these circumstances, the all rail alternative would require expansion of rail capacity, either through additional improvements to the BN, or through the addition of another carrier. The addition of capacity by the BN to handle additional traffic demands beyond its existing plans depends on the BN's future business decisions. Such decisions would be based on an assessment of the value of investments to the company.

On the other hand, if production is below the projected level, the BN would incur significant losses in traffic which would be seriously aggravated if a coal-slurry pipeline siphoned off existing traffic from the BN. The most serious impact would be felt if the BN had undertaken new investments to carry Powder River coal which was then lost to the pipeline. The consequences of such an impact are not fully addressed in the DEIS.

In light of these uncertainties, careful consideration should be given to the above points regarding the demand and capacity assumptions of the DEIS and the DEIS statements on the transportation requirements for Powder River Coal.

Interrelationships of All-Rail Alternative With Other Planned Projects

The DEIS recognizes that the most important planned project affecting the all-rail (no-action) alternative is the Chicago and North Western (C&NW) Coal Line Project. The Interstate Commerce Commission (ICC) has made an initial decision to approve C&NW's entry in the Powder River Basin (October 7, 1980) partly on the basis of the proposed final EIS issued May 1980. Government support for the financing of this project is still under consideration by the Federal Railroad Administration (FRA). The FRA has not yet released its final EIS on the C&NW application. The final EIS for the coal slurry pipeline project should include reference to the ICC environmental document.

Federal Highway Administration

The EIS states on pages 7 and 3-81 that the proposed pipeline construction across highways would have no significant impact on them. No reference is made about contacting State, County and Township officials for permits to cross these highway rights-of-way. In each case, permits may require specific types of construction. The respective policies regarding accommodation of utilities should also be recognized. Therefore, even though the impact may be minimal, we believe the EIS should acknowledge the need for permits and identify that such coordination will be accomplished.

3

Although we are aware of some contact with State highway officials regarding this project, the statement does not acknowledge this coordination or identify the need for the same. We assume the Draft EIS review and the hearing process will help clarify the need to include all State highway Agencies and local government officials that may be affected by the project.

We believe the no-action alternative should recognize the impact the increased use of railroads would have on highway/railroad crossings. With substantial increase of unit coal trains, the impact on communities and heavily traveled highways would be significant. Communities could be physically divided for a total of several hours a day with traffic and essential public services being delayed. Such delays could be very disrupting to the life of a community. To avoid such disruption would require the construction of many highway/railroad separations involving a major public investment.

Appendix D-1 refers to other agency authorizing actions. Permits for highway crossings from the Federal Highway Administration and the State highway agencies of Wyoming, Oklahoma, Arkansas, and Louisiana should be added in this section.

Closer coordination should be obtained with the Louisiana State highway agency in scheduling concurrent construction of the pipeline and I-49.

In the discussion of visual resources, the scenic overlook along the highway in Russellville, Arkansas, should be mentioned and coordination obtained with the Arkansas State highway agency.

Safety features available to avoid slurry spills in wetlands and in Class 1 waterways should be discussed.

The effect on existing transportation systems, especially highways, in transporting materials should be discussed in greater detail in the final EIS.

The maps do not show the location of I-40 between Conway and Fort Smith, Arkansas. The pipeline appears to be quite close to I-40.

<u>United States Coast Guard</u>

The report fails to adequately address the project's impacts on other modes of transportation.

217

Interstate Commerce Commission
Washington, D.C. 20423

OFFICE OF POLICY AND ANALYSIS

January 8, 1981

Mr. Richard Traylor
U.S. Department of Interior
Bureau of Land Management
3rd Floor East
555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

Thank you for the opportunity to review the Draft Environmental Impact Statement on the proposed Energy Transportation System, Inc. coal slurry pipeline between Gillette, WY and power plant customers in Oklahoma, Arkansas and Louisiana.

We were quite impressed with how the document was prepared. The level of detail was quite appropriate for such a complex project. We were also impressed by your ability to overcome problems we have had with quantification of impacts.

With the exception noted below, we concur with the comparative analysis of alternatives and feel that the all-rail alternative would impose significantly less impacts than the proposed action or other alternatives, even considering the need for use of imported fuel for locomotives. The down-line impacts from rail operations appear to be the only area of potentially significant impacts. It would appear that mitigation of these impacts through construction of track to reroute around affected communities would be quite reasonable. On page 4-117 of the EIS, reference is made to the fact that rerouting would eliminate these impacts, but the assumption in the last paragraph under "Community Disruption" appears contradictory. It is also presented in such a way to have the reader feel it represents the conclusion from this section. I feel greater emphasis has to be given to the more realistic result - construction of rerouting track. I recognize that this type of action is not within the jurisdiction of DOI, but is consistent with CEQ regulations.

-2-

Not withstanding my criticism above, you are to be congratulated on an excellent and precedent-setting EIS.

Very truly yours,

Robert M. Maestro

Robert M. Maestro
Assistant Chief
Energy and Environment
Branch

cc: C. Bausch
Chron

218

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
P.O. Box 2417
Washington, O.C. 20013

1950

JAN 9 1981

Mr. Richard E. Traylor
Bureau of Land Management
Special Projects Staff
555 Zang Street 3rd Floor East
Denver, Colorado 80228

Dear Mr. Traylor:

The Forest Service has reviewed the proposed Coal Slurry Pipeline Oraft Environmental Impact Statement in light of its role as a cooperating agency.

We recommend identifying the Oahe Reservoir water source as the preferred alternative in the final environmental impact statement or include a mitigation measure requiring ETSI to compensate any existing Nebraska and South Oakota water users that are affected by ETSI pumping.

Our review of the proposed action indicates the proposal would impact approximately a one-mile strip, 300 feet wide, of Federal uncommitted coal. The impact would occur in two locations of approximately one-half mile each on the Thunder Basin National Grasslands. Under the unsuitability criteria set forth in 43 CFR 3451.1(b), the strip would be declared unsuitable. However, an exception may be applied that would allow for relocation of the pipeline at the time of mining. We recommend applying the exception. This recommendation is based on the facts that the coal is not under lease and prospective lessees would be notified of the existence of the pipeline right-of-way. Lessees would have to bear the costs of moving the pipeline should it be economically feasible on the basis of the amount of coal in the right-of-way.

The draft environmental impact statement adequately identifies the permits and permit stipulations required by the Forest Service.

Mr. Richard E. Traylor

Specific comments follow:

Page 1-23 under FS-1, bottom left. Change last sentence to read:

"Final regulations were issued in the Federal Register, Vol. 45, No. 111, June 6, 1980, and became effective July 7, 1980. It would be issued by the Regional Forester for an appropriate duration and would specify its renewability, and under what conditions."

Page 1-23, second paragraph. Change to read:

"Grant a temporary special-use oermit parallel and immediately adjacent to the long-term right-of-way easement. This temporary permit is for construction of water and coal slurry pipelines across approximately 27.0 miles of Federal lands administered by the Forest Service in the Thunder Basin National Grassland in northwestern Wyoming."

Page 1-23 Authorizing Action.

Authorizing action lists certain lands owned by Bureau of Land Management, Forest Service, and others on which a 50-foot right-of-way is being proposed. This proposed 50-foot right-of-way appears to be used in prairies, but not forested land. From Table 4-16 it appears that the right-of-way through forested areas is 100 feet, although it is not stated as such. We feel strongly that a 50-foot right-of-way be used for the entire project route except at stream crossing.

Page 4-43, Table 4-16.

The summary of vegetation type and cropland for the proposed action and alternatives lists a total of 6,389 acres of forested land to be cleared as a result of the project. This is approximately 30 percent of the total 21,589 acres involved. Some mention should be made about the utilization of the timber and wood cut from the proposed route. An effort should be made to salvage all merchantable timber, pulpwood, firewood, etc., and utilize it in an effective manner. The possibility of making firewood available to the public as a source of energy should be of considerable interest to those who have wood-burning stoves and fireplaces.

We appreciate the opportunity to review the draft environmental impact statement.

Sincerely,

for R. MAX PETERSON
Chief

225

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WASHINGTON, D.C. 20245

IN REPLY REFER TO:
Environmental Services
(204)

JAN 15 1981

Memorandum

To: Richard E. Traylor
Bureau of Land Management
Denver, Colorado

From: Acting Director, Office of Trust Responsibilities

Subject: Review of Draft Environmental Impact Statement on the Energy Transportation Systems Inc., Coal Slurry Pipeline Transportation Project (DES 80/69)

We have reviewed the draft EIS on the coal slurry pipeline proposed by Energy Transportation System, Inc. Our comments are as follows.

Direct impacts on lands under the jurisdiction of the Bureau of Indian Affairs appear to be adequately addressed in the draft EIS. However, we are concerned that withdrawal of extensive amounts of water from the Madison Aquifer may adversely affect water resources on the Crow and Northern Cheyenne Reservations in Montana. Both of these areas lie above the Madison Aquifer, and, in fact, withdrawals of water from the Madison formation are currently being made in these areas.

It is important to remember that the courts have consistently held that the nature of Indian water rights is such that sufficient water has been reserved for accomplishing the purposes for which reservations were established and to provide for the present and future needs of the Indians. In addition, waters reserved cannot be preempted by non-Indians pursuant to State law.

We submit that attention must be given to the present and future water needs of both of these reservations. Proposals that may now or in the future affect the use of Indian waters and the development of Indian resources should not be considered until impacts can be accurately described and the Tribes are made aware of the ramifications involved.

William L Benjamin

226

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 9 1981

OFFICE OF THE ADMINISTRATOR

Mr. Richard E. Traylor
Special Projects Staff
Bureau of Land Management
Department of the Interior
Denver, Colorado 80228

Dear Mr. Traylor:

In accordance with our responsibilities under Section 309 of the Clean Air Act, EPA has reviewed the BLM's draft environmental impact statement (EIS) on the proposed Energy Transportation Systems Inc. coal slurry transportation project. Our general concerns are highlighted below and our detailed comments are enclosed.

EPA is optimistic that a coal slurry pipeline can be designed and constructed to minimize significant environmental impacts. We commend the BLM for their scoping process and their attempt to assess the environmental impacts of a coal slurry pipeline from a generic as well as a site specific standpoint.

We are, however, concerned with the potential for groundwater and surface water degradation as a result of waters pumped from the Madison aquifer. These withdrawals have the potential to impact the municipal water supplies for a number of communities. We are very concerned with the possibility of contamination of the Madison aquifer as a result of leakage from upper aquifers with high salt concentrations. The potential for low quality water to contaminate the wellfields is an important issue to evaluate both from its impact on groundwater and treatment needed for dewatering plant effluent. Depletion of the Madison aquifer will also result in surface flow losses that will be felt most keenly during low-flow periods.

EPA believes that the EIS should contain more information regarding the quality and treatment of dewatering plant effluent. For example, no information is given on pretreatment of the slurry water prior to combination with the coal and its impact on the dewatering plant effluent.

We question the assumption that power plants receiving the slurried coal will accept slurry water effluent for use in the plant. The slurry water will have high Total Dissolved Solids (TDS). Power plant usage, through a cooling system will not serve to treat BOD, TDS, SO_4, or CL. The treatment technology for these dissolved materials is advanced and of questionable reliability. In light of these concerns, the impact of this effluent on the receiving water needs further discussion and should be considered in the BLM's decision making process.

We believe the Oahe reservoir is an environmentally preferrable water supply and should be considered in the BLM's decision making process. We also note that from any energy standpoint the Oahe reservoir alternative would require about the same amount of power as pumping water from the Madison aquifer. The use of Oahe reservoir water would also minimize environmental problems with the dewatering effluent.

In accordance with our system for rating EIS, we have rated the proposed action ER2. This indicates we have reservations concerning the environmental effects of the water quality aspects of the proposed action as described in the draft EIS and believe the draft EIS does not contain sufficient information to fully assess the environmental impacts of the proposed action.

We appreciate the opportunity to comment on this draft EIS. Please contact Andrea Myslicki (FTS 755-9408) of my staff if you have any questions, or if we can be of further assistance.

Sincerely yours,

William N. Hedeman, Jr.
Director
Office of Environmental Review (A-104)

Enclosure

EPA's Detailed Comments on the ETSI
Coal Slurry Pipeline

Groundwater Impacts

EPA believes that the impacts on local communities from drawdowns of the Madison aquifer need to be examined in greater detail. The proposed project anticipates extracting some one million acre-feet of water from the Madison aquifer over the life of the project. A number of small communities draw water from this aquifer and will be adversely affected by this project. EPA is concerned with both the physical depletion and potential for water quality degradation of this aquifer, and the related impact on those communities which depend on this aquifer for their water supply.

The Groundwater analysis in the draft EIS and in the supporting Wellfield Hydrology Technical Report presents a comprehensive characterization of what has happened in the past with this aquifer, the expected scenario of new developments without the project, and the expected impact as a result of the ETSI coal slurry pipeline. While we recognize the uncertainties in trying to model complex groundwater/geological systems, we have a number of concerns with the modeling effort that we believe should be addressed in the final EIS. Our principal concerns are discussed below. We recommend, however, that for a full discussion the persons responsible for preparation of the groundwater section contact our Regional personnel with special expertise in this area. In our Denver office, either Paul Osborne or Fred Baker will be available to discuss these issues in more detail (303 837-2731).

EPA is concerned that the numerical models developed for predicting groundwater impacts underestimated changes in total dissolved solids (TDS) concentrations as a result of pumping from the Madison aquifer. The estimates presented on page 4-14 and 4-17 of the EIS indicate very little degradation of quality. It is not clear whether the method of analysis included the concentration of salts as a result of leakage from the Minnelusa or only included migration of lower quality water from within the Madison aquifer.

We are also concerned that the assumptions used in the model regarding the assigned aquifer parameters (such as low permeability zone) may have biased the model so that water quality changes were minimized. For instance, the numerical model used in the geo-hydrological analysis of the groundwater assumes restrictive boundary conditions for the Madison aquifer and predicts very little impact on water levels west of the Niobrara wellfield. One of our reasons for concern is that there is some scientific controversy regarding the permeability of the Fanny Hill Mountain Monoline. If this supposed "impervious" structure does have leakage through it, and water moves from the west of the wellfield where water quality is extremely poor, water quality impacts could be severe. Because of this uncertainty, additional modeling using different permeability and boundary assumptions should be undertaken to present a better picture of the potential for water quality impacts in final EIS.

The water quality analysis in the final EIS should address contamination from the Minnelusa Formation. The Minnelusa Formation sits above the Madison Formation and contains very high concentrations of inorganic salts over much of its areal extent in Wyoming. Concentrations of salt as high as 200,000 mg/l were reported in the EIS. Other EPA data shows these elevated concentrations occuring over most of that aquifer. (See Occurance and Characteristics of Groundwater in the Power River Basin; Water Resources Research Institute, University of Wyoming, Laramie. Final Draft EPA Contract G008269780). With the extent of drawdowns predicted for the Madison aquifer and knowing that some leakage will occur from the Minnelusa, we are concerned that significant contamination of the Madison could occur.

It is also not clear whether this modeling effort has included all of the major existing uses of Madison water within the Powder River Basin, not to mention impacts from projects in the planning stages. For instance, AMOCO Corporation is currently pumping 8-10 mgd from the Madison aquifer near Midwest, Wyoming for the flooding of its Salt Creek oil field. The effect of this pumping on the Niobrara well field will depend on the regional aquifer parameters. If the results of the USGS preliminary model were somewhat realistic, the pumping at Midwest would show a substantial effect on drawdowns between Midwest and Niobrara. Additional discussion is needed on the cumulative impact of other large users in the basin. It is especially important to try and quantify the potential water quality impacts associated with having several large pumping centers within the basin.

The EIS presents recommendations regarding monitoring wells for the proposed pumping areas and the affected community well areas. The location of the wells poses a problem. For example, in the case of the Niobrara County wellfield all of the monitoring wells will be upgradient of the wellfield. The model does show depressions in the piezometric surface downdip after ETSI pumping. Since the downdip directions are primarily toward the west they also would be drawing from potentially the worst quality water. For this reason we recommend that monitoring wells be installed to the west of the proposed wellfield as well.

Surface Water Impacts

The EIS consistently presents the figure of 20,000 acre-feet per year as the amount of water necessary to pipeline the slurry coal. How was this number generated and how wide a range of error can be expected? We understand that the slurry will be operated with an approximate mixture of fifty percent coal and fifty percent water. It appears that this mixture is similiar to the one used in the Black Mesa pipeline. Can one

safely project the same fluid mechanical characteristics to the much larger ETSI pipe? The EIS should present a range of water volumes necessary to transport the three million tons of coal projected for the pipeline. We are concerned that if greater amounts of water are needed from the wellfields, the environmental effects will be much worse than those presented in the EIS.

The EIS points out that a number of area streams, particularly those originating in the Black Hills, will suffer streamflow depletions. The estimates of depletions, from one to five cfs, are relatively modest, but will affect streams during the periods of time when flows are most critical. The EIS presents estimates that there will be extended periods of low or no flows. With these levels of depletion, aquatic life in the streams may be affected by greater fish mortality, depleted food organisms, and reduced spawning potential.

We are especially concerned with possible reduced flows in the Niobrara River as it is a candidate for inclusion in the National Wild, Scenic and Recreation River System. Also, three segments of the Niobrara are listed in the Heritage Conservation and Recreation Service's draft "Nationwide Rivers Inventory", and the Niobrara is among the 47 rivers listed in the so called "5-0" Report, requiring special consideration by Federal agencies. The implications of these designations and the impact of the pipeline project should be specifically presented in the final EIS.

Since the possibility also exists that the depletions will be of even greater severity than predicted, we believe the EIS needs to better quantify the likely impacts to aquatic life systems in these affected streams.

Finally, we are concerned that the effects on the Hot Springs area could be much more severe if the spring flow is depleted greater than is anticipated in the EIS. The EIS should better identify the present uses of the Hot Springs area, and the impacts if the spring flow is significantly reduced.

Discharge of slurry water

The EIS should contain information regarding pretreatment of the transport medium prior to combination with the coal. A discussion should be included on any additives, such a hexavalent chromium, and their purpose.

The draft EIS has identified that the proposed coal slurry system will require hydrostatic testing prior to being used for coal transportation. EPA Region VI in Dallas considers hydrostatic testing discharge water as innocuous and is currently in the process of developing general permits for this type of activity. However, a possible limitation in association

with coal slurry pipelines might relate to workover hydrostatic testing where pipeline residual materials could cause contamination of hydrostatic test water. If residuals are to be a significant problem, the EIS should discuss and identify methods of effective technology to remove this potential impact.

Under Section 1.M, Slurry Pipeline Water Discharge Alternative, it is stated that the residual water from the slurry dewatering facilities would be used by the power plants at each coal delivery point. It is highly questionable that this is a viable alternative in most instances. It is our opinion that the high TDS levels and possible heavy metals in the discharge water will make its use by the power plant highly questionable. Power plant usage, through a cooling system, will not serve to treat BOD, TDS, SO4, CL etc. It is doubtful that the customer utility will want to assume responsibility for use or discharge of this water.

Since dewatering plant effluent is roughly equivalent in BOD concentration to raw sewage, the equivalent of secondary treatment will be necessary at all locations for the attainment of both the Best Possible Treatment (BPT) and Best Control Technology (BCT) requirements. In addition, more stringent requirements could be required to meet state water quality criteria.

A comparison of tables 4-36 and 4-37 in Volume 1 of the EIS and Table 18 in the Surface Water Quality Technical Report indicate that the following treatment would be required:

Prior -	CL
Ologah -	TDS and SO4
Lake Charles -	TDS , CL, and SO4
Boyce -	SO4

The treatment technology for these dissolved materials is advanced and should not be underestimated from either a technology or cost standpoint. In light of these concerns, we request that the final EIS specifically account for the unique technology and cost problems and, accordingly, revise the estimated impacts to water quality, aquatic plant and animal life within each receiving stream to be affected. Compliance with the Section 208 Water Quality Management Plans should be assured.

The draft EIS has identified that TDS, SO4, and CL levels in the effluent have been determined to meet applicable State water quality standards. The EIS should address whether a mass balance approach was used in this analysis. If so, the measured background stream levels of the above constituents, along with the stream's critical low flows, should be identified.

In the discussion of the potential effects of coal slurry filtrate effluent upon the water quality of the receiving streams, the final EIS should address whether organics and their related compounds could be leached into the carrier water from the coal. The technical report supplementing the draft EIS states there is no data available to evaluate specific organic parameters which could be potentially toxic. Therefore, we believe that the EIS should address this concern by identifying the organics that are believed to be harmful and have the potential to cause significant adverse effects upon the receiving waters. If further studies are warranted, the final EIS should identify that need.

Air Quality

In Appendix G-6 entitled "Air Quality Impacts of Operation of a Coal Fired Boilder at the Cypress Bend Dewatering facility", it is implied that a Prevention of Significant (PSO) permit application has been submitted for the coal slurry preparation plant in Cypress Bend, Arkansas. Contrary to the statement in this section, no PSO application has been received in EPA Region 6 for this facility. If this alternative is chosen as the actual method to be used, PSO would apply to the Cypress Bend Dewatering Facility due to boiler emissions from the burning of 300,000 tons/year of coal.

Noise Quality

The draft EIS needs to be strengthened in the discussion of associated noise impacts. The anlysis presented on pages 3-127, 4-104, and 4-119 is too general to provide for adequate evalution of the significance of the impacts discussed. The noise analysis on page 4-119 explains that unit trains used as an alternative would be expected to cause significant noise impact; however, the number of people affected would be dependent upon the population distribution along the rail route. This is not a sufficient basis for evaluating the noise impacts. Rather, the final EIS should provide noise contours along both the proposed and alternative slurry pipeline or rail routes depicting the anticipated noise levels and the receptors to be affected. Also, any mitigation measures needed to control noise levels within acceptable limits should be addressed in the final EIS.

Alternatives

The ETSI coal slurry pipeline will provide only a fraction of the coal needed in Arkansas, Oklahoma, and Louisiana by 1985. The pipeline will not eliminate the need for coal trains and will establish a precedent for additional coal slurry pipelines in this area. A clear discussion of the cummulative impacts among competing transportaion alternatives should be provided in the final EIS.

We believe that the Oahe Reservoir water supply alternative is the environmentally preferable alternative. Using water from the Oahe Reservoir for the pipeline would afford some small South Dakota, and perhaps Wyoming communities, with the opportunity to obtain higher quality municipal water supplies. However, we recommend that the Oahe

Reservoir alternative be considered only if the size of an Oahe pipeline is limited to the size needed to supply water for the ETSI project and local communities. A larger size Oahe pipeline would have significant impacts and would require environmental studies beyond the scope of this EIS. Other alternatives that might be considered include water supplies from the Fort Peck and Pathfinder Reservoirs and the use of wastewater effluent as a transport medium.

Cost Evaluation

The EIS contains no information on the costs of various alternatives. We recommend that cost estimate for all alternatives and alternative system components be provided in an appendix to the final EIS.

Stream and Wetland Crossings

We have no major concerns with the stream crossings outlined in Appendix B-6 providing that mitigation measures are strictly carried out. We request that the final EIS make the distinction between those crossing which may be performed under the Nationwide 404 Permit and those which will require individual permits. Mitigation measures should also be required for all wetland crossings in accordance with EPAs Section 404(b)(1) guidelines published December 24, 1980 in the Federal Register.

We request that the BLM and ETSI consider emergency shutoff valves at each important stream crossing as well as at each pump station.

General

The EIS should identify the type and quantity of any wastes to be generated during construction and operation of the project. It should also identify the method of disposal of these solid wastes and any adverse effects upon either surface or groundwater. If State licensing is required, this should be explained and the status of approval identified.

The final EIS should emphasize that any herbicides applied along the right-of-way for the purpose of weed control during reclamation efforts must be EPA approved. The Statement should further explain that the application work conducted must be done under the careful scrutiny of a professional person certified under existing EPA programs as a Certified Pesticide Applicator.

231

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
P. O. BOX 103, DOWNTOWN STATION
OMAHA, NEBRASKA 68101

MRDPD-ER 22 January 1981

Mr. Richard Traylor
Project Leader
Bureau of Land Management
3rd Floor East, 555 Zang St.
Denver, CO 80228

Dear Mr. Traylor:

Staff members of the Corps of Engineers, Lower Mississippi Valley Division, Missouri River Division, and Southwestern Division have reviewed the DEIS on the Energy Transportation Systems, Inc. Coal Slurry Pipeline Transportation Project and the Water Quality Technical Report. The review comments are submitted, even though the DEIS states the review period ended 6 January 1981, based on your extension of the review period for the Corps of Engineers to 23 January 1981, communicated to Mrs. Ann Jass, Omaha District, by telephone. Individual comments for both the Water Quality Technical Report and the DEIS have been divided into four categories.

A. Areas where little or no information has been provided;

B. Areas where statements are made, but are not supported with complete data;

C. Areas where inconsistencies seem to exist; and

D. General comments.

The applicant indicates an awareness of the need for certain regulatory permits (Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act). The Corps cannot concur that a single permit for all stream crossings by the pipeline is desirable. Each Corps District may determine its own permit approach. Contacts should be made with districts in which a permit may be required: Kansas City District (816) 374-3645, Memphis District (901) 521-3471, New Orleans District (504) 865-1121, Omaha District (402) 221-4133, Tulsa District (918) 581-7351, and Vicksburg District (601) 636-1311. I have inclosed a suggested outline for Section 404(b)(1) water quality evaluation which will be used in determining issuance of the Section 404 permits.

The "Market Alternative" route would cross the Saline River in the upper reaches of the Wilson Lake flood pool. If this alternative route is selected

MRDPD-ER 22 January 1981
Mr. Richard Traylor

as the proposed plan, the Kansas City District, 700 Federal Building, 601 East 12th Street, Kansas City, Missouri 64106, (816) 374-3645 should be contacted to determine impacts at Wilson Lake.

Future documents pertaining to the proposed pipeline, including the Final Environmental Impact Statement document, should be forwarded to the District Engineer, Omaha District, Corps of Engineers, 6014 U. S. Post Office and Court House, Omaha, NE 68102, ATTN: MRDPD. This also includes a signed and ratified copy of the Memorandum of Agreement between the Bureau of Land Management, the Advisory Council on Historic Preservation, and the appropriate State Historic Preservation Officer.

If you have any questions concerning the Corps of Engineers' comments, please contact Mrs. Ann Jass (402) 221-3136. Thank you for the opportunity to review the DEIS.

Sincerely,

John E. Velehradsky

2 Incls
as

JOHN E. VELEHRADSKY
Acting Chief
Planning Division

Coordinated Review Comments
Technical Report-Surface Water Quality
Coal Slurry Pipeline
As Proposed by Energy Transportation System, Inc. (ETSI)

Category A

No relevant comments

Category B

Page 14, par. 1. This paragraph indicates insufficient data are available to evaluate the effluent water quality. The determination of the effluent water quality is essential before the use of or treatment costs for the slurry effluent may be evaluated.

Page 29, par. 2. B. Construction methods include the diversion of perennial streams. Fill material used to divert the flow of streams may be subject to regulation pursuant to Section 404 of the Clean Water Act. More detailed information is needed to make this determination.

Occasional high mercury levels in Oahe Reservoir in combination with mercury contributed by the coal in the slurry may result in effluent levels which periodically exceed the EPA recommendations and state water quality standards. This problem should be addressed.

Chemical analyses were performed on dissolved fractions of the effluent water samples. Since most waste water treatment effluent allows for up to a 30 mg/l suspended solids, this level of suspended solids should be included in the analyses of the effluent.

Throughout the report, the presence of methylene chloride (EPA primary pollutant) and alkyl substituted napthalenes or any other toxic organics are denied or omitted. This is done throughout Volume I and on page "i" of the Technical Report. Only in the text of the technical report are these substances identified as being present in detectable quantities. All real, as well as potential toxins should be discussed, since actual analyses are limited and of unknown reliability.

Category C

Page 18, tab. 1-10 shows the EPA Draft Priority Pollutant Criteria for CN as being 38 ug/l and Pb as not having been established. The correct value for CN is 5 ug/l and for Pb is 50 ug/l. Both of these elements exceed the maximum permissible concentration. Further discussion is necessary.

Page 15, tab. 1-8 shows TDS, SO_4, and Mn levels will exceed EPA water quality criteria. This should be addressed.

Category D

Oologah is misspelled on pages 2 and 4.

Reference tab. 1-10 in the first sentence, second paragraph, page 17.

There is no source for the values listed in table 1-12, p. 22. These values must meet state standards.

Oklahoma was omitted from tables 2-4 and 2-5, pages 43 and 45, respectively.

Coordinated Review Comments
Draft Environmental Impact Statement
Coal Slurry Pipeline
As Proposed by Energy Transportation Survey, Inc.

Category A

Page 1-2 sec's. 1.C and 1.D have not fully explained why shipment of coal to the subject southern states is requisite. Increased energy production from coal could be accomplished by power plants in or near Wyoming, and the energy made available to these states via the national grid. This would seem a reasonable alternative and may warrant discussion.

Page 1-22, sec. 1.F.4 The authorizing documents provided by BLM, Forest Service and other party agencies should include provisions for review and alteration of easements, or other instruments should the need arise during the life of the project.

Page 1-39. Construction of the coal-fired plant at the dewatering plant at the Cypress Bend barge-loading site needs to be analyzed more thoroughly.

Page 2-6, sec. 2.B.2, and p. 4-3, sec. 4.A.1 The complications of groundwater drawdown should be discussed more fully.

Page 4-17, col. 2, par. 1-3. No consideration has been given to slower controlled hydrostatic test releases. Erosion and degradation to the receiving drainage could be greatly reduced by slowing the releases which would allow for mixing and recovery within the receiving waterway.

Page 4-2, par. 1. Indicates that if revegetation of disturbed areas is unsuccessful, the impact would be significant. Page 4-59, col. 2, par. 3 does not indicate how revegetation is to be assured, merely that it is assumed the Erosion Control & Revegetation Plan will be fully implemented by ETSI. There is no indication of bonding to assure continuing successful completion of the plan.

Page 5-15, sec. 5.C. The concept of benefits and trade-offs should be defined. These categories should be distinguished from each other and from other impacts. Trade-offs should describe the losses and counter balancing benefits. Some of the "trade-offs" listed appear to have no counter balancing benefits.

Page 5-15, sec. 5.C. What is the cost to ranchers/farmers tapping the Madison Aquifer if their wells go dry and stock remain unwatered or farms not irrigated between the time their water is lost and the water is replaced from another source. This other source should be identified, the method of transfer defined, and the timing involved for accomplishment expressed. In addition, what is the cost economically to the public with a possible loss of foodstuffs and the loss of energy normally consumed by other users. The effects of the projected drawdowns of ground water have not been quantified.

Page 5-15, sec. 5.C.2. Some discussion should be made concerning the town(s) or counties which will be adversely impacted. The facilities will be located outside a town, and little increase in the tax base will evolve to offset increasing costs (pages 4-28, col. 2, par. 2). Some resolution of the Town's future problems precipitated by the presence of the facility should be discussed.

Page 5-18, sec. 5.D. tab. 5-4, item 20, col. 1, should include consideration for the reclamation of the 725,000 tons of steel in the pipeline, in accordance with NEPA goals. The FEIS should discuss relative impacts of abandoning or reclaiming the steel.

Mitigation and monitoring discriptions appear to contain no provisions for mandatory and effective cleanup of spills into wetlands, streams or onto the ground. Provisions for insuring restoration of environmental values degraded by spills should be described in the FEIS. In addition, water quality impact data for wetlands and waterway crossings during pipeline construction are virtually nonexistent. More emphasis and detailed information should be developed. In accordance with Executive Order (EO) 11990, and for 404(b) evaluation for permits, wetlands should be delineated. Impacts should be described. See also Category D comments.

The DEIS does not address the physical impacts of the stream crossing activities on stream regime. Trench and fill operations at stream crossings could result in stream channel instabilities, resulting in a variety of adverse impacts. Examples include increased bank erosion, degradation and possible headcutting in upstream directions, deposition and increased flooding downstream, transient bed form disturbances and damages to bridges and other similar structures.

If the Oabe option is selected, would alternate water sources be available during years of low pool elevation? What would be the lost benefits of the diverted water in terms of hydroelectric or recreation potential throughout the mainstem system?

It would appear that no on-site evaluations were made. Particularly lacking are inspections at major stream crossings which would allow values and benefits of these locations to be assessed.

Noise levels generated by the proposed action and alternatives have not been covered sufficiently.

Attention is given to the effects of the coal on aquatic organisms in case of ruptures or spills, but the effect of the slurry water, high in TDS and BOD on affected lakes, streams, or wetlands has not been addressed. The extent of degradation of the water quality of the receiving waters is not adequately addressed. These streams will receive most, if not all, of the coal slurry effluent water.

The desirability/advisability of exporting such large quantities of water from a semi-arid region with questionably sufficient rainfall to recharge the aquifer should be discussed more thoroughly.

5

It appears that the pipeline route traverses some environmentally sensitive areas in Arkansas and creates multiple stream crossings which could be avoided with slightly altered routes. These alternatives were not addressed. Also, there is no explanation as to why routes along the Okla-Ark segment north of the Arkansas River are planned, thus requiring two crossings of the river and potential interference with I-40 in Arkansas. A route south of the river from Muskogie would appear practical since only 1 crossing of smaller dimensions would be necessary for access to the Independence Delivery Terminals. This southerly route would result in a shortening of the overall distance of the main trunk.

Category B

Page 4-17, par. 2. Estimates of stream flow or spring flow reductions are presented. However, the base flows or flow durations are not given in the text. Without these data, adequate evaluation of the impact of these reductions is impossible.

Page D-28, App. D-6. This appendix contains the list of crossings not covered by the nationwide permit. Change the last sentence of the first paragraph on page D-38 to read as follows: " A detailed list of crossings to which these measures will be applicable is found in the Technical Report."

Page 5-15, sec. 5.C.2. par. 1. Acre-feet should be shown in the more familiar measurement of gallons, considering that what is being withdrawn amounts to 334,047,500,000 gallons over the projects expressed 50-year life at 6,680,950,000 gal./year or 18,303,972 gal./day.

6

Category C

Page 1, par. 6. indicates withdrawal of 20,200 acre-feet of water annually over a 50-year period. Page 1-6, col. 1, par. 2, states ..." approximately 50 years,..." Page 4-4, col. 1, par. 3, states "...50-year design life..." The design life is 50 years, what is the practical life of the project? It has been stated in various articles that the United States has sufficient coal reserves to carry us well beyond the next 100 years. Oil and natural gas reputedly exist in smaller quantities than coal. What is the future of the coal industry if the pipeline is discontinued in 50 years and the railroads do not have adequate track or cars to carry coal? Will the impact of using railroads to carry coal be any less acute in 50 years and beyond, than it is in 1981? If the pipeline is continued beyond 50 years what is the anticipated drawdown affect on the aquifer and the surrounding areas which will be impacted.

Page 1-6, sec. 1.P.1. states that construction schedules are subject to change. Page 1-21, sec. 1.P.2. stipulates stream crossings are to be done during low flow or timed to avoid fish migration or spawning. Page 4-47, sec. 4.A.5 also specifies construction times. Scheduling of construction should be more accurately detailed.

Page 1-6, fig. 1-3. The capacities indicated in this figure do not agree with the capacity described in the permit letters on p. D-42, app. D.

Page 1-15, col. 1, par. 1, does not include emission quantities for the 22.4-MMTA plant. The emission quantities which are listed in this paragraph exceed permitted levels. An explanation is warranted.

Page 1-23, col. 2, par. 2. The paragraph should be reworded to state that the ETSI pipeline crossings presented in Appendix D-6 are not within the scope of the nationwide permit for utility lines and, therefore, may require individual Section 10 or Section 404 permits.

Pages 1-48, and 4-18, indicate there would be no release of the coal cleaning scrub water or scrubbed substances from the cleaning operation. Page 4-94 sec. 4.E.2 indicates there would be degradation to the stream invertebrates due to release of 200 tons/year of scrub water substances. This requires further study and explanation.

Page 3-43. It is invalid to use data compiled in 1975 regarding voluntary travel distance by workers. In 1975, gasoline prices averaged $.55 per gallon. In 1980, they averaged around $1.25 per gallon, and are expected to rise about $.46/gallon before 1982. Impacts to surrounding towns should be reassessed. Depending on the travel distance to the work site from the nearby counties, (p. 4-29, par. 1) an impact could conceivably be felt by a single county or community. This likelihood deserves discussion as it definitely could impact housing, schools, etc.

Page 4-29, col. 2, par. 3. The statement is made that the operating work crew (permanent) would number 243 persons residing throughout the counties.

7

Further, permanent workers would replace construction crews, thus, there would be no impact on housing. Page 4-23, col. 2, par. 1 indicates a housing shortage with few recent housing starts. Page 4-29, col. 1, par. 5 indicates permanent staff would desire detached housing. It is obvious that transient and permanent workers have different needs and there is going to be a shortage of single family housing and a surplus of apartments and mobile homes. Clarification is necessary. Impacts to towns and/or counties should be discussed.

Page 4-111 par. 2-5 and p. 4-113, tab. 4-37. The rationale for estimating the allowable discharge quality levels for TDS, Cl and SO_4 is questionable. The procedure used assumes that the dilution capacity of the receiving streams may be used to allow discharge of constituents at levels considerably in excess of ambient concentrations. There is no assurance that this will be the case when best available technology standards are established which control slurry effluent discharges. Further, it is questionable that the total constituent load, which could be discharged without violating instream water quality standards, would be allocated to one single industry.

Page 5-17, tab. 5-4, col. 3, item 7. Consideration should be given to rewording this statement to, as follows: "Significant Impacts, near well field." The NEPA goal of widest range of beneficial uses of the environment could be restricted. Beneficial uses of the environment, e.g., municipal, industrial, recreational, agricultural, or environmental uses could be perceived as being significantly handicapped by project use of ground water.

Page C-3, col. 2. Cofferdams are discussed under Trenching and Preservation of Topsoil. Cofferdams and other diversionary techniques involving the placement of fill material may be subject to regulation pursuant to Section 404 of the Clean Water Act. This should be discussed on p. 1-17, sec. 1.P.2., Slurry Pipelines and Pump Stations, in the paragraph on stream crossings.

Selection criteria for cooling make-up water favors water low in total dissolved solids and sulfate. The accumulation of salts in cooling make-up water decreases the heat transfer efficiency in the cooling towers. Evaporation further concentrates these dissolved salts and intensifies the scaling problems. Thus, it is inconceivable that coal slurry effluent high in both total dissolved solids and sulfate would be used as make-up water when better quality local water supplies are available.

8

CATEGORY D

Wetland crossings may be eligible for a nationwide permit provided they meet these conditions:

a. That the excavated material will be placed on either bank above the ordinary high water line (OHW) and not in the stream or wetland area;

b. That there is no change in the preconstruction bottom contours by backfilling. (Any excess excavated material not used for backfill must be wasted above the OHW as not to reenter the stream or wetland area;

c. That the fill will not be located in proximity to public water supply intake;

d. That the fill will not destroy a threatened or endangered species as identified under the Endangered Species Act or endanger the critical habitat of such species;

e. That the fill will not disrupt the movement of those species of aquatic life indigenous to the water body;

f. That the fill will consist of suitable material free from toxic pollutants in other than trace quantities.

g. That the fill created by the discharge will be properly maintained to prevent erosion and other nonpoint sources of pollution; and

h. That the discharge will not occur in a component of the National Wild and Scenic River System nor in a component of a state wild and scenic river system.

Information specifying whether these conditions would be met should be made available. Crossings not meeting these conditions could require individual permits. However, construction in wetland areas should be avoided to the extent possible and the effects of proposed construction activities should be discussed.

Construction of any facility in the 100-year flood plain should not increase the water surface elevation of the 100-year flood more than 1 foot relative to existing conditions. All construction in the flood plain should be protected from, at least, the 100-year flood. If the operation of the facilities during floods is considered critical, they should be protected from the 500-year flood.

Page 1-23, col. 2, par. 3, line 1. Change to read: "A list of ETSI pipeline river crossings that require individual..."

Page 1-24, col. 1, par. 3. Omit the last sentence in item 4.

Page 1-25. Oklahoma has been omitted from state permits.

Page 3-51, tab. 3-19. Add Oklahoma next to red-cockaded woodpecker.

Page 4-56, par. 6, sent. 1. Replace the word "fish" with "macroinvertebrates".

Page 4-111, par. 5. Biological treatment requirements may differ from equivalent secondary level of treatment. Discharge levels will be required to meet best conventional pollution control technology by 1 July 1984.

Page D-28, sent. 1. Insert the word "individual" in front of Department of the Army.

Appendix D-9, Front and back pages of state air quality permit letters are mismatched.

River and harbor are not plural in River and Harbor Act of 1899.

The Whooping Crane habitat extends all along the Platte River into Colorado and Wyoming. Minimal disruption of these habitats during periods of migration will be necessary to protect the cranes survival.

Much of the data on terrestrial biology, threatened and endangered species, aquatic biology, ruptures, and spills are not included in the DEIS but were published in technical reports written by Woodward-Clyde Consultants, Inc. These data should be included in the original mail out so that comments may be expedited, especially in light of the short review time and the volume of material presented. In addition, the technical reports should be listed in the Table of Contents.

Data from the ongoing studies of the potential alteration of carrier water quality due to long-term storage (Plummer and Associates) should be included in the Final Environmental Impact Statement.

Page 2-1 through 2-12. The no action alternative is the most energy efficient transportation system analyzed and the least damaging environmental alternative; however, preference is given the proposed action because railroads would utilize diesel fuel with its possible dependency on foreign sources of oil. This assumes that railroads are irreversibly committed to use diesel fuel for the next 50 years, which may or may not be the case.

Major environmental impacts of the proposed action and alternatives discussed in Chapter 4 are compared somewhat narrowly in Chapter 2 (comparative analysis of the proposed action and alternatives). This chapter deals primarily with an arbitrary energy efficiency comparison which appears to be overly detailed and seems to place primary importance on the all-rail alternative. Other economic justifications should be included in the comparisons to give a broader comparison. This could include system reliability, safety, consumer costs per ton of delivered coal, and effects on regional transportation modes. Although chapter 2 does provide a good comparison of the water supply alternatives, environmental considerations of the pipeline are not equitably discussed. Environmental comparisons could include effects on air quality, water quality, wetlands, flood plains, transportation, terrestrial and aquatic ecosystems, archeological resources, socioeconomics, land uses, noise,

systems reliability, safety, and national energy goals. These comparisons should not be dismissed by stating they are similar for each alternative as tab. 2-3 might indicate. Chapter 4 deals more specifically and completely in these areas, but comparative analysis is lacking. A table showing all these environmental comparisons and their relative weight would be desirable.

Section 5.A.1 does not include all known planned developments of Madison formation water. The proposed Panhandle Eastern Pipeline Company's Coal Gasification Plant would have access to about 4000 acre-feet/year from a well field in the Madison Aquifer. Also, that project's coal mine in Campbell County, according to the 1974 Environmental Assessment, would normally need another 1200 acre-feet/year. Would that water come from the Madison Aquifer? Further, several other mines are up for approval and initiation in the Campbell/Converse Counties area within the next year; and numerous other mines are expected in the future. What water sources would be needed for those projects? Cumulative impacts have not been thoroughly addressed.

12

ARKANSAS HISTORIC PRESERVATION PROGRAM

Suite 500, Continental Building · Markham and Main · Little Rock, Arkansas 72201 Phone (501) 371-2763

December 2, 1980

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street

Re: Draft Environmental Impact Statement, Coal Slurry Pipeline Transportation Project, Energy Transportation System, Inc.

Dear Mr. Traylor;

Thank you for the opportunity to review the above-cited document. From the standpoint of protecting cultural resources, the important item is the proposed memorandum of agreement (MOA) discussed on section/page 4-58. We look forward to the completion and final acceptance of the memorandum of agreement.

It is important that the State Archeologist review the draft environmental impact statement (DIES). If you have not already done so, please send a copy of the draft environmental impact statement to:

Ms. Hester Davis, State Archeologist
P.O. Box R
Fayetteville, AR 72701

If we can assist you further, please feel free to contact Jack Doss of my staff at 371-1763.

Sincerely,

Joan Baldridge

Joan Williams Baldridge
State Historic Preservation Officer

JWB/JD/jal

cc: Hester Davis

A Division of the Department of Natural & Cultural Heritage
An Equal Opportunity Employer

16

BARREN FORK CREEK · FLINT CREEK · ILLINOIS RIVER

OKLAHOMA SCENIC RIVERS COMMISSION

Phone: 918-456-3251

P.O. BOX 292
TAHLEQUAH, OKLAHOMA 74464

December 3, 1980

Mr. Richard E. Traylor
Office of Special Projects
3rd Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

The Oklahoma Scenic River Commission has great concerns over the proposed Coal Slurry Pipeline and it's effects on our Scenic Rivers Area.

The Commission has the responsibility for the "protection and development of the state's Scenic Rivers Area, and adjacent and contiguous lands..." To meet this responsibility, the Commission has been given legislative authority to take whatever actions are necessary to protect the Scenic Rivers.

We are concerned that the Coal Slurry Pipeline may create pollution problems for the Scenic Rivers, and would appreciate consideration of our interests and opinions.

Please include these comments in your records of the Coal Slurry Pipeline. Thank you.

Sincerely,

K. Wayne Mitchell
bh

K. Wayne Mitchell, Chairman
Oklahoma Scenic River Commission

bgh

Members of the Commission:

Reford Akin	Garlin Robison
Harvey Chaffin	Ed Stepp
Leroy Chamberlain	Tom Tate
Gene Colburn	Margaret Maltsberger
Floyd Glenn	
Lloyd Goodwin	
Charles Hathaway	

cc: Commission members, Governor George Nigh

PRESERVE OUR SCENIC RIVERS

17

ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION

OFFICE OF BUDGET
INTERGOVERNMENTAL SERVICES

Bill Clinton, Governor · R.L. Qualls, Director

P.O. Box 3278 Little Rock, AR 72203
Telephone Area Code (501) 371-1074 or 371-2311

February 9, 1981

U. S. Dept. of the Interior
Bureau of Land Management
Special Projects Staff
555 Zang St., 3rd Floor, East
Denver, CO 80228

RE: EIS 0273 Coal Slurry Pipeline

Dear Sir:

The State Planning and Development Clearinghouse is in receipt of the above environmental document pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

To carry out the review and comment process, this document was forwarded to members of the Arkansas Technical Review Committee. Resulting comments received from the Technical Review Committee which represent the position of the State of Arkansas are attached. Porthcoming comments will be forwarded to you for your consideration.

The State Clearinghouse wishes to thank you for your cooperation with the Arkansas Project Notification and Review System.

Sincerely,

Shirley J. Thomas

Shirley J. Thomas, Director
State Clearinghouse

SJT/ma
cc: John Saxton, TRC

An equal opportunity employer

Arkansas Soil and Water Conservation Commision

MEMORANDUM Environmental Impact Statement.

TO: Shirley J. Thomas, Director, State Planning and Development Clearinghouse

DATE: Februray 4, 1981

FROM: John P. Saxton, Chairman, Technical Review Committee

SUBJECT: EIS-0273. Draft - Coal Slurry Pipeline.

We have reviewed the above stated DEIS and find it to cover this action very capably. We have one specific comment on Appendix "A" (map volume). On map A-25 PM1110-PM1170, the North area is reversed thus making the pipeline milage to specific points wrong.

Comments from Pollution Control and Ecology and from Arkansas State Parks are enclosed. Comments from other members of the Technical Review Committee will be forwarded as and when they are received in this office.

JPS:bs

Enclosures

ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION

OFFICE OF INTERGOVERNMENTAL SERVICES

Bill Clinton, Governor — William D. Gaddy, Director

P.O. Box 3278 Little Rock, AR 72203
Telephone: Area Code (501) 371-1074 or 371-2311

M E M O R A N D U M

TO: All Technical Review Committee Members

FROM: Shirley J. Thomas, Director SJT
State Planning & Development Clearinghouse

SUBJECT: 404 Notice No. ______

EIS No. 0273

DATE: November 20, 1980

Please review the above stated document under provisions of Section 404 of the Clean Water Act Section 102 (2) (c) of the National Environmental Policy Act of 1969, and the Arkansas Project Notification and Review System. PLEASE MAIL YOUR COMMENTS WITHIN FIFTEEN (15) DAYS TO JOHN P. SAXTON, CHAIRMAN, TECHNICAL REVIEW COMMITTEE.

- [ ] Support
- [ ] Do Not Support (Comments Attached)
- [x] Comments Attached
- [ ] Support with Following Conditions
- [ ] Non-degradation Certificate Issued (applies to Dept. of P.C.& E. only)

The Report in two (2) volumes covers the impact very well. In Vol. 2, Map A-25, PM 1110 - PM 1170, the north arrow is reversed and the Pipeline mileage are incorrect at the indicated points.

Signed Doug Edwards Date 1-14-81

Agency Soil & Water Conservation Commission

An equal opportunity employer

IGS/SC 0100-003-80

STATE OF ARKANSAS
DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 NATIONAL DRIVE P.O. BOX 9583
LITTLE ROCK, ARKANSAS 72219

501 371-1701 WATER
501 371-1701 GEN. OFF.
501 371-1136 AIR DIV.
501 371-2130 SOLID WASTE

MEMORANDUM

TO: John Saxton, Chairman, Technical Review Committee

FROM: David Criner, Chief, Environmental Preservation Division DGC

DATE: December 5, 1980

SUBJECT: ETSI DEIS

Attached are this Department's comments for the Coal Slurry Pipeline proposal.

jk

Attachment

DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 NATIONAL DRIVE
LITTLE ROCK, ARKANSAS 72209

501 371-1701 GEN OFFICE
501 371-1701 AIR DIVISION
501 371-1701 SOLID WASTE DIV
501 371-1701 WATER DIV
501 371-2130 BUS OFFICE

December 4, 1980

Richard E. Traylor
Bureau of Land Management
Special Projects Staff
3rd Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

I have reviewed the Draft Environmental Impact for the proposed ETSI coal transportation project, subject of your letter of November 7, 1980.

The EIS appears to adequately discuss the social, environmental and economic impacts of the pipeline. This department has reviewed various studies and participated in numerous meetings, relative to the pipeline proposal, over the past few years and we are quite familiar with the issues.

During construction there will, of course, be environmental disturbances which will be temporary if care is taken to minimize damage at stream crossings and to immediately stabilize the refilled ditch. The disturbed areas should immediately be seeded with a cover crop which will serve to prevent erosion and serve, at the same time, as cover and food for wildlife.

Once the pipeline is in place, however, environmental effectsin Arkansas will be insignificant.

Please advise if more information is needed.

Sincerely,

D G Criner

David G. Criner, Chief
Environmental Preservation Division

DGC/jk

ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION

OFFICE OF INTERGOVERNMENTAL SERVICES

Bill Clinton, Governor — William D. Gaddy, Director

P.O. Box 3278 Little Rock, AR 72203
Telephone: Area Code (501) 371-1074 or 371-2311

M E M O R A N D U M

TO: All Technical Review Committee Members

FROM: Shirley J. Thomas, Director SJT
State Planning & Development Clearinghouse

SUBJECT: 404 Notice No. ______

EIS No. 0273

DATE: November 20, 1980

Please review the above stated document under provisions of Section 404 of the Clean Water Act Section 102 (2) (c) of the National Environmental Policy Act of 1969, and the Arkansas Project Notification and Review System. PLEASE MAIL YOUR COMMENTS WITHIN FIFTEEN (15) DAYS TO JOHN P. SAXTON, CHAIRMAN, TECHNICAL REVIEW COMMITTEE.

- [x] Support
- [ ] Do Not Support (Comments Attached)
- [ ] Comments Attached
- [ ] Support with Following Conditions
- [x] Non-degradation Certificate Issued (applies to Dept. of P.C.& E. only)

Signed D G Criner Date 12-3-80

Agency PC&E

An equal opportunity employer

IGS/SC 0100-003-80

25

ARKANSAS DEPARTMENT OF HEALTH
4815 West Markham Street
Little Rock, Ark. 72201

December 15, 1980

Mr. Richard Traylor
United States Department of
the Interior
Bureau of Land Management
Special Projects Staff
Third Floor, East
555 Zang Street
Denver, Colorado 80228

RE: Environmental Impact Statement
Coal Slurry Pipeline
Energy Transportation System, Inc.
81 E 491-4

Dear Mr. Traylor:

Our office has reviewed the above referenced report and we have no adverse comments to make. We would, however, like to present the following comment:

> Certain segments of the projects could have short term impacts upon water quality while crossing watersheds and waterways serving as public water supply sources. In view of this, we would request coordination between our office and the appropriate project authority during construction in order to assure that any affected water systems could be notified and, thus, minimize any possible impacts on finished water quality. Once the final project alternative is chosen, our office can forward a list of affected water systems and project segments to the appropriate authority. Cooperation in this matter would be greatly appreciated.

Thank you for the opportunity to review this document. If our office can be of any assistance, please advise.

When submitting correspondence pertaining to this project, please include our reference number 81 E 491-4.

Sincerely,

T. A. Skinner by

T. A. Skinner, P.E., Chief Engineer
Division of Engineering

TAS:BM:jp

"AN EQUAL OPPORTUNITY EMPLOYER"

36

Kansas Fish & Game

BOX 54A, RURAL ROUTE 2, PRATT, KANSAS 67124
(316) 672-5911

REGIONAL OFFICES:

Northwest Regional Office
2204 Vine
Hays, Kansas 67601

Northcentral Regional Office
Box 489, 511 Cedar
Concordia, Kansas 66901

Northeast Regional Office
3300 S.W. 29th Street
Topeka, Kansas 66614

Southwest Regional Office
808 Highway 56
Dodge City, Kansas 67801

Southcentral Regional Office
Box 764, 204 West Sixth
Newton, Kansas 67114

Southeast Regional Office
222 West Main Building
Suite C & D
Chanute, Kansas 66720

December 24, 1980

Ref: 316.2
SA1 No. 8934

Mr. Richard E. Traylor
Bureau of Land Management
3rd Floor, East
555 Zang St.
Denver, CO 80228

Dear Mr. Traylor:

My staff has completed a review of the November, 1980 Coal Slurry Pipeline Draft EIS and offer the following comments.

First, I want to voice a complaint about the piecemeal procedure used to distribute the EIS and its support documents. Our office provided considerable manpower to the consultants during the preparation of this document but we have yet to receive a copy of the EIS directly. We did obtain a copy for review through the A-95 clearinghouse upon which these comments are based. The only documents we received from BLM were the technical reports on aquatic biology, terrestrial biology and Threatened/Endangered Species. We still have not had an opportunity to review the Rupture and Spills Technical Report which is crucial to understanding the full impact potential of the project. In our opinion, our agency should not have to take the initiative to run down all of the necessary documents to complete a review. With the dollar investment our agency has already in this project, we should have been extended the courtesy of being provided a complete EIS for review.

Concerning the document contents, the EIS in general appears quite adequate. However, since we did not receive a complete set of documents to review, we have some concern about the adequacy of contingent plans to protect aquatic resources in the case of a pipeline rupture or spill. The EIS proper is inadequate in discussing how these situations will be handled.

The table on page 3-79 needs review in light of the HCRS stream list being proposed for their national inventory. Similar data for the alternative routes also need updating.

Page 2
Mr. Traylor
Dec. 24, 1980

Unless our files are in error, the listing of 404 protected streams in Kansas is incomplete. The proposed route will cross at least eight additional such streams.

Sincerely,

Bill Hanzlick

Bill Hanzlick, Director
Kansas Fish & Game Commission

ddd

xc: Kansas Field Office, F&WS, KC, MO
State Clearinghouse

44

STATE of NEBRASKA

CHARLES THONE
GOVERNOR

DON STENBERG
DIRECTOR

POLICY RESEARCH OFFICE
P.O. BOX 94601, LINCOLN, NEBRASKA 68509
STATE CAPITOL, ROOM 1321, (402) 471-2414

December 22, 1980

Mr. Richard E. Traylor
U. S. Department of the Interior
Bureau of Land Management
Special Projects Staff
3rd Floor, East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor

Under the provisions of OMB Circular A-95, this agency has conducted the state clearinghouse review of the draft environmental impact statement on the Energy Transportation Systems, Inc., coal slurry pipeline transportation project.

The enclosed comments were received from the Nebraska Water Resources Center, the University of Nebraska Conservation and Survey Division, the Department of Environmental Control, the Natural Resources Commission, the Department of Water Resources, the Department of Roads, the Department of Health, and the Public Service Commission and should be considered by the U. S. Department of the Interior in any final decisions on the proposed project.

Sincerely

Larry Bare

Larry Bare
Director

LB:npn
Enclosures (8)
cc: Robert Burns
Vince Dreeszen
George Ludwig
Jerry Wallin
John Neuberger
Gerald Grauer
Richard Beck
Terrence Kubicek

STATE OF NEBRASKA

NATURAL RESOURCES COMMISSION

PROGRAMS:
SOIL & WATER CONSERVATION
WATERSHED PROTECTION
COMPREHENSIVE PLANNING
FLOOD PLAIN MANAGEMENT
DATA BANK
WATER QUALITY PLANNING
DEVELOPMENT FUND

P. O. Box 94876
Lincoln, Nebraska 68509
Phone: (402) 471-2081
Office Location:
Fourth Floor
301 Centennial Mall South

December 18, 1980

RECEIVED
DEC 20 1980
POLICY RESEARCH

Ms. Neoma Parks
Policy Research Office
State Capitol Building
Room 1321
Lincoln, NE 68509

Dear Ms. Parks:

We have reviewed the draft EIS for the Energy Transportation Systems, Inc. (ETSI) coal slurry pipeline, SAI No. 801107, and have the following comments:

(1) The route of the proposed pipeline has been selected in such a manner as to minimize potential cultural and environmental impacts. With proper stream crossing and revegetation techniques, adverse impacts associated with installation of the pipeline should generally be insignificant.

(2) Based on our limited knowledge of the Madison Formation and its associated aquifer, it appears that the proposed action would have little impact on Nebraska's water resources. Although there would be significant drawdowns (25-400 feet) in the Madison Aquifer potentiometric surface after 50 years of pumping from the Niobrara County and/or Crook County well fields, these drawdowns are not expected to affect the currently utilized groundwater resources in northwest Nebraska. Likewise the drawdowns are not expected to adversely affect (diminish) the base flows of the upper Niobrara River or the Pine Ridge streams.

Since the Conservation and Survey Division has recognized expertise in the field of hydrogeology, we will leave specific comments regarding groundwater and surface water impacts in Nebraska to them.

Very truly yours,

Verlon K. Vrana

Verlon K. Vrana
Chief, Planning Division

VKV:TFP:lf

Institute of Agriculture and Natural Resources

TEACHING NEBRASKA EXTENSION

THE UNIVERSITY OF NEBRASKA–LINCOLN
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
LINCOLN, NEBRASKA 68583

CONSERVATION AND SURVEY DIVISION
113 Nebraska Hall
901 North 17th Street
Lincoln, Nebraska 68588

Telephone (402) 472-3471

Geological and Natural Resources Surveys

DATE: December 18, 1980

TO: Neoma Parks
Project Review Coordinator

FROM: Robert Kuzelka Bob Kuzelka
Water Resources Planner

RE: ETSI EIS (80 11 07)

The staff of this organization has reviewed the subject EIS. Our major finding was a lack of reference to paleontological sites in the path of the pipeline. It is our feeling that there is a potential that the path will disrupt such sites in Nebraska. We recommend that BLM contact Dr. Allan O. Griesmer, 213A Morrill Hall, University of Nebraska-Lincoln, Lincoln, NE 68588 in this regard.

Some specific changes or additions in the EIS that should be made include:

1. Appendix D-3 should be expanded to include paleontological investigations. Perhaps this could be done along the lines of the law which requires cooperation between the Nebraska Department of Roads and state agencies (Neb. RRS § 39-1363) as attached. There are also federal laws that address this area.

2. On pages 3-66 and 4-58 recognition should be made of potential paleontological sites.

3. On page 5-16 it should be pointed out that with proper salvage agreements, as previously recommended in this memo, the destruction of paleontological resources would not have to be irreversible.

cc: Dr. Allan O. Griesmer

THE UNIVERSITY OF NEBRASKA–LINCOLN THE UNIVERSITY OF NEBRASKA AT OMAHA
THE UNIVERSITY OF NEBRASKA MEDICAL CENTER

STATE HIGHWAYS § 39-1364

tor-State Engineer or his authorized representative as soon as the exigencies of the situation allow.

Source: Laws 1955, c. 148, § 61, p. 442.

39-1362. Cross or dig up highway; violations; penalty. Any person, who shall dig up, cross, or otherwise use any portion of the state highway system or drainage facilities of the state highway system for laying or relaying pipe lines, ditches, flumes, sewers, railways, for constructing, or installing any new pole line, underground conduit, buried cable, or new guy wires, or for any other similar purpose without obtaining a written permit from the department or without complying with the regulations of the department shall be guilty of a Class III misdemeanor. Each and every day that such a violation continues, after the department issues written notification to the violator, may constitute a separate offense.

Source: Laws 1955, c. 148, § 62, p. 443; Laws 1977, LB 40, § 213.

39-1363. Preservation of historical, archeological, and paleontological remains; agreements; funds; payment. To more effectually preserve the historical, archeological, and paleontological remains of the state, the Department of Roads is authorized to enter into agreements with the appropriate agencies of the state charged with preserving historical, archeological, and paleontological remains to have these agencies remove and preserve such remains disturbed or to be disturbed by highway construction and to use highway funds, when appropriated, for this purpose. This authority specifically extends to highways which are part of the National System of Interstate and Defense Highways as defined in the Federal Aid Highway Act of 1956, Public Law 627, 84th Congress, and the use of state funds on a matching basis with federal funds therein.

Source: Laws 1959, c. 170, § 1, p. 649.

39-1364. Plans, specifications and records of highway projects; available to public, when. The Department of Roads shall, upon the request of any citizen of this state, disclose to such citizen full information concerning any highway construction, alteration, maintenance, or repair project in this state, whether completed, presently in process, or contemplated for future action, and permit an examination of the plans, specifications, and records concerning such project; *Provided*, any information received by the department as confidential by the laws of this state shall not be disclosed. Any person who willfully fails to comply with the provisions of this section shall be guilty of official misconduct. By the provisions of this section, the officials of the Department of Roads will not be required to furnish

985

State of Nebraska
Department of Water Resources
301 Centennial Mall | PO Box 94676 | Lincoln, Nebraska 68509 402/471-2363
Charles Thone, Governor John W. Neuberger, Director

RECEIVED
NOV 24 1980
POLICY RESEARCH

IN REPLY REFER TO

November 21, 1980

Re: SAI No. 80 11 07
Coal Slurry Pipeline, U.S.
Department of Interior

Ms. Neoma Parks
Project Review Coordinator
Policy Research Office
Room 1321, State Capitol
P.O. Box 94601
Lincoln, Nebraska 68509

Dear Ms. Parks:

The Department of Water Resources is concerned with the following items in connection with the Coal Slurry Pipeline proposal:

1. Many of the water courses designated as state floodplains which will be crossed will require flood plain permits from the Department prior to any construction.

2. Well fields such as the Niobrara County, Wyoming, if utilized to furnish water for the pipeline, will severely effect the drawdown and ground water over the 5,300 square mile well field. Thirty percent of this well field is in Sioux and Dawes County, Nebraska. The proposed one million acre-feet of withdrawal may require close monitoring and perhaps restrictions if determined detrimental to other users of ground water.

3. Water from the Missouri mainstem reservoirs, if permitted, would also have to be closely monitored, and controlled in order to satisfy Missouri River navigation and the generation of power.

Sincerely,

L. C. Kubicek
Chief, Engineering Branch

LCK:jh
cc: John W. Neuberger

State of Nebraska
CHARLES THONE, GOVERNOR

DEPARTMENT OF ROADS
DIRECTOR-STATE ENGINEER
DAVID O. COOLIDGE

P. O. BOX 94759
LINCOLN, NEBR. 68509
402-477-6012

Mr. Richard E. Traylor
Office of Special Projecta
3rd Floor East
555 Zang Street
Denver, Colorsdo 80228

November 24, 1980

Dear Mr. Traylor:

The following comments are in response to the Draft Environmental Impact Statement on the proposed Coal Slurry Pipeline.

The proposed Coal Slurry Pipeline which begins near Gillette, Wyoming and crosaes several counties in Nebraska will require a special permit for each state highway crossing. These permits require a two week time period for issuance and would remain effective for six months. The permits may be obtained from Mr. Byron Warlick, Highway Accesa Control Officer, State of Nebraska, Department of Roads, P.O. Box 94759, Lincoln, Nebraska 68509. In addition to these permits, a cash performance guarantee will be required for possible road repair at the crossings and will be retained for six months. At the state highway crossings, the pipeline would be required to be encased in an additional pipe from Right of Way line to Right of Way line. Ditching will be permitted on the ROW outside of fill areas. Dry boring will be required through the roadway section. If you have any questions concerning this information, you may contact Mr. Warlick at the above address or call him at 402-473-4625.

Very truly yours,

DOCoolidge

DAVID O. COOLIDGE
Director-State Engineer

DOC/GG/bv

cc: Neoma Parks
L. O'Donnell
J. Jensen
V. Wagner
G. Grauer
B. Warlick

CHARLES THONE
GOVERNOR

STATE of NEBRASKA
DEPARTMENT OF ENVIRONMENTAL CONTROL

DAN T. DRAIN
DIRECTOR

RECEIVED
DEC 03 1980
POLICY RESEARCH

December 1, 1980

WWM DIV

Ms. Neoma Parks
Project Review Coordinator
Policy Research Office
P. O. Box 94601
Lincoln, NE 68509

RE: S.A.I. No. 801107
Coal Slurry Pipeline
U. S. Dept. of Interior

Dear Ms. Parks:

The review of the proposed project has been completed by this Department. The Environmental Impact Statement indicates that there will be no significant water quality impacts in Nebraska. This Department would like to emphasize the necessity for careful management practices with regard to proper construction measures during stream crossings and revegetation along streambanks upon completion of work.

It is noted that the Nebraska Department of Water Resources has already provided comment indicating concern over flood plain requirements and potentially adverse effects on groundwater quantity.

Very truly yours,

Dan T. Drain

Dan T. Drain
Director

ME/th

cc: Dept. of Water Resources

Mail, Box 94877 Statehouse Station • Office, 301 Centennial Mall South • Lincoln, Nebraska 68509 • (402) 471-2186

Institute of Agriculture and Natural Resources

THE UNIVERSITY OF NEBRASKA–LINCOLN
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
LINCOLN, NEBRASKA 68583

December 11, 1980

Reply to:
Nebraska Water Resources Center
Office of the Director
310 Agricultural Hall
(402) 472-3305

M E M D R A N O U M

TD: Neoma Parks
Project Review Coordinator
Nebraska Policy Research Office

FROM: Robert E. Burns
Nebraska Water Resources Center

RE: "A-95" Review of SAI 80 11 07
Draft EIS for Coal Slurry Pipeline

As per your request, we have reviewed the Draft Environmental Impact Statement for the proposed coal slurry pipeline. Enclosed, please find the 2000-1S form and technical comments on the Draft EIS, prepared by Dr. Charles Deknatel, Assistant Professor with the UNL Department of Community and Regional Planning. Please be advised that Dr. Deknatel's comments do not necessarily reflect the views of the University of Nebraska.

We appreciate the opportunity to comment.

REB:sf

Enclosure

cc: Dr. William L. Powers
Dr. Charles Deknatel

THE UNIVERSITY OF NEBRASKA–LINCOLN THE UNIVERSITY OF NEBRASKA AT OMAHA
THE UNIVERSITY OF NEBRASKA MEDICAL CENTER

UNL
The University of Nebraska–Lincoln

College of Architecture
Department of Community
and Regional Planning
Lincoln, Nebraska 68588

November 20, 1980

TO: Bob Burns, Water Resources Center
FROM: Charles Deknatel, Department of Community & Regional Planning, UNL
SUBJECT: Comments on Draft Environmental Impact Statement on the Coal Slurry Pipeline Transportation Project

I have reviewed this statement, and I wish only to make limited comments in three areas from my personal perspective.

1. As an aid to decision-makers in terms of clarifying issues and demonstrating the potential consequences of this action, the EIS appears to me to be successful and adequate. The project is effectively divided into its component activities and related alternatives and the impacts of these is generally well delineated. Trade-offs between water requirements, energy requirements and the advantages of reduced rail traffic and an alternative mode of transportation are clearly identified.

2. From a "Nebraska" point of view, there are certainly some factors to be treated with concern. Primary are the levels of drawdown of groundwater if the Niobrara Water Supply area is utilized as the primary source. Related streamflow effects would also be of concern. Second, would be impacts on Sandhills vegetation where the pipeline crosses such areas, for example, in Morrill County or Chase County (Maps A-6, A-8). Third, would be impacts on recreation areas, wildlife habitat and other land uses, throughout the Nebraska portion of the project, but particularly as the pipeline is near the Platte River and its north and south branches west of Ogallala. A fourth area of impact is that of the workforce on communities in Nebraska and elsewhere. This needs to be compared with equivalent impacts of the rail alternative and depending on the point of view of local communities can be seen as either a project benefit, or a possible negative impact. Finally, the current and projected impact of the rail alternative (and projected rail traffic with the pipeline project as well) are important factors for judgement within Nebraska, both from a local and statewide perspective.

3. From an overall and more personal point of view, the value of constructing a duplicate transportation system, with some significant impacts on natural resources (especially water) needs major justification. Although there will likely be rail expansion in either case, many rail corridors are historically established and provide alternatives for improvement and management to alleviate existing problems. Energy, water and land/environmental costs would appear to raise significant questions about the benefits of this project which should be closely examined.

The University of Nebraska-Lincoln The University of Nebraska at Omaha The University of Nebraska Medical Center

STATE *of* NEBRASKA

DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL ENGINEERING
301 CENTENNIAL MALL SOUTH
P.O. BOX 95007
LINCOLN, NEBRASKA 68509

M E M O R A N D U M

November 21, 1980

TO: Richard Beck

FROM: Clifford L. Summers, Director
Division of Environmental Engineering

SUBJECT: Coal Slurry Pipeline
U.S. Interior
SAI No. 80 11 07

Nebraska Statutes require that major water system improvements be planned by a registered professional engineer. These statutes also require that plans and specifications be submitted to the Health Department for review and approval prior to construction.

Nebraska Public Service Commission

301 CENTENNIAL MALL SOUTH
Lincoln, Nebraska
68509

(402) 471-3101

November 20, 1980

Don Stenberg
Attn: A-95 Coordinator
Policy Research Office
Room 1321, State Capitol
P.O. Box 94601
Lincoln, NE 68509

Dear Mr. Stenberg:

The Coal Slurry Pipeline Environmental Impact Statement was reviewed by the Public Service Commission. The pipeline as proposed is for the interstate transportation of coal slurry and as such it is not within the regulatory jurisdiction of the Commission. The issues remain, however, as to the open-ended use of groundwater from the Madison Aquifer and the expected deleterious impact on the railroads that serve Nebraska.

If the coal slurry pipeline is authorized to proceed, higher rates on grain and general commodities should be anticipated to provide a sufficient return on investment for the railroads to continue operations.

The Commission feels that these issues have not been adequately discussed.

Sincerely,

Terrence L. Kubicek

Terrence L. Kubicek
Executive Secretary

TLK:jb

COMMISSIONERS:
DUANE GAY
JAMES F. MUNNELLY
ERIC RASMUSSEN
JACK ROMANS
HAROLD SIMPSON

SECRETARY:
TERRENCE L. KUBICEK

TEACHING RESEARCH EXTENSION
Institute of Agriculture and Natural Resources

THE UNIVERSITY OF NEBRASKA-LINCOLN
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
LINCOLN, NEBRASKA 68583

CONSERVATION AND SURVEY DIVISION
113 Nebraska Hall
901 North 17th Street
Lincoln, Nebraska 68588

Telephone (402) 472-3471

Geological and Natural Resources Surveys

January 22, 1981

Mr. Richard E. Traylor
Special Projects Staff
3rd Floor, East
555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

As part of the State of Nebraska review comments on the ETSI project (letter dated December 22, 1980) this organization identified a lack of adequate reference to paleontological sites in the proposed path of the pipeline. We are now able to submit a detailed list of such sites and a cover memo regarding these sites from the Nebraska State Museum staff. Please consider this material in your final draft EIS.

If you wish further information on this matter I would be happy to put you in contact with the appropriate persons.

Sincerely,

Robert D. Kuzelka

Robert D. Kuzelka
Water Resources Planner

as

cc: Neoma Parks
Mike Voorhies

THE UNIVERSITY OF NEBRASKA-LINCOLN THE UNIVERSITY OF NEBRASKA AT OMAHA
THE UNIVERSITY OF NEBRASKA MEDICAL CENTER

UNIVERSITY OF NEBRASKA
STANDARD MEMO FORM

Date: Jan. 15, 1981

To Dept. of: Conservation and Survey Attn: Bob Kuzelka

From: Mike Voorhies Dept. Museum W436 Nebr. Hall 2-2657

Subject: Paleontological sites near or on Coal Slurry Pipeline

- ☐ Your Information
- ☐ Suggested Reply
- ☐ Appropriate Action
- ☐ Your Recommendation
- ☐ Please Return
- ☐ Your Files
- ☐ Direct Reply
- ☐ Carbon copy for our files

Message:

Dear Mr. Kuzelka:

I have just been shown a copy of the ETSI Environmental Impact Statement along with a Memo of yours sent to Neoma Parks of the BLM. In your memo you very correctly pointed out that numerous paleontological sites had been ignored in the "Cultural Resources" portion of the EIS. I have prepared the enclosed list of Museum fossil localities within the 10-mile-wide pipeline corridor within Nebraska. Obviously there are a lot of them, they are important, and I am more than a little disturbed that the EIS took no notice of these at all.

I am somewhat of a novice at this game so I would appreciate any advice you can give on what action I can take to assure that the final version of the EIS takes note that many unique vertebrate fossil localities are directly in the way of the proposed pipeline in Nebraska.

Mike Voorhies

Please use Standard Forms where ever possible.
Available in following sizes, 8½ x 5½—8½ x 11 and several colors at General Stores.

University of Nebraska State Museum Vertebrate Paleontological Localities

Within the 10-mile-wide Corridor of the Proposed ETSI Coal Slurry Pipeline

Position of pipeline route taken from maps in Appendix A of the Environmental Impact Statement (ETSI EIS 80 11 07) made available to the Museum on January 13, 1981.

UNSM Site Number	County	Site Name & Age	Proximity to Pipeline
*Mo 9	Morrill	Sphenophalos middleswarti type locality Late Miocene	3 mi. SW
*Mo 4	Morrill	Broadwater Quarry #1 Pliocene	1 mi. E
*Mo 5	Morrill	Broadwater Quarry #2 Pliocene	2 mi. E
*Mo 6	Morrill	Broadwater Quarry #3 Pliocene	2 mi. E
Mo 101	Morrill	Kepler Quarry #1	1 mi. E
Mo 102	Morrill	Kepler Quarry #2	1 mi. E
Mo 111	Morrill	Ruby Locality (late Miocene)	3 mi. E
Mo 112	Morrill	Pussy Spring Locality (middle Miocene)	3 1/2 mi. E
*Gd 10	Garden	Oshkosh Quarry (late Miocene)	1/2 mi. N
Gd 101	Garden	McCuligan Canyon Locality late Miocene	directly on line
Gd 103	Garden	Horseshoe Bend Draw Locality Miocene	3 mi. NE
Gd 104	Garden	Dale Grace Locality Miocene	3 mi. NE
Gd 16	Garden	Unnamed Locality Miocene	4 1/2 mi. S
Gd 106	Garden	Clary Ranch Locality Early Holocene	3 mi. NE

-2-

UNSM Site Number	County	Site Name & Age	Proximity to Pipeline
Hk 110	Hitchcock	Dutcher Pit Locality Pleistocene	1 1/2 mi. SW
Hy 101	Hayes	Palisades Locality Pleistocene	4 mi. SE
Rw 101	Red Willow	Gillen Locality Pleistocene	<1/2 mi. NE
Rw 103	Red Willow	Missouri Valley Pit Locality #1 Pleistocene	1 mi. NE
Rw 104	Red Willow	Roger Brown Locality Pleistocene	1 mi. NE
Rw 108	Red Willow	Missouri Valley Locality #2 Pleistocene	1 mi. SW

Comments: All sites represent significant concentrations of vertebrate fossils, having yielded from several dozen to several hundred thousand catalogued specimens. Nearly all sites have been published in the paleontological literature. Those indicated by asterisks are type localities for vertebrate fossil species. In several cases they represent the only location in the world known to contain remains of these species. The Broadwater Quarries (Mo 4,5,6) have produced the largest known sample of Pliocene horse remains of any site in North America.

45

OKLAHOMA DEPARTMENT OF ECONOMIC AND COMMUNITY AFFAIRS

State Grant-In-Aid-Clearinghouse

5500 N. WESTERN OKLAHOMA CITY, OKLAHOMA 73118 (405) 840-2811

December 24, 1980

Mr. Richard E. Traylor
United States Department of the Interior
Bureau of Land Management
Special Projects Staff
3rd Floor, East
555 Zang Street
Denver, Colorado 80228

RE: 13K007 - 1792(142) ETSI Coal Slurry Pipeline Transportation Project, Draft Environmental Impact Statement (SAI #01224001)

Dear Mr. Traylor:

The environmental information for the above referenced project has been reviewed in accordance with OMB Circular A-95 and Section 102 (2) (C) of the National Environmental Policy Act by the state agencies charged with enforcing environmental standards in the State of Oklahoma.

The state agencies, comprising the Pollution Control Coordinating Board, have reviewed the proposed project and offer the following specific comments:

Oklahoma Archaeological Survey - Comments are attached and made a part of this letter.

Oklahoma Transportation Department - Copy of comments are attached and made a part of this letter.

COEDD - Copy of Pawnee County Conservation District's comments are attached and made a part of this letter.

The state clearinghouse requires no further review.

Sincerely,

Don N. Strain
Director

DNS:mt

cc: NECO, EODD, COEDD, INCOG, NODA

The University of Oklahoma at Norman

Oklahoma Archaeological Survey

NOV 26 1980

November 25, 1980

Mr. Don Strain
State Clearinghouse
5500 N. Western
Oklahoma City, OK 73118

Re: Draft Environmental Impact Statement for the Coal Slurry Pipeline proposed by Energy Transportation System, Inc., and Bureau of Land Management.

Dear Mr. Strain:

I have reviewed the referenced document for its treatment of cultural/historical resources. As a draft, and in conjunction with the draft memorandum of agreement between BLM, ETSI, and the SHPO office, I have no objections to the contents of the EIS.

Sincerely,

Larry Neal
Assistant State Archeologist

WLN/ast

cc: Glenn Jordan, State Historic Preservation Officer
BLM Office, Oklahoma City

1335 South Asp Avenue, Norman, Oklahoma 73019 (405) 325-1028

STATE OF OKLAHOMA
DEPARTMENT OF
TRANSPORTATION
200 N. E. 21st Street
Oklahoma City, Oklahoma 73105

November 21, 1980

Mr. Richard E. Traylor
Project Leader
Bureau of Land Management
Third Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

The Oklahoma Department of Transportation has completed their review of the Draft Environmental Impact Statement (DEIS) on the proposed Energy Transportation Systems Inc. coal slurry transportation project. Based on this review, the DEIS appears to be in conformance with the Final Regulations as promulgated by the Council on Environmental Quality on November 29, 1978. However, there are three areas which should be addressed more adequately in the Final Environmental Impact Statement (FEIS).

1. The discussion of alternates is unclear whether any of the proposed alternatives will utilize barges on the Kerr-McClellan River Project between Tulsa, Oklahoma and Fort Smith, Arkansas. If this assumption is correct, we suggest that the feasibility of such an alternate be developed and studied.

2. The Oklahoma Department of Transportation's Wildlife Management Specialist has reviewed the report and offers the following comments:

> "Two caves containing known gray bat (Myotis grisescens) and possible Indiana and Ozark big-eared bat (Myotis sodalis and Plecotus townsendii ingens, respectively) populations occur on or near the proposed route of the Coal Slurry Pipeline Market alternative. These caves are located south and west of Lyons, Oklahoma in Adair County near Station MB 454 of the market alternative. These three species of bat are endangered and any disturbances during the construction of the Coal Slurry Pipeline should be avoided."

Mr. Richard E. Traylor
November 21, 1980
Page 2

3. The Oklahoma Department of Transportation's Archaeologist reviewed the DEIS for cultural resources and offered the following comments:

> "The report is somewhat weak as to where these resources occur. Archaeological sites are not randomly or evenly distributed in space. So the sites per square mile figure is misleading. Oklahoma Department of Transportation linear transect surveys (such as the pipeline survey would be) indicate that many more sites occur near waterway holds. Many more sites are likely to be found in Muskogee, Sequoyah, and Adair Counties than in Grant, Kay, or Noble Counties. This type of information would seem to be valuable in scheduling of cultural resource surveys so that construction would not be held up or controversies arise.
>
> A second weakness is in procedures for archaeological materials uncovered during pipeline construction after the cultural resource survey. Are these to be ignored or will BLM hire the necessary archaeologists to monitor construction? Perhaps a training program in recognition of archaeological materials for contractors or BLM personnel would be valuable here."

Once a final alignment for the coal slurry line has been established, the Oklahoma Department of Transportation recommends that an archaeological survey by a qualified archaeologist be accomplished.

The preceding comments are intended to be beneficial in the preparation of the FEIS. However, should you have questions, please feel free to contact this office.

Sincerely,

J. D. Chambers
Planning Engineer

ee

cc: Mr. Leonard A. Solomon, Oklahoma Conservation Commission
Mr. Don Strain, State Clearinghouse

70

CHARLES THONE
GOVERNOR

STATE OF NEBRASKA
LINCOLN 68509

December 30, 1980

Mr. Richard E. Traylor
U.S. Department of the Interior
Bureau of Land Mangement
Special Projects Staff
3rd Floor, East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

Recently Nebraska's Policy Research Office conducted the state clearinghouse review of the draft environmental impact statement on the Energy Transportation Systems, Inc., coal slurry pipeline project.

A number of state agencies have responded to the review by expressing their concerns regarding the project. After reviewing the comments of these agencies, it is apparent that a large number of unanswered questions remain regarding the potential impact the pipeline could have on the State of Nebraska. I would sincerely hope that these questions will be adequately addressed prior to making any final decisions on the proposed project.

With kind regards,

Sincerely,

CHARLES THONE
Governor

CT:klv

72

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

ED HERSCHLER
GOVERNOR

December 31, 1980

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

The draft environmental impact statement for the Energy Transportation System, Inc. (ETSI) coal slurry pipeline proposal has been circulated for review by our state agencies. Copies of the agency comments, as well as comments prepared by my office, are enclosed for your consideration and use. I believe that these comments raise several substantial issues which need to be fully reconciled before preparation of the final impact statement. In view of the current uncertainties, data deficiencies and incomplete assessment, I must request that the action alternatives be reanalyzed, particularly the closed loop system and the Lake Oahe pipeline alternatives. The final document must fully array and analyze both the short and long term merits and impacts of each alternative before it can truly be used as a decision document.

Yours sincerely,

EH:pcd
enclosures

cc: Maxwell T. Lieurance
Wyoming State Director
Bureau of Land Management

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

ED HERSCHLER
GOVERNOR

State of Wyoming
Executive Department Comments
Energy Transportation System, Inc.
Draft Environmental Impact Statement (ETSI DEIS)

The ETSI DEIS is predicated on the assumption that 20,200 acre feet of water will be available annually for slurrying coal to points south and east of the Powder River Basin. The Legislature of Wyoming only authorized 20,000 acre feet subject to terms and conditions of the Wyoming State Engineer. An Agreement between ETSI and the State Engineer of Wyoming dated September 24, 1974, (appendix C-3), allows ETSI the use of 300,000 acre feet over a 20 year period, or an annual average of 15,000 acre feet, not the 20,200 acre feet as stated in the DEIS. This difference, 5,200 acre feet, will cause several distinct problems for the determination of adequacy in the DEIS:

1. The volume of coal that can be moved by slurry is substantially reduced, up to a reduction of 25 percent.

2. The impacts on the aquifer are substantially in error. Due to the complex nature of the Madison Aquifer, it is nearly impossible to state how severe or where the draw down on the aquifer will occur.

3. The reduction in the volume of coal to be moved will in all likelihood negate the need for three slurry preparation plants.

4. There is an unknown and uncertain interrelationship between the Madison Aquifer and the other aquifers that overlay the Madison. Due to faulting, fracturing and oil and gas exploration in the area of the proposed Niobrara County well field, it is highly possible that a drawdown of the Madison will result in a drawdown on the overlying shallow aquifers resulting in stock and domestic wells going dry as long as the Madison formation water is being "mined".

5. Added to the unknowns concerning aquifer interrelationships is the failure of the DEIS to adequately assess the cumulative impact of this project and other projects on the hydrologic regime and socio-economic environment.

Primarily, at least one synthetic fuel project is in the planning stage for Converse County and it will create additional water demands on an already scarce water resource base. Sufficient information is on file with the Wyoming Industrial Siting Administration that a more thorough discussion of the synthetic fuels project and its relationship with the ETSI proposal could have been included. The Department of the Interior is also considering the leasing of additional federal coal in April of 1982. The specific quantity of coal to be leased has not yet been determined, but in any event the federal lease potential should have been included in the DEIS. Concurrent with the scheduled federal lease sale is the on going Bureau of Land Management's processing of Preference Right Lease Applications (PRLA's). There are 42 PRLA's in Campbell County and 16 PRLA's in Converse County which must be processed by BLM by December 1, 1984. It is quite likely that several of these PRLA's will prove to have commercial quantities of coal and will be in production within the time frame under consideration in the ETSI DEIS. In addition to the PRLA's, there are 11 outstanding coal leases in Campbell County and 8 leases in Converse County which may be developed and would create an additional impact on the aquifers as well as create more pressure for the limited water resource. Development of the PRLA's, the undeveloped leases and at least one synthetic fuels project will require more labor, auxiliary facilities and services which will, in turn, place additional population pressures on Campbell, Converse and possibly Niobrara Counties. All totaled, the ETSI DEIS has not adequately assessed the cumulative impacts associated with the ETSI project or any other project planned in the area of consideration.

Need for the Project 1.C p.1-2

The need for the project is somewhat questionable. There is sufficient existing and planned rail capacity to handle the coal development scenario developed by the Department of Energy in their August 7, 1980 Preliminary National and Regional Coal Production Goals for 1985, 1990, and 1995. As proposed, the ETSI pipeline would siphon-off traffic from the railroads which must depend on coal transport revenues to remain solvent and to help defray less profitable rail movements. Further, more than just one railroad will benefit from increased rail traffic since the United States

rail network is an integrated system. If rail traffic is siphoned off from the Burlington Northern, other rail carriers in the midwest may also feel the economic consequences of lost traffic. Continued federal subsidization of Conrail, the bankruptcy of the Rock Island and the Milwaukee Road railroad companies provides sufficient illustration of what can happen when rail traffic is diverted to other forms of transportation. Insuring a healthy rail network would appear to make more sense from a national security perspective than a coal slurry pipeline. No analysis has been made of economic impact on the railroads should this slurry pipeline be developed. An economic analysis of lost rail traffic and revenues should be considered.

The demand for low sulfur coal in the Arkansas, Louisiana, Oklahoma and Texas demand centers can be supplied from various coal areas such as Colorado, New Mexico, Texas and Wyoming to name just a few. In any event, the predicted demand of 124 million tons by 1985 appears to be an extremely high estimate of demand. The 1977 Federal Power Commission report used to determine coal/electricity demand is based on higher than current growth estimates for electricity. Historic load growth appoximated 6 percent annually, the Department of Energy now uses an estimate of between 3 percent and 3.7 percent annually. Projected electric demand growth has been reduced by nearly 50 percent and with it the need for early 1970's coal production and transportation demand has been reduced.

Even if historic load growth rates were maintained, it is doubtful that all the coal would be supplied from the Powder River Basin. According to the National Coal Association report titled Steam Electric Plant Factors, 1979, the total projected (1979-1988) new coal fired plant capacity for the demand centers mentioned above will approach 36,808 megawatts of electricity. This translates to approximately to 140 million tons of coal annually (MMTA). Also, the Department of Energy estimates that approximately 34 MMTA of that demand will be satisfied from coal fields in Oklahoma and Texas. By 1990 the amount of coal supplied from Oklahoma and Texas sources will increase to 90 MMTA and by 1995 it is anticipated to increase to 140 MMTA. This would seem to indicate that a substantial portion of the market area demand could be satisfied by locally derived coal resources in Oklahoma and Texas. Lower than anticipated load growth and locally supplied coal will reduce the demand for power plants, Powder River Basin coal and subsequently the coal slurry pipeline.

Additionally, the first paragraph of Need For Project, 1.C, p. 1-2, would seem to indicate that there has only been favorable testimony on the coal slurry legislation. The opposite is true, the project team should refer to the following Congressional Documents:

1) Committee Print 95-56, on the Coal Pipeline Act of 1978;

2) Testimony on H.R. 4370 and H.R. 4632, in November, 1979, before the House Subcommittee on Public Works and Transportation, publication number 96-43; and

3) Testimony on Senate 2665 during May and June of 1980, before the U.S. Senate Committee on Energy and Natural Resources, publication number 96-127.

A review of the testimony mentioned above would indicate that substantial differences of opinion remain concerning the savings that a coal slurry could provide. Further, railroads appear to be more cost effective from an energy perspective than slurry pipelines according to the DEIS. Additionally, the Office of Technology Assessment (OTA) report on Coal Slurry Pipelines, March 1978, states that coal slurry pipelines may not represent the least costly method of transporting coal. The project team should include a discussion of the economic advantages available by mode and not offer blanket generalities on the merits of coal slurry pipelines.

The overriding goal should be to provide coal to meet the nation's need for electrical power at the lowest economic, environmental and social costs. These costs are real and must be fully displayed and considered in the analysis of alternatives contained within the environmental impact statement. The final decision must reflect the opportunity costs of all inputs to the various coal transportation alternatives. Comparison of the socioeconomic effects of the alternatives can be reduced to basic benefit-cost analysis if the various inputs are accorded their true opportunity cost values. Decisions to commit resources, labor and materials to specific long term use must recognize that such commitments effectively limit or even foreclose future development options.

The ETSI draft environmental impact statement is very deficient insofar as long term, cumulative resource commitment and impact analysis. For example, it appears

Page 5

that the closed loop system alternative was rejected becauae of energy cost consideratIona. However, when theae energy costs are properly balanced against the opportunity costs aaaociated with the annual export of 20,000 acre feet of Wyoming water, the closed loop system appeara aa cost effective, if not more. The annual energy cost differential between the closed loop system and the proposed alternative must be compared to the annual opportunity costa of the proposed water withdrawal. Rough calculations indicate that the energy coat differential doea not offset the loas to the state of the opportunity to utilize this water for different purposes. Considering the fact that municipal and industrial water in the semi arid West is becoming an increasingly rare and valuable commodity, it is imperative that the long term benefits and costs to the state, region and nation of using Madison formation water in a coal slurry pipeline vs the benefits and costs of in-state use of that water be analyzed.

There is a definite need to conduct more thorough regional economic analysis before any final decision is reached. The current and projected excess rail transportation capacity and the potential impacts on rail carriers who are dependent on coal traffic to stay afloat financially must be factored into the analysis. Likewise, the potential socioeconomic impacts associated with the immediate, yet short term, construction related population increases need to be more thoroughly analyzed. These dramatic population increases will undoubtedly result in increasing costa to local governments. These up-front costs may not be offset by long term tax base growth because of the small permanent workforce and the relatively small projected property tax revenues. The draft displays a negative net fiscal impact on local governments within Campbell County of $6,549,000 between 1984 and 1990. Campbell County may not need ETSI from a fiscal perspective. Similar with/without analysis should be conducted for local governments in Converse, Weston and Niobrara Counties.

In summary, extensive additional analysis must be conducted before the environmental impact statement can truly be used as a decision document. There is a particular need to analyze the cumulative impacts of the proposed slurry line, other Powder River area slurry line proposals, associated coal mine developments and proposed synfuel projects on the water quantity and quality and socieoeconomic parameters in the study area. The full costs, both ahort and long term, of all resource inputs into the alternative systems must be identified, assessed and mitigation strategies developed before any action alternative is approved.

THE STATE OF WYOMING ED HERSCHLER GOVERNOR

State Engineer's Office

BARRETT BUILDING CHEYENNE, WYOMING 82002

December 10, 1980

M E M O R A N D U M

TO: The Honorable Ed Herschler, Governor, State of Wyoming, and State Planning Coordinator's Office

FROM: George L. Christopulos, State Engineer GLC

SUBJECT: Review of Energy Transportation Systems, Inc. Environmental Impact Statement.

The stated purpose of the Environmental Impact Statement "is to present facts about the proposed Energy Transportation Systems Inc. Coal Slurry pipeline transportation project and alternatives to the proposal, and their environmental consequences, in sufficient detail to inform the public and to assist in decision making". The impetus for the E.I.S. arose because the proposed pipeline will cross some Federal lands and has been deemed a "significant action". Pipeline construction and associated factors as they affect the Federal lands involved is within the scope of National Environmental Policy Act of 1969. However, I have a real problem with how far this Act could be interpreted to allow investigation into the water supply aspects of the proposed pipeline. The investigation into the water supply points in the direction of involvement by the Federal Government in allocation of water supplies in the State. The water supply for the proposed project is to be derived from water appropriated in accordance with Wyoming Statutes and even though there has been considerable controversy within the State over this pipeline proposal, I question whether resolution of the problem should come from Federal involvement.

In addition to the above, our groundwater staff reviewed the E.I.S. and Technical Report, "Well-Field Hydrology" and generally disagrees with the conclusions reached with regard to drawdown, affects on surface water sources, etc. The attached specific comments are offered after a technical review of the E.I.S., Volume 1 and the Technical Report - Well-Field Hydrology by our groundwater staff.

Memorandum re: ETSI's E.I.S. and Technicsl Report - Well-Field Hydrology
Page 2

ETSI's E.I.S.

1. The quantity of water granted to Energy Transportation Systems, Inc. by the State Engineer is 15,000 acre-feet per year, not 20,200 acre-feet per year as stated in the E.I.S. This means the analysis is probably in error by 25 percent at the start. (Summary P.1)

2. Drawdowns of the Madison Aquifer are stated to be substantial; however, it should be noted that in much of the area which would be affected sccording to the E.I.S., the water level in the Madison Aquifer is above or near the land surface. (Summary P.2)

3. One of the alternative water supplies is water from Oahe Reservoir. The E.I.S. states that the use of such wster would not produce impacts on groundwater. The E.I.S. does not sddress all of the impacts which could be produced by the use of Oahe Reservoir water on other factors. (Summary P.3 and Chapter 1, P.52)

4. The E.I.S. says that the Madison Aquifer system consists of geologic rock units from Precambrian age basement rocks to the Cretaceous shales. This premise is not accepted by a majority of geohydrologists primarily because to have the water in the Madison limestone pressurized (artesian), it must be confined by intervening impermeable layers of rock. (Chapter 3, P.2)

5. The E.I.S. says that recharge to the Madison Aquifer may come in part from infiltration of wster from the Arikaree Formation in the Hartville uplift. This would probably not occur since the head (pressure) in the Madison is greater than that of the Arikaree Formation. (Chapter 3, P.15)

6. The E.I.S. states recharge in the Black Hills to be 140,000 to 400,000 acre-feet per year. This must be the entire Black Hills, not just the area of interest. (Chapter 3, P.15)

7. The E.I.S. states that base flow of some streoms is likely to contain a Madison Aquifer base flow component. This is inconceivable since several hundreds to thousands of feet of impermeable rock separate the Madison Aquifer from the streams. If one assumes a Madison component, then effects are produced. If a Modison base flow component is not assumed, no effects occur. (Chapter 3, P.15)

8. Map 3-5 is incorrectly referenced. Stockdale did not prepare such a map in 1974. (Chapter 3, P.16)

9. Table 3-1 lists a creek called "Stockdale-Beaver Creek". There is no such creek. (Chapter 3, P.17)

10. The E.I.S. states that historic changes in the Madison potentiometric surface could not be sccurately determined. In order to verify any model of the Madison, historic informstion on the potentiometric surface would be extremely important. Since such data is not avsilable, it makes the whole modeling effort suspect. (Chapter 3, P.22)

Memorandum re: ETSI's E.I.S. and Technical Report - Well-Field Hydrology
Page 3

11. Table 3-4 shows Town of Osage water use doubling by 1996. This seems unreslistic and could affect the model simulation. (Chapter 3, P.25)

12. The E.I.S. states that four streams may potentially be affected by groundwater withdrawals from the Madison Aquifer. These are the Cheyenne, Belle Fourche, Powder and Niobrara River (this stream is basically dry in Wyoming) Basins. This is totally inconceivable in the case of all the stated drainages. This is supported by data collected by the United States Geological Survey. It seems equally inconceivable that the White River would not experience stream flow reduction if the premise is correct. This was not addressed at all. (Chapter 3, P.60)

13. The E.I.S. used a decrease of 25 feet in the potentiometric surface of the Madison Aquifer and a reduction of stream flow consisting of 0.5 cfs as producing significant potential impact. The decrease in potentiometric head (pressure) is misleading as the potentiometric head is above the land surface over much of the area. Wyoming Statute 41-3-933 (1977) specifically states that there is no guarantee of artesian pressure. The 0.5 cfs reduction in stream flow is below the accuracy of stream flow discharge measurement. Because of this, it would be unlikely, if not impossible, that such a reduction could be observed or measured. (Chapter 4, P.1)

14. In general, the other alternative groundwater sources, Crook County Well Field and use of the Gillette Well Field also are stated to produce large unrealistic drawdowns and unrealistic reductions in stream flow. Such would not be the case for the previously stated reasons.

15. The recommended monitoring program is already covered under the existing permit, legislative and third party agreement conditions. (Chapter 4, P.121-123)

In summation, Chapter 5, P.6 states: "The probability distributions of drawdowns in the Madison Aquifer from Monte Carlo simulations of ETSI's proposed withdrawals show that the drawdowns calculated in Section 4.A.1 are greater than the values that have a 50 percent exceedance probability (WCC 1980b). This suggests that the values computed are conservative in the sense that they have a smaller probability of being exceeded rather than not exceeded. However, conclusive documentation of aquifer system properties that may lead to regional assessments based on the proposed conceptual model would only be available when the effects of large-scale, long-term water production are carefully observed (WCC 1980b)."

It should be readily apparent from this statement that the analysis performed on the Madison Aquifer was based upon theoretical conjecture concerning the hydrologic properties of a huge aquifer. Nowhere does the analysis indicate that the actual observed field results of the State Engineer-ETSI pump testing data were reproduced utilizing the methodology employed in preparing the E.I.S. It should also be noted that the E.I.S. relied heavily upon the implied inference that the

Memorandum re: ETSI's E.I.S. and Technical Report - Well-Field Hydrology
Page 4

methodology employed in the E.I.S. is that utilized and approved by the United States Geological Survey. Since the United States Geological Survey Madison Aquifer Investigation has yet to be published, it is impossible to tell if similar methodologies will be utilized.

It would appear that there are three major areas which should concern the State of Wyoming:

A. Federal intervention into the right of the State of Wyoming to utilize water supplies of the State.

B. The inadequate data base and methodology employed in evaluating the water supplies for the proposed project.

C. The credibility of the conclusions reached concerning impacts caused by water production from the Madison Aquifer in light of the inadequate data base and methodology employed.

Memorandum re: ETSI's E.I.S. and Technical Report - Well-Field Hydrology
Page 5

Comments on Technical Report - Well-Field Hydrology

1. The "Madison Aquifer" receives leakage from the overlying Minnelusa Formation. The evaporate zone in the Middle Minnelusa would act as a no-flow boundary to vertical flows from above. Due to the presence of the cavernous zones in the upper part of the Madison, interpretation of aquifer test data by conventional theory is problematical. At least part of the vertical flow component interpreted from the test data is probably a reflection of water being contributed by the cavernous zones.

2. At the assumed rate of recharge - 140,000 to 400,000 acre-feet per year, the Madison Aquifer should be replenished faster than they could deplete it at 15,000 to 20,000 acre-feet per year.

3. The Technical Report states that the City of Gillette would pump at the rate of 3000 gpm when actually the City proposes to pump at 7000 gpm with Pacific Power and Light pumping an additional 1000 gpm.

4. They have assumed that the potentiometric surface of the Madison Aquifer has already been affected, but they really don't have any historical records.

5. Even though they are stating that their pumpage will affect flows in the Powder River, etc., they do not consider the effects of proposed pumpage from the western part of the basin.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

State Engineer's Office

BARRETT BUILDING CHEYENNE, WYOMING 82002

MEMORANDUM

December 30, 1980

TO: The Honorable Ed Herschler, Governor, State of Wyoming, and State Planning Coordinator's Office

FROM: George L. Christopulos, State Engineer GLC

SUBJECT: Additional Comments to Supplement those submitted December 10, 1980 on the Review of Energy Transportation Systems, Inc. Draft Environmental Impact Statement

The purpose of this memorandum is to provide further information regarding the technical evaluation of the proposed E.T.S.I. ground water withdrawals from the Madison Limestone as stated in the draft E.I.S. On page 4 of my December 10, 1980 memorandum concerning this subject, Items B and C of those items listed as areas of major concern deal directly with the water supply aspects of the proposed project. It is our contention that the data base and methodology utilized to analyze the water supply for the proposed project is inadequate and therefore the conclusions obtained during analysis are not correct.

Since the majority of the water supply analysis contained in the E.I.S. was accomplished utilizing both a "conceptual" and ultimately a "numerical" model developed by Woodward-Clyde Consultants, perhaps a brief discussion and description of each is warranted.

A "conceptual model" is generally based upon known geologic and hydrologic information from a given area. With this information available, the ground water flow system and the effects produced by the various geologic and hydrologic parameters controlling the flow system are then determined by the investigator. It is the investigator's best guess or estimate as to how the ground water flow system functions. Unfortunately, it is at this point where the bias of the individual investigator in the preparation of the "conceptual model" often leads to the development of an erroneous "numerical model". If the investigator conceptually perceives various geologic and hydrologic parameters and the effects produced by them on the ground water flow system inaccurately prior to the preparation of the "numerical model", the same inaccuracies are perpetuated in the "numerical model", and even worse, the inaccuracies are often justified by adjusting parameters in the model which may be correct at the outset creating a totally inaccurate "numerical model" producing unrealistic conclusions.

MEMORANDUM: Additional comments on Review of E.T.S.I.'s Draft E.I.S.
Page 2

The "numerical model" consists of mathematical calculations based upon "hard" numbers and the "conceptual model" as perceived by the investigator for the various geologic and hydrologic parameters. Once the "numerical model" is developed it then has to be "calibrated". The "calibration" process involves "adjusting" (guessing) the various hard numbers assigned to the geologic and hydrologic parameters within the "numerical model" until a point is reached where the results of the "numerical model" approximate "real world" conditions. Generally, the "real world" condition against which "numerical models" are calibrated is the ground water level in the area of interest. It is assumed that if the proper "conceptual model" is perceived, the correct numbers for geologic and hydrologic parameters are utilized in the "numerical model", and the numbers generated by the "numerical model" approximate the observed water levels within a certain area, then the "numerical model" is correct.

While I have no particular quarrel with the theory behind the development of computer models, it is incumbent upon the investigator to develop a correct "conceptual model" or the resulting "numerical model" will not accurately represent even a close approximation of the "real world" conditions that exist. It is our contention that the "numerical model" developed by Woodward-Clyde Consultants to assess the effects of the proposed E.T.S.I. water withdrawals from the Madison Limestone is not valid because of inaccuracies in both the development of the "conceptual model" and the hard numbers utilized for hydrologic and geologic parameters.

Specifically, we addressed several technical points as they relate to the Madison Limestone on pages 2 and 3 of our December 10, 1980 memorandum which I will try to expand upon.

1. It is important to note again that E.T.S.I. was only granted the use of 15,000 acre-feet of water per year, not the 20,200 acre-feet per year utilized in the predictive numerical model calculations incorporated in the E.I.S. This creates an error of 25 per cent which may be cumulative throughout the model depending upon the accuracy of the numbers utilized for the geologic and hydrologic parameters.

2. The E.I.S. considers the Madison Aquifer System to consist of all geologic rock units from Precambrian age basement rocks to the Cretaceous shales. This relates back to the "conceptual model" problem. Two problems appear to surface because of this. First, the recharge figures quoted related only to the Madison Limestone and would be several orders of magnitude larger if the Madison Aquifer as defined above is considered. Secondly, recent investigations by both the Water Resources Research Institute at Laramie and the United States Geological Survey indicate thick layers of impermeable salt and anhydrite in the middle portion of the geologic formation immediately above the Madison Limestone. Such materials should effectively prevent vertical movement of water from above or the upward propagation of effects produced by Madison pumpage to overlying formations. The existence of such materials is further confirmed because the Madison Limestone is under pressure which can only occur if it is confined between impermeable rock units.

MEMORANDUM: Additional comments on Review of E.T.S.I.'s Draft E.I.S.
Page 3

3. The E.I.S. states recharge to the Madison Limestone in the Black Hills to be 140,000 to 400,000 acre-feet per year. This must be the entire Black Hills area. Also, if the Madison Aquifer as defined by Woodward-Clyde Consultants is utilized, recharge would be much greater. If the recharge is as stated, 140,000 to 400,000 acre-feet per year, it is difficult to see how the withdrawal of an additional 15,000 acre-feet of water per year would produce the effects on ground water levels shown in the E.I.S.

4. The E.I.S. states that effects will be produced on certain streams in the area if E.T.S.I. is allowed to pump. This simply is not true due to two reasons. First, the impermeable nature of the rock units overlying the Madison will not allow such to occur. Secondly, the U.S.G.S. has recent information prepared by Marlin Lowry of the Wyoming District Office showing that there is little, if any, ground water contribution to the base flow of most streams in the Powder River Basin of Northeastern Wyoming. It should also be pointed out, if the Niobrara River is predicted to be affected, I fail to see why the adjacent White River is not affected. Both streams are in the same general area and have the same general characteristics, but the White River is never mentioned.

5. One of the most important points relating to the technical aspect of the E.I.S. is the historic data available on water levels in the Madison Limestone. As stated previously, the information is critical in the calibration and verification of both the "numerical" and "conceptual" models respectively. The E.I.S. states that historic changes in the Madison potentiometric surface could not be accurately determined. This would seem to indicate that the credibility of the modeling effort was questionable at best.

6. An extremely critical point which is carried through both the "conceptual" and "numerical" models is the assumed existence of a fault where large vertical displacement has occurred which is located to the west of the proposed E.T.S.I. well field. While there is evidence that a fault exists at that location, seismic data for that area purchased from petroleum companies does not indicate a large vertical displacement but rather a "drape" of the Madison. The net effect of considering the fault to have a large vertical displacement is to say that the fault is a no-flow boundary thus forcing the predicted effects of pumpage to the east of the proposed well field. The fact that only a "drape" exists would modify the eastward spread of effects and allow the effects to propagate westward into the deeper portions of the Powder River Basin. This would have a profound effect on the modeling results and would reduce substantially both the size of the effected area and the magnitude of predicted water level declines.

7. Pump tests of the E.T.S.I. test wells were conducted during May and June, 1974. The tests and data collected were monitored by a representative of this office. The data was analyzed and it soon became

MEMORANDUM: Additional comments on Review of E.T.S.I.'s Draft E.I.S.
Page 4.

apparent that the Madison Limestone in the general vicinity of the proposed E.T.S.I. well field was not homogeneous and isotropic. Because of this, standard type mathematical analysis of the aquifer parameters was not feasible. The application of "leaky aquifer" theory was necessary and dictated by the data generated during the pumping tests. The "leaky aquifer" theory, very simply stated, says that when water is removed from an aquifer, slow drainage of water stored in overlying or underlying formations into the pumped aquifer will occur. In the case of the Madison Limestone, leakage from the basal portion of the overlying Minnelusa Formation occurs. It is important to note, however, that the vertical leakage from the Minnelusa Formation to the Madison is confined to the basal portion of the Minnelusa Formation by the thick layers of impermeable evaporite materials located in the middle portion of the Minnelusa Formation. The slow leakage will provide huge quantities of water over time without producing the widespread effects predicted by the Woodward-Clyde model.

To reiterate, it is my contention that the "conceptual model" developed by Woodward-Clyde Consultants is in error thus causing the "numerical model" and the predicted effects derived therefrom to be invalid. The pumping tests conducted in May and June of 1974 do not indicate the widespread effects predicted by the model in the E.I.S. It is difficult to accept the model results as the final word in light of the data utilized and the generalities of the assumptions made concerning the geologic and hydrologic parameters. To assume homogeneous conditions in the Madison Limestone over large areas is not scientifically sound.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Water Development Commission

BARRETT BUILDING TELEPHONE: 307-777-7626 CHEYENNE, WYOMING 82002

Michael H. Reese
Administrator

Robert H. Johnson, Chairman
Lewis Freudenthal, Secretary
Elmer N. Johnston
Kenneth Kennedy
William J. Kirven, Sr.
James Noble
Walter J. Pilch
Willard C. Rhoads
Nelson E. Wren, Jr.

December 24, 1980

TO: Warren White
State Planning Coordinator's Office

FROM: Mike Reese
Administrator MR

RE: A-95 #80-150 ETSI Coal Slurry Line

The Bureau of Land Management should be commended for its report on ETSI's proposed slurry pipeline. The ETSI proposal has generated much concern and controversy, so it is not an easy task to write such a comprehensive report.

My major concern, however, relates to the allocation of Wyoming water resources to the task of developing Wyoming's energy potential.

If the slurry pipeline were decided 100 years ago, the fact that water would be used out of its valley and would cross a state line would be of no consequence as long as the test of beneficial use was satisfied. Later when the "public interest" could be used as grounds to deny such a permit, I'm sure that ETSI's proposal would be turned down.

But the social, political and environmental atmosphere has changed considerably, such that coal slurry pipelines have attracted vigorous opposition. The State of Wyoming has a long-standing prohibition against the appropriation, storage or diversion of stream water for use outside the state without prior approval of the legislature. W.S. 41-3-105. The legislature has previously given its approval in advance to the appropriation by ETSI of 20,000 acre-feet or groundwater for use in a slurry pipeline to transport coal to a large steam electric plant in Little Rock, Arkansas, W.S. 41-3-115(d). This approval was granted provided several conditions were satisfied. Perhaps the most important condition is that the ETSI slurry pipeline not interfere with other existing beneficial uses.

Despite this legislative history of ETSI, the major weakness of the BLM report does not address the question of better future use of the water.

Before granting or denying approval of the proposed project, I think it is incumbent upon BLM to consider that the future energy needs of the

Warren White
December 24, 1980
Page 2

area may require large amounts of water, and, without an overall scheme for developing the local water resources, projects like ETSI will advance on only an ad hoc basis.

My concerns revolve around the importance of water usage in synthetic fuel production. Synthetic fuel production is now in its infancy. The recognition of declining world reserves of petroleum and natural gas has accelerated the development of the technology to produce synthetic fuel compatible with existing equipment. The momentum is building for a synthetic fuel industry, spurred on by a federal commitment to encourage synthetic fuel industry.

The Department of Energy as of mid-December, 1980, has selected 79 proposed synthetic fuels projects in 36 states to receive a total of $270 million under the agency's second round of awards for feasibility studies and cooperative agreements. In this second round, Mobil Research and Development Corporation, New York City, successfully proposed a $73 million coal-to-methanol-to-gasoline plant to be built in Wyoming.

If synthetic fuel development is to be a viable prospect from a federal perspective, federal agencies such as BLM will have to be careful in making decisions that affect a potential water supply.

Let me further describe some of my concerns, by using data developed by Exxon Oil Company and the U. S. Water Resources Council in connection with synthetic fuel development in this country.

Exxon Oil projects that synthetic fuel will supply about 19% of the U. S. energy supplies by the year 2000. The distribution of the synthetic industry will primarily occur in the Piceance Basin in Colorado and the Powder River Basin in Wyoming. Exxon predicts that local sources of water would support the synthetic fuels industry through the 1990's, using 3.6 barrels of water for each barrel of synfuel. Beyond the 1990's interregional water transfers will be needed for synfuel development or the consequence would be that synfuel development will be limited to 3-5 million barrels per day (BPD).

This is just Exxon's scenario, subject to further study and verification. But one thing is clear - water will be critical for the development of a viable synthetic fuel industry to meet those objectives set by the federal government and private industry.

The U. S. Water Resources Council has said that "surface water is generally available in the Upper Missouri River Basin to support coal conversion development". However, "not all synfuel development would be located near this water supply . . ."

The Water Resources Council identified the available surface water as 700,000 acre-feet of surface water available in Boysen and Yellowstone Reservoirs

Warren White
December 24, 1980

Page 3

on the Bighorn River. Exxon, on the other hand, uses Lake Oahe in South Dakota as its source of water for synthetic fuel development in the Piceance and Powder River Basins.

Whatever scenario one chooses to chart, water, including groundwater, must be made available for energy technology development and other beneficial uses in the Powder River Basin. These uses will be future uses, but decisions made now can certainly affect such uses.

But it strikes me that no federal strategy exists to ensure that such water will be made available. Will the water use requirement by ETSI forego options for other energy uses. The U. S. Water Resources Council in the Federal Register of October 29, 1980, has stated: "There is a need now for a unified commitment by Federal, State, Local, and Private entities to advance water resources planning management strategies that will ensure that water will be available for energy technology development and other beneficial uses in the Upper Missouri River Basin".

The federal government's report on water for synthetic fuel development flatly states that "water use conflicts will probably arise in the coal-rich Tongue and Powder River Basins". If the federal government wants to develop the synthetic fuel industry, serious consideration must be given as to where and how the water will come from, and satisfy existing and other future uses of water.

It seems to me that BLM should integrate into its report future energy needs of the area in terms of water. Not to do it might work against the federal government's own energy policies.

This office has other concerns raised in the BLM report.

In the report the three major water supply alternatives (Niobrara, Crook County, and Oahe) are stated to be roughly equal in energy efficiency. Further, none of the three are shown to be significantly less damaging environmentally; in fact the Oahe alternative would obviously cause no ground water impact and would benefit 24 South Dakota communities with a domestic water supply. The cause of concern is the treatment of the Oahe alternative in the report. The technical data on the Oahe alternative is presented but never seriously considered as a viable source of water!

The reasons behind the preference of the ground water alternative should be clearly explained. The Oahe alternative would appear to offer substantially increased benefits with fewer adverse impacts, and should be considered in a more in-depth manner by BLM.

Moreover, what is the effect on the environment of a drawdown over a 50-year project life of 20,200 acre-feet. The report focuses on existing users, like the City of Edgemont, South Dakota. But what about future uses - will they be precluded by such large drawdowns of water? Again, this comment relates to future uses like synthetic fuel development.

Warren White
December 24, 1980

Page 4

In conclusion, given the uncertain future of energy development in Wyoming and the associated growth of Wyoming communities, a commitment by BLM should not be made until an energy and water strategy is developed.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Department of Agriculture

TELEPHONE: (307) 777-7321 CHEYENNE, WYOMING 82002

LARRY J. BOURRET, COMMISSIONER

BOARD MEMBERS
LESTER JACOBSON, JACKSON
PRESIDENT
KAZ URIU, WORLAND
VICE PRESIDENT
ROBERT CURRY, VETERAN
BRUCE GOSE, UPTON
FRED HAGEMAN, SHAWNEE
ED HERSCHLER, GOVERNOR
DR. HAROLD TUMA, DEAN
COLLEGE OF AGRICULTURE
UNIVERSITY OF WYOMING, LARAMIE

M E M O R A N D U M

DATE: December 22, 1980

TO: State Planning Coordinator
Wyoming State Clearinghouse

FROM: Don Daiss Don Daiss
Assistant Commissioner
and Liaison Officer for E.I.S. Review

SUBJECT: Energy Transportation Systems Inc. (ETSI) Coal Slurry Pipeline Transportation Project

Attached are the comments of Collin Fallat, Agriculture Planning & Development Division, Department of Agriculture; and of Don Nelson, Wyoming Conservation Commission.

These comments reflect the feelings of the Wyoming Department of Agriculture.

We thank you for the opportunity to comment.

DDjh

Messenger

"AGRICULTURE—the backbone of Wyoming"

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Department of Agriculture

TELEPHONE: (307) 777-7321 CHEYENNE, WYOMING 82002

LARRY J. BOURRET, COMMISSIONER

BOARD MEMBERS
LESTER JACOBSON, JACKSON
PRESIDENT
KAZ URIU, WORLAND
VICE PRESIDENT
ROBERT CURRY, VETERAN
BRUCE GOSE, UPTON
FRED HAGEMAN, SHAWNEE
ED HERSCHLER, GOVERNOR
DR. HAROLD TUMA, DEAN
COLLEGE OF AGRICULTURE
UNIVERSITY OF WYOMING, LARAMIE

DATE: December 16, 1980

TO: Don Daiss

FROM: Collin Fallat CF

SUBJECT: ETSI COAL SLURRY PIPELINE EIS

The following comments on the ETSI coal slurry pipeline EIS have been prepared by the Agricultural Planning and Development Division. Our specific concerns are as follows:

1. The EIS states (Page 3-9) that a series of shale beds isolates the Madison aquifer from important aquifers nearer the surface. The EIS has not addressed the fact that fracturing and faulting within the shale beds could be sufficient to blend the aquifers. If this is the case, important aquifers utilized by the agricultural industry could be adversely affected by any draw-down in the Madison aquifer. Further study is needed to determine if a hydrologic relationship exists between the Madison aquifer and aquifers above it. Additionally, the BLM has failed to adequately document the drawn-down and recovery levels of the Madison aquifer.

2. The EIS does not address the problem of noxious weeds resulting from ground disturbance. The applicant should be required to consult and cooperate with Weed and Pest Districts along any pipeline route.

3. The Department of Agriculture is concerned about the loss of ground-water at two pumping stations proposed in Wyoming. The annual consumption of 60 acre feet of water will be in direct conflict with existing or potential ground-water needs in the vicinity of the pumping stations. A pumping station proposed near Carpenter, Wyoming would be drawing ground-water from an area already designated as a critical ground-water area. The State Engineer has placed a moratorium on the drilling of water wells in this area. ETSI's proposed plans to drill a water well in this area is in direct conflict with a decision made by the Office of the State Engineer.

"AGRICULTURE—the backbone of Wyoming"

Page 2
Don Daiss
December 16, 1980

4. The loss of permanent vegetation along the pipeline could be significant. Placement of a pipeline through rangeland with limited rainfall and high winds could result in a long term loss of grazing production. Compensation must be made to producers for the grazing capacity lost during the period prior to revegetation. Unstable soil and adverse climatic conditions in eastern Wyoming are such that revegetation and erosion control will be difficult even under optimum conditions. If not adequately supervised, and continued over time, reclamation is virtually impossible.

5. A concern should be shown for farmland, falling within the pipeline right-of-way, with construction being scheduled between harvest and planting seasons to prevent any loss of crop production. In the flood irrigated agricultural land particular care must be taken in reclaiming the disturbed area. Any settling of the surface above the pipeline will result in a depression which will alter water flow.

6. Wyoming is already exporting various minerals out of state for the benefit of other states. Wyoming cannot afford to export water, one of its most vital natural resources. Another source of water needs to be found outside of Wyoming's boundaries where the water supply is more abundant. One benefit from the Oake Reservoir alternative is the additional water supply it could potentially provide to communities in western South Dakota.

7. The Wyoming Department of Agriculture takes strong exception to the statement on page 4-61 in the EIS, which states, "that the impact of crop production loss would be relatively minor from a regional standpoint, since it would be spread over 6 states." It is this line of thinking that is contributing to the loss of three million acres of agricultural land in the United States annually. Decision makers have got to understand and mitigate the cumulative affect that eventually results when agricultural land use is altered.

8. Graphic presentation in the EIS is inadequate. Section 1502.8 in the Council on Environmental Quality Regulations related to implementing NEPA, calls for supporting data from the environmental design arts. Reviewers have been provided with little more than a road map with proposed pipeline routes superimposed upon it. The BLM should have provided a series of maps which provided agricultural, environmental and social information.

I hope this review will be of assistance to your efforts.

CF/lms

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming State Conservation Commission
CONSERVATION DISTRICTS

State Conservation Commission

2219 CAREY AVENUE PHONE (307) 777-7321 CHEYENNE, WYOMING 82002

STAFF:
BILL GENTLE
CONSERVATION COMMISSION STATE EXECUTIVE
JOHN OREGE
DISTRICT PROGRAM CONSULTANT
LOU WENZEL
AG WATER QUALITY MANAGEMENT SPECIALIST
MARY NOWAK
SECRETARY
LAURA JOHNSON
SECRETARY

COMMISSION MEMBERS:
LARRY BOURRET
CHAIRMAN (STATE AG. DEPT.)
CHARLES JAMIESON
VICE-CHAIRMAN (AREA V DIRECTOR)
PETER MEIKE, JR.
(AREA I DIRECTOR)
JAMES R.L. MAY
(AREA II DIRECTOR)
STANLEY PREATOR
(AREA III DIRECTOR)
STEVE ADAMS
(AREA IV DIRECTOR)
DR. HAROLD TUMA
(U.W. AG. COLLEGE)
GEORGE CHRISTOPULOS
(STATE ENGINEER'S OFFICE)
EUGENE HARDY
(LIVESTOCK BOARD)
JOHN MILAND
(DEPAD)

December 1, 1980

M E M O R A N D U M

TO: Don Daiss
Assistant Commissioner

FROM: Don Nelson DN
Conservation Commission
Program Consultant

SUBJECT: ETSI(draft)

Attached is a summary of my feelings on the Energy Transportation System, Inc., draft on the proposed coal slurry pipeline as far as the Wyoming portion is concerned.

If you think there should be any additions or deletions, let me know and we'll have a meeting. I don't know what the Departments feelings are on this.

DN:mo

cc: Larry J. Bourret, Chairman, Conservation Commission

Enclosure:

PROTECT OUR HERITAGE
through the
Conservation of Wyoming's Natural Resources

Comments on the Wyoming portion of the
Energy Transportation System Inc., ETSI
Draft by Don Nelson, Program Consultant,
Conservation Commission

ETSI has applied to Blm for permits to cross 6 miles of Federal land and 27 miles of National Grasslands in Wyoming, to construct a coal slurry pipeline. Nothing is said in the report as far as I can see, as to how they, ETSI, will deal with the 66 miles of individual, private landownership. The 100 foot construction right of way would only disrupt about 12½ acres of land per mile for a relatively short period of time during the construction period. This could interfere somewhat with grazing animals and/or farming for a short period of time, depending on the time of year. Most, or in some cases all, of the right of way could be restored to normal use by proper reseeding and vegetation planting, or whatever the landowner or management agency desired. There would be some residual effect from weed growth for possibly a year or two, and some areas might encounter additional erosion for quite a period of time, due to terrain and soil type. We recommend that ETSI consult with the Conservation Districts along the pipeline route. All in all, I don't think the long range impact would be very serious to the farm/ranch community if the landowners are fairly compensated.

It appears that the most serious problem would be the potential water draw down from the Madison aquifer by pumping either the Niobrara or Crook County well fields. This could also lessen spring and stream flows in the area, which would have a detrimental effect on a fairly large area for a long time to come.

Wyoming state laws and stipulations that authorize the withdrawal of Madison formation water require, that ETSI compensate any existing Wyoming water users that are affected by ETSI pumping. Appendix C.2 & C.3 discusses the legalities of this in the back of this draft, Vol. 1.

It appears that the most sensible water approach would be pumping from the Oahe Reservoir in South Dakota. This would cause no drawdowns in Wyominn and could be a great advantage to many South Dakota communities that would receive water from pipeline taps. ETSI would, of course, have to obtain a water right from the state of South Dakota and purchase right of way across 276 miles of Western South Dakota.

There would be some detrimental impact during construction from dust and vehicle emmission from equipment working on the project. This would be comparatively short lived. There would also be some inconvenience to road and highway travel, where the lines crossed, but this would also be of short duration.

If the water problem can be solved so as not to be detrimental to agriculture, urban, and recreational use, I believe the pipeline to be the most ecologically sound.

The no-action railroad alternative would not have the construction phase impact, but would cause problems for the life of the project. There would be a certain amount of air pollution and considerable noise from all of the additional trains. There would be a greater danger to human life due to a possible increase in crossing accidents. The greatest inconvenience would be to many communities on the rail route, having certain portions of town cut off by every passing train. Schools would be cut off, housing areas, hospitals, and others could lose police and fire protection for long periods of time.

The rail system would also use petroleum products for fuel as compared to the pipeline, using electric power generated by coal fired plants.

Warren

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

Water Quality Division

30 EAST GRINNELL SHERIDAN, WYOMING 82801 TELEPHONE 307-672-6488

December 5, 1980

Mr. Robert E. Sundin
Department of Environmental Quality
401 West 19th Street
Cheyenne, Wyoming 82002

Dear Mr. Sundin:

Upon review of the draft Environmental Impact Statement for the ETSI coal slurry pipeline, I have one comment relative to the functions of the Water Quality Division.

There appear to be two types of facilities for which ETSI will be required to obtain Permits to Construct from the Department through the Water Quality Division. These types of facilities are as follows:

1) Septic systems located at pump stations for disposal of sanitary wastewater, and

2) Any pond, located at a pump station or elsewhere, which will store or dispose of coal slurry or water separated from coal slurry.

If you have any questions on this, please contact me. Thank you for the opportunity to comment.

Yours truly,

Tom Mueller

Tom Mueller
District Supervisor

TM/ls

xc: Tony Mancini
Jake Strohman

THE STATE OF WYOMING

Ed Herschler, Governor
Leno Menghini, Superintendent and Chief Engineer

Wyoming State Highway Department

P. O. BOX 1708 CHEYENNE, WYOMING 82001

November 19, 1980

MEMORANDUM

TO: Dick Hartman
State Planning Coordinator

FROM: William P. King, P.E. WPK
Environmental Services Engineer

SUBJECT: Review Comments on ETSI
Coal Slurry Pipeline Draft EIS
State Identifier Number 80-150

All of the action alternatives require crossings of State highways. These will require licenses which are obtained from the Department's District Engineer. The Department must approve the crossing details, and structural design if the crossing requires a structure. This is required for any kind of encroachment -- power lines, pipelines, and access approaches are examples.

The maps indicate that some of the mine mouth loading facilities and operations will be close to State highways, particularly at the North Rawhide and Jacobs Ranch mines. Proposals that involve any adjustment of, access to, or encroachment on State highways must be agreed to and approved by the State Highway Department.

WPK/mg

DANIEL N. MILLER, JR.
DIRECTOR AND
STATE GEOLOGIST
DEPUTY DIRECTOR AND
STAFF GEOLOGIST
GARY B. GLASS
STAFF GEOLOGISTS
RODNEY H. DE BRUIN
W. DAN HAUSEL
DAVID R. LAGESON
ALAN J. VER PLOEG
TECHNICAL EDITOR
DAVID A. COPELAND

THE GEOLOGICAL SURVEY OF WYOMING
UNIVERSITY OF WYOMING
BOX 3008, UNIVERSITY STATION
LARAMIE, WYOMING 82071
Serving Wyoming Since 1933

DEC 11 1980
TELEPHONES
(307) 742-2054
(307) 766-2286

SURVEY ADVISORY BOARD
D. L. BLACKSTONE, JR., LARAMIE
A. THOMAS GRANAM, JR., GREEN RIVER
EDMUND L. (ROY) HEISEY, CASPER
ROBERT S. HOUSTON, LARAMIE
BAYARD D. REA, CASPER

December 9, 1980

Mr. Dick Hartman
State Planning Coordinator
Wyoming State Clearinghouse
2320 Capitol Avenue
Cheyenne, WY 82002

Dear Mr. Hartman:

Gary Glass, Deputy Director/Coal Specialist has reviewed the draft, ETSI Coal Slurry Pipeline Transportation Project (I.D. No. 80-150) and has made a comment which is attached.

If your office or any other state agency would like us to reexamine any part of this draft for any specific purpose, please feel free to ask.

Sincerely,

Rodney H. De Bruin
Rodney H. De Bruin
Staff Geologist

RHDB:eb

Geology--Interpreting the past to provide for the future

DANIEL N. MILLER, JR.
DIRECTOR AND
STATE GEOLOGIST
DEPUTY DIRECTOR AND
STAFF GEOLOGIST
GARY B. GLASS
STAFF GEOLOGISTS
RODNEY H. DE BRUIN
W. DAN HAUSEL
DAVID R. LAGESON
ALAN J. VER PLOEG
TECHNICAL EDITOR
DAVID A. COPELAND

THE GEOLOGICAL SURVEY OF WYOMING
UNIVERSITY OF WYOMING
BOX 3008, UNIVERSITY STATION
LARAMIE, WYOMING 82071
Serving Wyoming Since 1933

TELEPHONES
(307) 742-2054
(307) 766-2286

SURVEY ADVISORY BOARD
D. L. BLACKSTONE, JR., LARAMIE
A. THOMAS GRANAM, JR., GREEN RIVER
EDMUND L. (ROY) HEISEY, CASPER
ROBERT S. HOUSTON, LARAMIE
BAYARD D. REA, CASPER

MEMORANDUM

To: State Planning Coordinator

From: Gary B. Glass, Deputy Director

Subject: Environmental Impact Statement, Coal Slurry Pipeline

Date: December 9, 1980

After reading this statement, I still cannot tell whether the ETSI coal slurry pipeline is displacing 25-35 million tons of coal presently shipped by rail or whether it plans to ship coal tonnage not yet committed to railroad haulage. The answer to this question has an obvious bearing on the overall economic impact of the proposed slurry pipeline and therefore requires a more definitive treatment.

Geology--Interpreting the past to provide for the future

DEC 23 1980

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Economic Planning and Development

BARRETT BUILDING CHEYENNE, WYOMING 82002 PHONE (307) 777-7284

JOHN NILAND
EXECUTIVE DIRECTOR

MEMORANDUM

TO: Dick Hartman

FROM: Cynthia K. Ogburn CKO

DATE: December 22, 1980

SUBJ: ETSI Environmental Impact Statement (Socioeconomic Section) #80-150

This slurry pipeline which ETSI proposes should have minimal socio-economic impact in Campbell, Weston and Converse Counties. Niobrara County will be the hardest hit with a 20 percent increase in population. The EIS points out that Niobrara County will have a 50 percent increase in property taxes, from $2.53 million to $3.83 million. It does not mention that most of this population increase will reside in Lusk which will not be receiving a large increase in its tax base.

No mention is made in the EIS as to how the Town of Lusk, which has never experienced impact, will deal with the potential problems. Among these are housing, fire, law enforcement, medical staff and facilities, sewer, water, streets and other public services and facilities. These potentially serious problem areas should be addressed and solutions found by ETSI before it begins construction in Niobrara County.

"Quality Growth Centers in a Quality Living Environment"

THE STATE OF WYOMING EXECUTIVE DEPARTMENT

ED HERSCHLER GOVERNOR

Office of Industrial Siting Administration

SUITE 500 BOYD BUILDING CHEYENNE, WYOMING 82002 TELEPHONE: 307-777-7368

December 22, 1980

Mr. Richard E. Taylor, Project Leader
Bureau of Land Management
Special Projects Staff
3rd Floor, East
555 Zang St.
Denver, CO 80228

Dear Mr. Taylor:

We have reviewed the Draft Environmental Statement on the ETSI coal slurry pipeline project. Our comments are as follows:

1.F.5 INTERRELATIONSHIP OF PROPOSED ACTION WITH OTHER PLANNED PROJECTS

Table 1-7 does not accurately reflect the number of construction projects currently planned for Campbell and Converse Counties between 1983 and 1990. Projects which should be included in Table 1-7 and in the cumulative impact assessment are listed below:

Project	Company
Coal	
Rawhide Expansion	Carter
East Gillette	Kerr-McGee
Rojo Caballo	Mobil
North Antelope	Peabody
Rochelle	Peabody
Wymo	Wymo Fuels
Belle Ayre	Amax
Eagle Butte	Amax
Black Thunder	Arco
Uranium	
North Butte	Cleveland Cliffs
Sand Rock Project	Conoco
Synfuels	
WyCoal Gas	Panhandle Eastern

Other	
N.A.*	Burlington-Northern

* Not Applicable

4.A.1 WATER RESOURCES

Groundwater

During the scoping process the public identified their major concern as the effect ETSI would have on groundwater supplies. According to the DES the effects of removing 20,200 acre feet of water per year from the Madison were determined using a numerical model. In order to better serve the public needs the FES should summarize the inputs into this model and the method(s) used to determine the aquifer characteristics. This summarization should include the transmissivity, storage coefficient, major assumptions, etc. used in the study.

Chapter 4 identifies the criteria used to determine the significance of the impact the proposed action would have on water resources. Impacts would be considered significant if either:

(1) drawdowns exceeded 25 feet,

(2) streamflows were reduced more than 0.5 cfs, or

(3) measurable water quality changes occurred.

The DES states that if the Niobrara well field (the agency preferred alternative) is used drawdowns greater than 25 feet will occur within a region of 5,300 square miles, several stream flows will be reduced more than 0.5 cfs and measurable water quality changes will occur. The FES should elaborate on the fact that the agency preferred alternative for use of the Niobrara well field exceeds the criteria used to determine if the impact is significant.

Two of the pumping scenarios that the DES evaluates include the use of water from the Gillette well field. The amount of water available to ETSI from the Gillette well fields was calculated as the difference between the maximum amount of water that the well field could produce and the amount Gillette needs to meet user demands. This calculation, however, does not accurately reflect the availability of water from the Gillette well field. The City of Gillette signed an agreement with Pacific Power

and Light Company (PP&L) on April 28, 1980. This agreement gives PP&L the "right and option to purchase any water which may be surplus to the needs of the City for its municipal customers." Therefore, unless PP&L relinqueshes their right or the Gillette well field is shown to have the capacity to serve the needs of Gillette, PP&L and ESTI, it should not be considered as an alternative source of water.

We agree with the DES that there are uncertainties and complexities involved in predicting future use of the Madison. However, for the benefit of the public, the FES should include a determination of when the Madison would fully recover from the ETSI pumping if there were no other Madison users.

Figure 4-3 on page 4-12 was omitted from the text.

Surface Water

The statement is made that stream crossing construction is scheduled to occur during low flow to minimize the likelihood of flooding during construction. Figure 1-2 depicts assumed construction schedules and shows stream crossing construction occurring in all four quarters. The FES should address this discrepancy.

4.A.2 SOCIOECONOMIC CONSIDERATIONS

The DES addresses several adverse socioeconomic impacts that will occur as a result of the proposed action. These include:

(1) Housing for fixed-site construction workers will be severely limited in the Gillette Planning Area and Lusk.

(2) The population of Lusk will increase over 20 percent for more than two to three years.

(3) Lusk will receive very little increase in tax revenues from the ETSI project.

(4) The proposed action will have a negative net fiscal impact on Gillette, Campbell County and the Campbell County School District.

We agree that the factors listed above will result in an adverse impact. The cumulative socioeconomic impacts from energy development in northeast Wyoming represent totally unacceptable impacts if they are not mitigated. Other energy companies in the region, are making substantial efforts to mitigate the impacts associated with their projects. However, since the socioeconomic impacts of a project cannot be isolated, the substantial

efforts made by other companies will be for naught if the impacts of a major construction project such as ETSI are not mitigated. It should be noted that the ETSI project was authorized by the Wyoming State Legislature prior to the passage of the Industrial Siting Act, and hence, is exempt from the permit provisions of the Act which would otherwise require mitigation of the socioeconomic impacts of the project. It should also be noted that the Office of Surface Mining has included stipulations for mitigation of socioeconomic impacts in their approval of mine plans under the authority of the National Environmental Policy Act. Unless an appropriate strategy is developed to mitigate the socioeconomic impacts of the project, we consider it to represent an unacceptable impact to the human environment. Therefore, the FES should address mitigating measures that would alleviate these impacts.

4.A.3 SLURRY PIPELINE RUPTURES AND SPILLS

According to the DES an evaluation was made on the impacts that could result if a rupture or spill should occur. It was determined that the impacts could range from insignificant to significant. The DES did not include a discussion of what mitigating measures ETSI should take if a spill occurred (e.g., clean up, restocking of fish, etc). The FES should include a discussion on these measures.

4.A.4 VEGETATION

The statement is made that "actual impacts on vegetation would be generally insignificant and for the most part temporary." However over 6,000 acres of land will be deforested for at least 50 years. This should be considered a significant long term impact.

The DES states that a few small areas where adequate vegetation cannot be established and maintained would require critical area treatment with continuing erosion control measures. The FES should outline what critical area treatment is and quantify the amount of area involved.

4.I. NO-ACTION ALTERNATIVE

The DES addresses the problems experienced by towns divided by railroad tracks such as delays for emergency equipment. The FES should give an estimate of the length of these delays.

APPENDIX C-7

Operating features for preventing and minimizing spills are give in Appendix C-7. Two of the methods used for identifying spills were regularly conducted aerial reconnaissance and ground patrols. It is agreed that both

Mr. Richard Taylor
Page 5
December 22, 1980

of these methods are useful in detecting potential problems and identifying spills. However, the time interval between inspections plays a crucial role in the effectiveness of a program of this nature. Therefore, the FES should address the frequency of inspections.

We appreciate the opportunity to comment on this DES, and we hope our review will assist the BLM in preparing their FES.

Sincerely,

Richard C. Moore, P.E.
Director

RCM/sm

DEC 18 1980

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Game and Fish Department

CHEYENNE, WYOMING 82002

EARL M. THOMAS
DIRECTOR

December 16, 1980

EIS L3/338 SIN #80-150
Energy Transportation
Systems, Inc. (ETSI)
Coal Slurry Pipeline
Campbell, Converse,
Niobrara, & Goshen

Mr. Dick Bartman,
State Planning Coordinator
2320 Capitol Avenue
Cheyenne, Wyoming 82002

Dear Dick:

Our Fisheries Division personnel have reviewed the subject DES and find impacts associated with the proposed action insignificant. Impacts and mitigation measures for other alternatives, however, were inadequately covered. If any water source other than the Niobrara Well Field (proposed action) is selected, additional alalysis of aquatic impacts is needed.

Volume 1.

Page 1-25, DEQ authorization should include 401 certification for all activities requiring 404 permits and issuance of water quality discharge permits.

Page 3-60, Fish descriptions included several references but failed to include the Wyoming Game and Fish Department. Since this department is the fisheries management agency for Wyoming, this oversight is significant. Fisheries data are inadequate without the display of information available from this source.

Page 3-62, paragraph 1 mentioned species considered rare in Wyoming by Clark and Dorn (1979). This reference should be either deleted throughout the EIS or qualified. It represents only the opinions of those two individuals and not any agency or legal classification. The publication titled Current Status and Inventory of Wildlife in Wyoming also should have been consulted.

Mr. Dick Bartman
December 16, 1980
Page 2, L3/338

Page 4-7, Table 4-3 illustrates changes in groundwater discharge rates to streams and springs. From this information we recommend selection of Plan 1; Niobrara Well Field only. If any other plan is selected, additional detailed analysis should be conducted and presented. Potential dewatering effects of the other plans are inadequately assessed and mitigated in the EIS.

Page 4-8, Map 4-1 depicts drawdown to a minimum of 25 ft. While this is generally sufficient, proximity to the North Platte River and the Laramie River cause concern. The Laramie River is at times the main supply of water to the North Platte below its confluence. Effects of any further flow reductions should be carefully scrutinized before authorizing this project. There is no way of knowing from the map whether the 24 foot drawdown line extends 5 feet or 50 miles from the 25 foot line or what effects, if any, would occur in stream flow.

Page 4-17, last paragraph, first column, describes flow reductions of 2 cfs for Sand Creek and 1 cfs for the Belle Fourche River. Other options throughout the EIS would dewater these streams by various amounts. If any option is selected which would dewater these streams, detailed site specific analysis of impacts should be made. These streams are too important to dismiss impacts based on a generalization.

Page 4-17, paragraph three, column two, describes hydrostatic testing. Extreme impacts could result from haphazard hydrostatic testing. All hydrostatic testing should be done in such a manner that no introduction of pollutants in excess of Wyoming water quality standards or stream channel degradation occurs.

Page 4-56 represents this section of the Belle Fourche River as a Class IV stream. Our inventory currently lists this as a Class III stream.

Technical Report - Aquatic Biology.

Pages 2-1, 2-2 and 2-3 display fisheries data but fail to present information available from our Department.

Page 2-12. Previous comments regarding the Clark and Dorn (1979) publication apply here also. Fisheries data are inadequate--again fail to use current information from our Department.

Pages 2-18 and 2-19 again fail to use current species composition data available for the Belle Fourche River. Its current classification is Class III, not Class IV as presented.

Mr. Dick Bartman
December 16, 1980
Page 3, L3/338

Page 2-21, previous comments regarding the Clark and Dorn (1979) publication apply.

Page 3-8 again incorrectly lists the Belle Fourche River as Class IV. Release of water from Keyhole is suggested to compensate for a 2 cfs decrease in flows downstream. The EIS states that apparently additional 2 cfs releases would not significantly affect the reservoir fisheries. Data on inflow and outflow quantities are needed to verify this statement before it can be accepted.

Possible flow reductions of 5 cfs in Sand Creek are related to this option. Sand Creek is the only Class I stream in northeastern Wyoming. Any proposal to dewater this stream should receive careful site-specific assessment to quantify and mitigate any habitat loss.

Page 3-12, paragraph 2, says that heavy equipment will be refueled outside of river channels, when possible. This should either always be done or specific measures outlined to assure that spillage and contamination will not occur.

Page 3-37 cites instream flow reductions. Previous comments again apply.

Technical Report - Threatened and Endangered Species.

Page A-3, Table A-1 includes four federally endangered species for Wyoming that have not been documented here. The Kendall Warm Spring dace is the only federally endangered fish species presently known to occur in Wyoming. Three state listed species are presented on page A-4. This listing is incorrect as Wyoming has no endangered species law.

The Clark and Dorn (1979) publication is cited in this report. Previous comments apply and this document should be corrected.

When review by the Game Division of these documents is completed, their comments will be sent in addition to these. If we may be of furhter assistance on this project please contact us.

Sincerely,

W. DONALD DEXTER,
ASSISTANT DIRECTOR, OPERATIONS
WYOMING GAME AND FISH DEPARTMENT

WDD:mlr

cc: Fred Eiserman, ETSI
Richard E. Traylor, BLM, Denver
Game Division
Fish Division

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

ED HERSCHLER
GOVERNOR

January 6, 1981

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

Enclosed are some additional comments on the ETSI coal slurry pipeline draft environmental impact statement. Please consider these comments as an addendum to the state agency comments which we submitted on December 31, 1980. Thank you.

Sincerely,

Paul Cleary

Paul Cleary,
Natural Resource Analyst

PC:dt
enclosure

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

Water Quality Division

30 EAST GRINNELL SHERIDAN, WYOMING 82801 TELEPHONE 307-672-8488

December 5, 1980

Mr. Robert E. Sundin
Department of Environmental Quality
401 West 19th Street
Cheyenne, Wyoming 82002

Dear Mr. Sundin:

Upon review of the draft Environmental Impact Statement for the ETSI coal slurry pipeline, I have one comment relative to the functions of the Water Quality Division.

There appear to be two types of facilities for which ETSI will be required to obtain Permits to Construct from the Department through the Water Quality Division. These types of facilities are as follows:

1) Septic systems located at pump stations for disposal of sanitary wastewater, and

2) Any pond, located at a pump station or elsewhere, which will store or dispose of coal slurry or water separated from coal slurry.

If you have any questions on this, please contact me. Thank you for the opportunity to comment.

Yours truly,

Tom Mueller

Tom Mueller
District Supervisor

TM/ls

xc: Tony Mancini
Jake Strohman

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

ED HERSCHLER
GOVERNOR

January 15, 1981

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

Enclosed are some additional comments submitted by the Game and Fish Department on the ETSI coal slurry pipeline draft environmental impact statement. Please consider these comments as an addendum to the state agency comments which we submitted on December 31, 1980. Thank you.

Sincerely,

Paul Cleary

Paul Cleary,
Natural Resource Analyst

PC:dt
enclosure

JAN 13 1981

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Game and Fish Department

CHEYENNE, WYOMING 82002

EARL M. THOMAS
DIRECTOR

January 15, 1981

EIS L4/338 SIN #80-150
Energy Transportation
Systems, Inc. (ETSI)
Coal Slurry Pipeline
Campbell, Converse,
Niobrara, & Goshen

Mr. Dick Hartman,
State Planning Coordinator
2320 Capitol Avenue
Cheyenne, Wyoming 82002

Dear Dick:

The following comments on this project were provided by our Game Division personnel to supplement those included in our letter of December 16, 1980. They found that the terrestrial wildlife section is quite thorough and that data were both accumulated and analyzed.

We did find, however, that the document understates the impacts of the no action alternative. If the no action alternative is selected, impacts to the area could be greater than those of constructing the pipeline. These impacts would include all impacts associated with transport of coal by rail or possibly those from burning the coal in Wyoming. Water use population increases, and wildlife habitat losses of the no action alternative could be much greater without the pipeline.

Please forward these comments to the appropriate agencies.

Sincerely,

W. DONALD DEXTER,
ASSISTANT DIRECTOR, OPERATIONS
WYOMING GAME AND FISH DEPARTMENT

WDD:HBM:mlr

cc: Game Division
Fisheries Division

Department of Local Affairs
Colorado Division of Planning

Philip H. Schmuck, Director

State Clearinghouse
State Cartographer
State Demographer
Land Use Commission
208 Water Quality

STATE OF COLORADO 1876

Richard D. Lamm, Governor

January 7, 1981

Mr. Richard E. Traylor
Office of Special Projects
Bureau of Land Management
555 Zang Street
Denver, Colorado 80228

SUBJECT: Draft Environmental Impact Statement
ETSI Coal Slurry Pipeline

Dear Mr. Traylor:

The Colorado Clearinghouse has received the above-referenced Draft Environmental Impact Statement and has distributed it to interested state agencies. Comments received from Colorado Department of Highways, Division of Planning, Colorado Historical Society, Office of Energy Conservation, Division of Water Resources and the Division of Wildlife are enclosed for your information.

Thank you for the opportunity to review this matter.

Sincerely,

SOEllis

Stephen O. Ellis
Chief Planner

SE/SG/vt
Enclosures

cc: Office of the Governor
Department of Highways
Department of Local Affairs
Colorado Historical Society
Office of Energy Conservation
Department of Natural Resources

520 State Centennial Building, 1313 Sherman Street, Denver, Colorado 80203 (303) 839-2351

STATE OF COLORADO 1876

COLORADO STATE DEPARTMENT OF HIGHWAYS

December 22, 1980

DEC 24 1980
DIV. OF PLANNING

Mr. Philip H. Schmuck
Director
Colorado Division of Planning
520 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

Dear Mr. Schmuck:

The Colorado Department of Highways has completed its review of the Draft Environmental Impact Statement for the ETSI Coal Slurry Pipeline and has the following comments.

The document does not discuss the permitting requirements or impact mitigation measures associated with highway and rail crossings. Should the Colorado alternative be selected this will need to be addressed. We have previously supplied a list of permits which this Department would require for the proposed pipeline.

Thank you for the opportunity to review this document.

Very truly yours,

Harvey R. Atchison
Director
Division of Transportation Planning

By Art Ruth for
Barbara L.S. Chocol
Manager
Impact Evaluation Branch

REG/rg

4201 EAST ARKANSAS AVENUE DENVER, CO 80222 (303) 757-9525

Department of Local Affairs
Colorado Division of Planning

Philip H. Schmuck, Director

State Clearinghouse
State Cartographer
State Demographer
Land Use Commission
208 Water Quality

STATE OF COLORADO 1876

Richard D. Lamm, Governor

M E M O R A N D U M

DATE: December 18, 1980

DEC 23 1980
DIV. OF PLANNING

TO: Steve Ellis
Colorado Clearinghouse

FROM: Philip H. Schmuck
Division of Planning

Phil

SUBJECT: Bureau of Land Management, ETSI Coal Slurry Pipeline Draft EIS #79-121

The Division of Planning has reviewed the foregoing EIS and offers the following comments:

The Colorado alternative route, if selected, would result in the disturbance of 7,446 acres of land in the north central and northeastern portion of the state and would require about 90 acre feet per year of water to satisfy pump station requirements. The Division of Planning can find in the Draft EIS no compelling reasons for the selection of this alternative route and does not support its selection. This Division urges that the Final EIS be amended to include consideration of local master plans and regulations regarding pipelines and the preservation of agricultural lands and how these local plans and regulations would impact or be impacted upon by the Colorado portion of the proposed project.

PHS/amn

520 State Centennial Building, 1313 Sherman Street, Denver, Colorado 80203 (303) 839-2351

COLORADO
HISTORICAL
SOCIETY

The Colorado Heritage Center 1300 Broadway Denver, Colorado 80203

December 29, 1980

RECEIVED DEC 30 1980

Mr. Stephen O. Ellis
Principal Planner
A-95 Clearinghouse
420 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

Dear Mr. Ellis:

This office has reviewed the ETSI Coal Slurry Pipeline Draft Environmental Impact Statement, #79-121 (BLM).

The Bureau of Land Management has outlined on page 4-58 in the above document certain provisions for the management of cultural resources to comply with Executive Order 11593 and the National Preservation Act as amended. Once these conditions have been adhered to, in consultation with this office, in accordance with 36CFR800, compliance will be achieved.

However, on page 4-59 under Construction, History and Prehistory, when previously unknown subsurface archaeological resources are identified in the course of the project, the adverse impact of construction must be interrupted until the resources are properly evaluated in terms of the National Register of Historic Places eligibility criteria (36CFR1202.6) in consultation with this office.

If this office can be of further assistance, please contact the Compliance Division at 839-3392.

Sincerely,

Arthur C. Townsend

Arthur C. Townsend
State Historic Preservation Officer

ACT(WJG)bf

STATE OF COLORADO

OFFICE OF ENERGY CONSERVATION
Office of the Governor
1525 Sherman Street
Denver, Colorado 80203
Phone (303) 839-2507

Richard D. Lamm
Governor
Joseph H. Zettel
Acting Executive Director

DEC 18 1980
DIV. OF PLANNING

DATE: December 17, 1980

TO: Colorado Clearinghouse

FROM: David Ford

SUBJECT: ETSI Coal Clurry Pipeline Draft EIS #79-121

The Office of Energy Conservation has reviewed the Draft EIS and offers the following comments.

The Draft EIS has ignored the Council on Environmental Quality's Guidelines pertaining to the preparation of Environmental Impact Statements, specifically those which require a study of alternatives to the proposed action including those which could significantly conserve energy. (Council on Environmental Quality, Preparation of Environmental Impact Statements: Guidelines, 40 C.F.R. 1502, 43 Fed. Reg. 55994 and 44 Fed. Reg. 873.) OEC feels that this is a significant deficiency of the DEIS. The consideration of the role that energy conservation and use of renewable resources can play in meeting the energy demands of the area to be served by the proposed slurry pipeline project must be a major component of the EIS.

The Draft EIS has included a fairly comprehensive energy analysis of the proposed alternatives. This study does not include, however, energy which would be consumed in the construction of the 1828 miles of pipeline, nor the 23 pumping stations which would be required for the development of the preferred alternative. It is also not clear whether the energy required to pump the production well water through 62 miles of gathering lines to the well-field pump station is included.

As the energy efficiency comparison now stands, the preferred alternative is less energy efficient than an all-rail mode which would utilize an existing infrastructure. Delivering energy to consumers in the most energy efficient manner should be favored as it is generally the least costly. It must be emphasized that the preferred alternative selected in the Draft EIS substitutes a less energy efficient system of delivery under the guise of national security. This trade-off must be recognized.

DF:PJ:pl

RICHARD D. LAMM
Governor

J. A. DANIELSON
State Engineer

DIVISION OF WATER RESOURCES

Department of Natural Resources
1313 Sherman Street - Room 818
Denver, Colorado 80203
Administration (303) 839-3581
Ground Water (303) 839-3587

December 5, 1980

DEC 9 1980
DIV. OF PLANNING

MEMORANDUM

TO: STEPHEN O. ELLIS, STATE CLEARINGHOUSE

FROM: HAL D. SIMPSON, ASSISTANT STATE ENGINEER

SUBJECT: ETSI COAL SLURRY PIPELINE, DRAFT EIS

We appreciate the opportunity to review and comment on the above Environmental Impact Statement concerning the Colorado Alternative with respect to its impact on the water resources of Colorado. Upon review of the Statement, the following comments are presented for your consideration:

1. If a Colorado Alternative is selected, the appropriate well permits will be needed for the supplemental water supplies.

2. The Colorado Alternative should state what impacts could occur in constructing the pipeline across irrigation ditches and the possible interference with headgate structures. This should be presented in Section 3.D. of the Statement.

3. A complete investigation of water availability should be conducted and impacts cited concerning the 90 acre-feet of supplemental water required for the pipeline alternative in Colorado.

We would have no objection to the project provided the construction is conducted in accordance with all applicable state water statutes and water users rights-of-ways.

HDS/JMS:mvf

Hal D. Simpson
Hal D. Simpson, P.E.

cc: Jim Clark, Div. Eng.

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
Jack R. Grieb, Director
6060 Broadway
Denver, Colorado 80216 (825-1192)

COLORADO DIVISION OF WILDLIFE

December 18, 1980

DEC 22 1980
DIV. OF PLANNING

TO : Stephen O. Ellis
Colorado Clearinghouse

FROM: Al Whitaker
Wildlife Program Specialist

SUBJ: ETSI Coal Slurry Pipeline - Draft EIS

Appropriate personnel of this Division have reviewed the above-referenced document. We offer the following comments.

Construction across cultivated farm lands should not present a problem for the state's wildlife. However, construction through the Sandhills area northwest of Wray could cause abandonment of a prairie chicken strutting ground. This construction in this area should take place during the months of June through December. Reclamation must be with native species.

All river crossings are of great concern to this agency. Construction at these crossings should take place during periods of low flow to minimize siltation of the river course. Reclamation of these sites must be complete and accomplished with native plant species. The goal of reclamation should be to return the area to its previously undisturbed state. Herbicides must not be used for vegetation control anywhere along the pipeline.

Some measure of protection for the pipeline should be initiated at stream crossings to prevent stream pollution in the event of a line break. We know that water lines are routinely embedded in concrete where they cross water courses.

We greatly appreciate the opportunity to comment on this proposal.

/d
cc: D. Bogart

99

Wyoming State Legislature

213 Capitol Building, Cheyenne, Wyoming 82002 - Telephone 307-777-7881

REPRESENTATIVE MARLENE J. SIMONS
Crook County
Windy Acres Ranch
Beulah, Wyoming 82712
Committee:
Agriculture, Public Lands and Water Resources

December 30, 1980

To Richard E. Traylor
ETSI EIS Project Leader
3rd Floor, East
555 Zang Street
Denver, Colorado 80228

Gentlemen:
The Enviromental Impact Statement on the Energy Transportation System Proposed to Wyoming is not an adequate statement as it does not adequately address the impact on the Northeast Corner of Wyoming and the Northwest Corner of South Dakota, as to what will happen to the water tables in the immediately future. My understanding is that the Gillette water system can not be used for the pipeline because of an agreement with the State Farm Loan Board and the Crook County Commissioners. This permit for deep water was granted for municipal use only. The Legislation says that there will not be permits granted if servere impact is shown and the statement certainly does just that but not adeqeuately. We have had two very dry years with streams ponds and springs dry that were not dry even in the thirtys. Deep concern must be shown for the effect on Agricultural if the water supply has a draw down of any degree. There are other damns in South Dakota that were not even mentioned as sources of Water and alternative sources of slurry that do not require this precious resource. Why were these not discussed in the Eis???? Also the pipe size ----is it available in the states or do we have to import it?????

There are Madison wells alreddy in Newcastle, Sundance, Hulett, Oshoto, Upton, and Gillette---What will happen to there supplies??? The alternatives of water from Crook County and Niobrara County should be far down the list for sources of water and only after all other sources of slurry have been researched should water from such an arid area even be discussed. The Concept of the pipeline is fine but the sources for slurry are questionable when the livelehood of the people living in the area could be at stake.

A second Impact Statement should address all other sources of slurry materials, and surface waters not deep water alternatives should be considered first. Every county effected should have a chance for a hearing including Montana.

Wyoming State Legislature

213 Capitol Building / Cheyenne, Wyoming 82002 / Telephone 307/777-7881

REPRESENTATIVE MARLENE J. SIMONS
Crook County
Windy Acres Ranch
Beulah, Wyoming 82712
Committee:
Agriculture, Public Lands and Water Resources

Page 2

The Statement talks of 37.5 Thousand acre feet of water when the legislation talks of 20 thousand acre feet. Why????

I would appreciate being kept informed of the progress of this statement and your decisions. Thank you for your time.

Sincerely,
Marlene Simons
Representative Marlene Simons
Crook County
Windy Acres
Beulah, Wyoming 82712

Oklahoma Department of Pollution Control

Box 53504 • N.E. 10th & Stonewall • Oklahoma City, Oklahoma 73152 • (405) 271-4677

Lawrence R. Edmison, J.D.
Director

Ralph O. Campbell
Programs Director

December 31, 1980

Richard Traylor, ETSI Project Leader
Office of Special Projects
Bureau of Land Management
555 Zang Street, Third Floor East
Denver, Colo. 80228

Re: Adequacy of Draft EIS for the ETSI Coal Slurry Project

Dear Mr. Traylor:

After reviewing the draft EIS provided by your office, the Oklahoma Department of Pollution Control would offer the following considerations for inclusion in the final EIS:

1. Draw Down of Water Tables-

   Additional information is needed to identify proposed methods by which ETSI plans to meet its responsibilities for providing adequate water supplies to affected parties during the expected 50 year project life. More specifically, how will future populations be treated and how will water supplies for individuals be continued as opposed to water supplies used by multiple parties.

2. Contingency Spill Plan-

   A contingency plan should be worked out and incorporated into the EIS prior to any federal, state or local permit issuance.

3. Treated Slurry Water-

   The permit requirements necessary for slurry water discharge to meet established water quality standards needs to be ascertained in detail. The EIS should then address the plans for treating and handling slurry water at the terminals based on these known permit requirements.

Richard Traylor
December 31, 1980
Page 2

4. Hydrostatic Test Water Discharge-

   The risk associated with discharge resulting from ruptures during hydrostatic testing is understood and appreciated. However, every effort should be made to control any discharge not resulting from a rupture. No hydrostatic test water should be allowed to be discharged unless it can be controlled and will not violate any established water quality standards or cause any environmental damage. In addition, any waters taken from within a State should be accompanied by proper water use permits and receive adequate treatment after use to meet acceptable water standards before final discharge.

   Additional information on test sites, water use per site, discharge site and quantity, and necessary treatment to meet discharge site standards should be included in the EIS.

5. Stream Crossing Data-

   The data presented in the draft EIS does not included any information on the bed material for Oklahoma.

   In addition, the Illinois River and Barren Fork Creek have not been included in Table 3-26 under Scenic and Recreational Waterways Crossed (Both of which are State Scenic Streams in Oklahoma and both of which would be crossed by the proposed alternative route).

Respectfully,
Ralph D. Campbell
Ralph D. Campbell
Program Director

RDC:bs

Office of the Governor
STATE OF SOUTH DAKOTA

William J. Janklow
GOVERNOR

January 6, 1981

Mr. Richard Traylor
ETSI Project Leader
Bureau of Land Management
555 Zang St., Third Floor East
Denver, Colorado 80228

Dear Mr. Traylor:

Enclosed please find the State of South Dakota's official comments on the Bureau of Land Management's Draft Environmental Impact Statement for the ETSI Coal Slurry Pipeline Proposal. The comments were compiled by this state's Department of Water and Natural Resources, but I take this opportunity to personally state that the draft document is inadequate and almost cavalier in its attitude and treatment of impacts to South Dakota. The draft document should be rewritten and circulated again for public comment.

Sincerely yours,

William J. Janklow

WJJ:wnj

State Capitol Building Pierre, South Dakota 57501 (605) 773-3212

State of South Dakota

Comments on Draft Environmental Impact Statement
on ETSI Proposed Coal Slurry Pipeline

Prepared by
South Dakota Department of Water and Natural Resources

Presented to
Bureau of Land Management
U.S. Department of Interior

January 6, 1981

TABLE OF CONTENTS

Introduction

The Department of Water and Natural Resources (DWNR) has been designated as the lead agency for the State of South Dakota in preparing comments on the draft environmental impact statement (EIS or DEIS) which has been prepared by the Bureau of Land Management (BLM) for the Energy Transportation Systems Incorporated (ETSI) proposed coal slurry pipeline project.

The DEIS has been reviewed by staff members of DWNR's Offices of Water Quality, Drinking Water, Water Rights, Geological Survey, Water Development, and Water Policy. In addition to DWNR staff, it has been reviewed by staff of the State Planning Bureau, Department of Game, Fish, and Parks, and Department of Agriculture. The comments of the other State agencies are generally incorporated into the text of this comment document; however, in addition, specific written comments from the other agencies are included in Attachment 1.

The comments presented herein are supplemental to the verbal comments presented at public hearings in Rapid City and Edgemont on December 15 and 16, 1980, (Attachment 2) and are directed toward areas in which the State of South Dakota perceives the DEIS and the NEPA process to be inadequate and unsatisfactory.

The DEIS and its proposed activities are inadequate in several respects. First, the process used to develop the DEIS was flawed, necessarily producing an unacceptable product. Second, the DEIS itself inadequately addresses alternatives, impacts, and mitigation measures, and its choice of the preferred alternative water source rests on a

conclusion not allowed the lead agency, BLM, by pertinent rules. Finally, and perhaps most important, the DEIS is obviously written to justify a conclusion already reached by ETSI, the State of Wyoming, and, apparently, the BLM itself. In violation of Section 102(2)(E) of NEPA, 42 USC 4332(2)(E), the BLM has used the DEIS process to rationalize the choice of ETSI and the State of Wyoming for a water supply. NEPA, in contradiction to the process employed, requires a rigorous analysis to determine if ETSI's choice is, in fact, the correct one. In the following pages this document will set out, in as constructive a manner as possible, the details supporting these conclusions.

A. The Process Employed Was Flawed

The State of South Dakota respectfully submits that the process used by BLM in the development of this EIS was insufficient in two respects. First, the liaison with the state was inadequate to issue full consideration of South Dakota's concerns. Second, the scoping process used was inadequate.

1. Inadequate liaison with South Dakota

In establishing the Council on Environmental Quality (CEQ) in § 103 of NEPA, Congress authorized the CEQ to adopt rules for the implementation of the act. 40 CFR Part 1501 addresses "NEPA and Agency Planning." One of the purposes of this part of the rules is:

> Emphasizing cooperative consultation among agencies before the environmental impact statement is prepared rather than submission of adversary comments on a completed document. 40 CFR § 1501.1(b).

In implementing their purpose the rules require that in cases involving the issuance of a permit the federal agency shall consult "early with appropriate State and local agencies and Indian tribes and with interested private persons and organizations when its own involvement is reasonably forseeable." 40 CFR § 1501.2(d)(2). In addition, the lead agency shall request the participation of cooperating agencies at the earliest possible time and use the environmental analysis and proposals of cooperating agencies to the maximum extent possible. 40 CFR 1501.6(a)(1), 1501.6(a)(2). The definition of "cooperating agency" is broad enough to include state agencies by means of agreement. 40 CFR § 1508.5.

In addition to these specific requirements, other sections of the rules consistently reinforce this concept of cooperative action with the states. Agencies are to cooperate with the states to reduce duplication. "(S)uch cooperation shall to the fullest extent possible to include: (1) joint planning processes ...." 40 CFR § 1506.2(b)(1). Environmental assessments and statements on applications to an agency are to begin no later than immediately after receipt of the application. "Federal agencies are encouraged to begin ... earlier, preferably jointly with applicable State or local agencies." 40 CFR § 1502.5(b).

Overlying these specific avenues for liaison with the states, the rules specifically state that "NEPA's purpose is not to generate paperwork - even excellent paperwork - but to foster excellent action." 40 CFR § 1500.1(c). Environmental information must be available to public officials and citizens before decisions are made and before actions are

3

taken. 40 CFR § 1500.1(b). In order to accomplish this overlying purpose of comprehensive decision-making, states that will be vitally and adversely affected by the proposed action, as will South Dakota in this case, must be closely involved in the early stages of environmental analysis.

The record of the BLM in involving South Dkaota in the DEIS is deficient. By letter of January 7, 1980, to Governor Janklow, BLM requested South Dakota's participation in "an eight-state Advisory Committee," the purpose of which was "to discuss and/or identify work schedules, public involvement, techniques, and possible locations for public meetings, significant issues associated with the proposal, State actions that would be involved, and any data that would be useful in preparing the EIS." (Letter from Richard E. Traylor to Governor William J. Janklow dated January 7, 1980.) This committee met on January 22, 1980, in Denver. The meeting minutes, dated January 24, 1980, indicated several things of importance to South Dakota. First, the DEIS would be delayed two months for completion of the USGS study on the Madison Formation. Second, although the Wyoming representative stated the water issue in that state was not yet decided and was likely to end up in court, studies would continue because of the existence of the Oahe alternative water source. Thirdly, that there would be a meeting in each state to discuss information requested by BLM and issues or questions raised by state agencies about the project. In spite of the fact that the agenda for the January 22 meeting labelled the gathering as "Meeting No. 1" and listed its last item as "Future Ad Hoc State Committee Meetings," no further meetings of this committee

4

was called by BLM or, if they were called, South Dakota was not invited.

While BLM did request early participation of South Dakota in the NEPA process, see 40 CFR 1501.6(a)(1), by doing so and by subsequent acts described above it led the state to believe that the DEIS would await the USGS report on the Madison Formation. This complete report is yet to be issued.

BLM led the state to believe that in spite of water problems in Wyoming, the EIS studies would continue because of the existence of the Oahe alternative. Yet, in the DEIS, BLM shirks its responsibility to fully consider the West River Aqueduct as the preferred alternative on the grounds that the Wyoming water right existed and that the issuance of a water right is a state perogative outside BLM's jurisdiction. South Dakota was led to believe by BLM statements and requests for information, that Oahe water would be fully considered when all BLM did was excuse itself from full consideration of that option. The state was told it would be involved in future Ad Hoc meetings - there were no such meetings.

For these reasons the liaison with the State of South Dakota was inadequate to ensure full consideration of all important issues in the NEPA process. The state was led to believe its cooperation in development of the DEIS was being requested, but consultation on important issues never materialized.

2. <u>South Dakota was not given equal or adequate consideration in the scoping process.</u>

5

> There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping. 40 CFR § 1501.7.
>
> As part of the scoping process the lead agency shall: (1) Invite the participation of affected Federal, State and local agencies, and affected Indian tribes, the proponent of the action, and other interested persons (including those who might not be in accord with the action on environmental grounds)... 40 CFR § 1501.7(a)(1).

South Dakota does not claim that the notice of intent was not published in the Federal Register as required by 40 CFR § 1501.7. The state does claim, however, that the attention given to South Dakota in the scoping process evidences the inadequate consideration given the state's concerns in the entire NEPA process.

Scoping of the EIS originally involved a series of hearings designed to identify important issues. No scoping hearing was scheduled for South Dakota by BLM. Upon discovering this and at the request of local citizens, Governor Janklow requested a scoping meeting in Edgemont for August 22, 1979. BLM responded indicating that "additional public meetings may not be warranted" and suggested an alternative of a meeting between key BLM staff, BLM's consultant, and state and local agency people to discuss the project and any data that may assist in assessing impacts. This meeting was finally held on October 10, 1979, in the Edgemont High School. 230 persons attended this meeting compared to the 469 attendees at the nine scheduled scoping meetings. <u>ETSI Coal Slurry Pipeline Proposal: a Report on Public Involvement in Identification of the Issues,</u> BLM, November 16, 1979 at 8. BLM states in its report on the scoping process

6

Design of the issue identification process began in the early summer of 1979. State government officials in all states crossed or affected by the proposed ETSI coal slurry pipeline route and a major alternative route were contacted by BLM. These officials were asked whether it would be appropriate to hold a scoping (issue identification) session or sessions in their respective states. Id at 7.

South Dakota has no record of ever being contacted in this manner. In addition, the report of the scoping process indicates that attendees at the meeting held in other states had an opportunity to cast ballots identifying the most important issues related to the proposal. No such opportunity was given the attendees at the meeting in Edgemont. In fact, BLM describes this meeting as being sponsored by the South Dakota Department of Water and Natural Resources, which was responsible for requesting the meeting, apparently disclaiming it as a BLM meeting or part of its official scoping process.

While representatives of the City of Edgemont attended the Gillette, Wyoming, scoping meeting and BLM states that issues raised at the Edgemont meeting were considered in scoping the EIS, Id at 13, it is apparent that South Dakota was given short shrift in the design of the scoping process in violation of 40 CFR §1501.7(a)(1) and that South Dakotans were not given an opportunity to affect the weight of the issues to be considered equal to that afforded the residents of other states. If South Dakota affected the scoping process at all, it was through the initiative of its individual citizens and the requests of state government rather than the sensitivity of BLM to South Dakota concerns.

In conclusion to this section, the state submits that the NEPA process, while leading South Dakota and its citizens to believe that its concerns would be rigorously investigated, was, in fact, conducted in a manner that could not have possibly done so. The following portions of these comments illustrate that this was exactly the result.

B. Inadequacies of the Hydrological Model

DWNR geologists and hydrologists have numerous questions and comments regarding assumptions, data, calculations, and conclusions utilized in the modeling effort as described in the Well-Field Hydrology Technical Report (WFHT Report). These questions and comments which relate to such important factors as recharge, leakage, transmissivity, and storage which could lead to substantial changes in the predicted drawdowns and impacts on groundwater levels and surface water flows are listed below:

1. The model's predictions are based on very limited data for a large and very complex geohydrologic system. We believe that the model does not adequately predict impacts of the proposed withdrawal because the complexity of this particular natural system does not lend itself to a prediction of satisfactory accuracy by numerical modeling techniques. Both the structural geology and the varied and complex geohydrology of the formations (both aquifers and confining layers) present in the area makes accurate predictions impossible.

2. The drawdowns predicted by the model do not correlate with previous studies conducted by others; therefore the modeler discredits all other attempts claiming this new attempt is the most valid. We question the basis for ignoring previous results.

3. Data is very inconclusive in major areas that are of concern in determining the amount of drawdown expected in South Dakota. There is difficulty in determining leakage down through overlying units

as the Madison is being pumped. How were the leakage values used in the model determined? Were any calculations made indicating the amount of water vertically leaking between individual formations? Could the head loss values generated by the model be duplicated using values for leakage which are not realistic? A second difficulty is determining the degree of hydrologic connection at the fault line of the Old Woman anticline. Another major problem is the large range of transmissivities reported. These range from 3,000 gpd/ft. up to 200,000 gpd/ft. The lower the transmissivity value the greater the drawdown and picking accurate transmissivity values is very subjective. If leakage is small from the overlying rock units, then the potentiometric surface drawdown will be on the higher end of estimates made, possibly 1,000 feet at Edgemont. If the Old Women Fault creates an impermeable barrier, it may cause very steep drawdowns next to the fault. This in turn will mean that more water will come from the opposite direction (towards the Black Hills) and create greater drawdowns in that direction compared to drawdowns if the fault transmitted water freely. The highest drawdown will be expected if the fault creates a barrier and the overlying aquifers do not leak readily to the Madison.

4. Why were sensitivity analyses not utilized to determine the effects on predicted results assuming different values for transmissivity, storage, leakage, recharge and other factors to provide a basis for assessing the accuracy of the model results? There are concerns about the range of errors which are inherent when trying to model such a complex aquifer with a karst topography. Why were the most

optimistic values for recharge, transmissivity and storage utilized in the model?

The following comments and questions relate to specific statements in the Well-Field Hydrology Technical Report.

5. PAGE 3 - 1 - Paragraph 1

It is doubted that the Madison Aquifer system includes units from the Precambrian basement rocks to the Cretaceous shales except in south-central South Dakota where the Madison recharges the basal Cretaceous sands.

6. PAGE 3 - 7 - Paragraph 1

Even using the terminology of this report, the unit that produces oil in southwestern South Dakota is Pennsylvanian in age; therefore, using this terminology, production is from the lower Minnelusa (see Comment 12).

7. PAGE 3 - 7 - Paragraph 2

States that "the Fall River Formation of the Inyan Kara Group is an important aquifer in Niobrara and Crook Counties;...". It is also an important aquifer in Fall River and Custer Counties in South Dakota.

8. On Page 3 - 8 - Paragraph 2 it states "Water movement in the Madison Aquifer system is influenced by the geologic structure in the Black Hills and eastern Powder River Basin region." These structural features are complex, and the model does not include the

most recent structural geology data obtained in the USGS Madison Formation Regional Analysis. (Reference: verbal comments presented by Donald L. Brown, formerly in charge of geologic investigations involved in the Madison Project, at the Public Hearing in Edgemont on December 16, 1980.)

9. PAGE 3 - 18 - Paragraph 3

Spring discharge from the Madison measured by Rahn and Gries is used as the lower limit for the recharge rate. An analysis of springs issuing from the Madison indicate actual recharge from the Madison may be less than 87 cfs (62,875 acre-feet per year). This estimate is based on water quality, but it is somewhat more scientific than merely looking at a spring and declaring it issues from the Madison. If the previous estimate were used the lower limit for recharge would equal not 139,000 acre-feet/year but 62,875 acre-feet/year. In other words, Rahn's and Gries' work did not under estimate Madison recharge but over estimated the lower limit of recharge by 100 percent.

10. PAGE 3 - 27 - Paragraph 4

Ground-water recharge to the east and northeast of the Black Hills was calculated to be 54 cfs (39,000 acre-feet/year). Thus, projected water use will consume more than half of the total recharge to the east and northeast.

11. PAGE 3 - 38 - Paragraph 2

If each of these lithologic units function as a separate hydrologic unit why is it maintained that there is rather unrestricted communication between the upper Minnelusa and the Madison. Wouldn't this have to occur through the middle Minnelusa which acts as a hydrologic entity? Page 3 - 44 shows that water produced from the same location has TDS of 2020 from the Upper Minnelusa and TDS of 300 from the Madison. The water from the Upper Minnelusa compares very favorably with water from LAK Springs with TDS 2110 and does not appear to be derived from the Madison. Does this illustrate communication?

12. PAGE 3 - 48 - Paragraph 3

It should be mentioned that oil is produced from the lower Minnelusa in Custer and western Fall River Counties, South Dakota.

13. PAGE 3 - 48 - Paragraph 4 (last sentence)

"No published inventory of Inyan Kara Group wells is known to exist."

Ground Water Reconnaissance Study of the State of Wyoming. Wyoming Natural Resources Board, 1962 by George F. (Pete) Dana, which is an inventory of all known wells in Wyoming and numbers 10,782 wells and lists producing units is available. Also available is Groundwater Resources of the Western Half of Fall River County, South Dakota. Report of Investigations No. 109, Jack R. Keene, South Dakota State Geological Survey, 1973.

14. PAGE 4 - 1 - Paragraph 1 - last line

". . .to model the aquifer system and simulate system response to pumping."

Question: This report considers rocks ranging in age from Precambrian to lower Cretaceous in age. Does this mean that figures showing drawdown in the Madison actually show drawdown in Mississippian, Pennsylvanian, Permian, Triassic, Jurassic, and Lower Cretaceous rocks?

15. PAGE 4 - 8 - Paragraph 4

Why does the author use water quality to indicate hydraulic connection between the Madison and the Bell Sand and ignore water quality and assume that Rahn's and Gries's estimate of spring discharge is correct when water quality shows that their estimate is wrong. The author also suggests communication between Upper Minnelusa and Madison through the Minnelusa confining unit (page 4-7) even though it has bad quality water (p. 3 - 38 and Table 3 - 6). How does this fit into the conceptual model?

16. PAGE 4 - 14 - Paragraph 4 states that "The model assumes regional transmissivity of the Madison aquifer is a function of well-developed zones of secondary porosity and permeability in the Madison aquifer. These zones are assumed to be randomly distributed." The basis for these assumptions are not adequately justified in the report.

17. PAGE 4 - 16 - Paragraph 3

Based on water quality calculations, a reasonable aquifer recharge rate would have a lower estimate of 62,875 acre feet--not 150,000 acre-feet.

On the basis of water quality calculations, transmissivity should range between 0.0075 to 0.030 square feet per second to produce reasonable aquifer recharge rates (73,000 to 300,000 acre-feet/year in the Black Hills). The author used the highest possible maximum figure of 0.03 square feet per second for an assumasd uniform transmissivity value? Again, how does this fit into the conceptual model in terms of quality water?

18. PAGE 4 - 17 - Paragraph 2

Here they use water quality to differentiate units where in other cases they ignore water quality.

Same comment for next paragraph.

19. PAGE 4 - 18 - Paragraph 2

For comments on this paragraph perhaps we should quote Tullis and Gries, Black Hills Engineer, South Dakota State School of Mines, December 1938, p. 245). "As noted by Newton (1880) the caverns in the Pahasapa limestone commonly occur in the upper half of the formation, an observation confirmed by the writers with two exceptions, one of them Crystal Cave which is in the middle of the formation (Johnson, 1919, p. 2) and the other, Rushmore Cave which

appears to be in the lower part of the formation." (Pahasapa Limestone = Madison Limestone)

Is it justifiable in suggesting on page 4 - 16 that just because the bit dropped when they encountered the top of the Madison, therefore caves do not exist at the base of the Madison, and therefore the transmissivities of the upper part of the Madison may be an order of magnitude 300 times larger on the top of the Madison than near the base of the formation?

20. PAGE 4 - 19

Minnelusa section - No mention is made of the lower Minnelusa member although hydraulic conductivity and transmissivity of the upper member is covered thoroughly. The part of the conceptual model was referred to on pp. 4 - 5 and Fig. 4 - 3 as the "Minnelusa Confining Unit". Would like to see some discussion inserted in text.

21. PAGE 4 - 21 - Paragraph 5

First, there is the rather arbitrary assumption of 3.3×10^{-7} storage coefficient. Secondly, this assumption was stretched to cover the entire Minnelusa Formation. Third, a uniform thickness of 1000 feet was used for calculating the storage coefficient of the upper Confining unit. If this coefficient is correct how can there be a "Minnelusa Confining Unit?"

22. PAGE 4 - 21 - Last Paragraph

If water is to be released from storage in the Minnelusa confining unit, then can we conclude that water levels in the Fall River-Lakota aquifers will decline?

23. PAGE 4 - 22

Leakage coefficient between the Red River-Madison and the Madison-Upper Minneluse should be reviewed. Aren't they saying that upward leakage is greater than downward leakage?

24. PAGE 4 - 23 - Paragraph 3

The vertical hydraulic conductivity of 5×10^{-8}ft/sec for the Minnelusa confining unit, which was used to compute the leakage coefficient of 10^{-10}sec^{-1}, is reasonable for clastic rich carbonates (Freeze and Cherry, 1979). . . . Thick evaporitie beds generally exist in the lower part of the upper member. Is this leakage coefficient reasonable for evaporite beds also?

25. PAGE 4 - 24 - Paragraph 1

Recharge rate of 230 cfs = 456 ac-ft/day = approximately 166,512 ac-ft/yr. Although ETSI's use of 20,000 ac/ft is approximately 12 percent of recharge over the entire model area it should be emphasized that it will probably be concentrated in some areas and may exceed local recharge rates.

26. Figure 5 - 1 following Page 5 - 2 shows the drawdowns in the Madison potentiometric surface in the Black Hills region in 1980 caused by pumping by present Madison Group water users, e.g., Edemont - 25' Newcastle $\doteq$ 100', Osage - 200'.

Figures 5 - 12, 5 - 14, 5 - 16, and 5 - 18 which show drawdowns after 50 years of pumping by ETSI and present users under various plans do not include the 1980 drawdowns from present users shown in Figure 5 - 1. This is very misleading. Figures should be provided in the report which are cumulative to show the total drawdown to be expected at the end of the 50 year period.

27. PAGE 4 - 23 - Paragraph 1 states that "The vertical hydraulic conductivity of the Minnelusa confining unit could not be defined from aquifer pump tests results or from recorded potentiometric declines near wells which have been pumping from the Madison for long periods of time. The Minnelusa confining unit has not been stressed enough by the short-term withdrawals, and the necessary data have not been collected near pumping wells to permit the calculation of the leakage coefficient. The aquifer tests conducted at the Niobrara and Gillette well fields were initially thought to contain information on leakage from the Minnelusa Formation to the Madison Group, but the numerical model used in this study to explain the aquifer test behavior was unable to clearly discern the magnitude of leakage from the Minnelusa Formation."

This statement illustrates the unknown leakage factors between aquifers overlying the Madison Formation.

28. PAGE 6 - 9 - Paragraph 3 states that "The University of Wyoming Water Resources Research Institute is presently making a Minnelusa water-well inventory in northeastern Wyoming. After this well inventory has been completed, a representative number of wells near

the chosen ETSI well site should be selected for the monitoring network to observe Minnelusa water levels and water quality. The monitoring procedures and schedule should follow the procedure outlined for the Madison wells above. These Minnelusa Formation wells will be useful in helping to measure impact on the Minnelusa aquifer system and in <u>observing</u> the amount of leakage that <u>may</u> be induced by ETSI's well-field development."

Note that this statement again suggests the uncertainty in leakage amounts and subsequent drawdowns.

29. Page H-32 offers the following conclusions about the use of the model for the Madison aquifer on the western flanks of the Black Hills:

1. The hydraulic behavior of the Madison aquifer can be best described with a conceptual model similar to that proposed. However, because the exact areal distribution of the high-transmissivity zones is not known, regional assessments of the aquifer have to be based on models that use an effective average of the properties of the high- and low-transmissivity zones.

2. Estimates of some Madison aquifer system properties that may be important factors in the long-term regional assessment cannot be obtained from the analysis of short-term pumping tests.

3. Analysis of short-term Madison aquifer tests may produce misleading results unless it is clear that the physical system is reasonably described by the prototype model.

4. Conclusive documentation of aquifer system properties that may lead to regional assessments based on the proposed conceptual model will be available only when the effects of large-scale, long-term water production are carefully observed.

The above conclusions clearly indicate that the results of the model are only estimates based upon assumptions and that the results are affected by scientific uncertainty.

The following comments and questions relate to specific statements in the Draft Environmental Impact Statement, volume 1.

30. PAGE 7 - left column

Agriculture (line 7) "The primary agricultural concern . . . . would be long-term loss of . . .lands at surface facility sites." An additional concern should be the limitation of livestock watering and irrigation in the Black Hills area due to lowering of the potentiometric head and the increased energy costs because of increased lift.

31. PAGE 3 - 2

"The Madison aquifer system is a regional system composed of geologic units from the Precambrian age basement rocks to the Cretaceous age shales."

~~31. PAGE 3 - 2~~

~~"The Madison aquifer system is a regional system composed of geologic units from the Precambrian age basement rocks to the Cretaceous age shales."~~

REMARKS

Under no stretch of the imagination does the Madison aquifer system contain rocks as old as Precambrian and as young as the Cretaccous shales. The Madison aquifer does discharge water to the Dakota Artesian System in the eastern part of south-central South Dakota. Beyond that point neither the Madison nor the "Madison aquifer system" exist. Only when the water from the Madison reaches the top of the Dakota Sandstone does the water contact Cretaceous Shales. If BLM is going to include the Dakota System in the "Madison Aquifer System" perhaps they should compute the long-term drawdown of the Dakota in South Dakota.

32. PAGE 3 - 21

"Sulfate and TDS concentrations in the Madison increase with distance from the outcrop areas."

A comparison of total dissolved solids (TDS) of (1) springs a short distance from the Black Hills, versus (2) wells withdrawing water from the Madison a greater distance from the Black Hills, suggests water quality improves with distance from the Black Hills.

(TDS values ppm)

(1)	(2) (TDS values ppm)
LAK Springs (TDS 2110)	Newcastle City (TDS 350)
Spearfish Springs (TDS 1250±)	Spearfish City (TDS 260)
	Belle Fourche (TDS 237)
Cascade Springs (TDS 2530)	Edgemont City (TDS 1151)
	Igloo (TDS 1280)
Evans Plunge (TDS 1553)	Hot Springs (TDS 436 & 878)
	Niobrara Well Field (TDS 400-500)

From the above it appears that the general statement of TDS increasing with distance from the Black Hills is incorrect. This inconsistency has not been addressed in the EIS.

33. PAGE 3 - 22

"No water, oil, or gas is produced from the Minnelusa Formation in northwestern Nebraska."

REMARK

But there are a <u>number</u> of oil and gas fields developed in the Minnelusa in Wyoming and South Dakota. If there is communication between the Madison and Minnelusa as the EIS suggests, will ETSI be liable for the pressure depletion that may affect production from these oil and gas fields?

34. PAGE 4 - 11 - Paragraph 2

States "only greater than 25 feet of drawdown in oil fields." However, the model indicates that Southwest Fall River County can expect 400 feet of drawdown. That's certainly greater than 25 feet!

35. PAGE 4 - 11

"Several small oil fields that produce from the upper part of the Minnelusa"

REMARKS

We are not too well acquainted with the oil fields in Wyoming, but do know that two or more oil fields produce from the Haydan Formation which underlies the Wendover Meek Formation whose top marks the top of the Pennsylvanian sediments and consequently constitute the lower one-third of the Minnelusa Formation in South Dakota. Thus, the question is, "What happens to the oil fields which are developed in the <u>lower</u> part of the Minnelusa?? Map 4- 1 shows potentiometric surface would decline 450 feet.

36. PAGE 4 - 11

". . .decline in water level. . .in the Minnekahta Limestone, the Spearfish Formation, the Sundance Formation, the Hulett Sandstone and the Inyan Kara Group. . .would be small. . .but decline in the <u>potentiometric head in confined portions of these aquifers were estimated</u> to be as <u>large as 90 percent of</u> those calculated for the Madison Aquifer."

REMARKS

This is a very important statement that was not elaborated on. The consequences of this should be investigated more completely and reported!!

The above-listed questions and comments related to the hydrological modeling effort all point out the inadequacies and uncertainties associated with determining the impacts on the Madison formation and overlying aquifers from withdrawing 20,200 acre-feet per year from the Madison formation for use in ETSI's proposed coal slurry pipeline project.

A few years ago, Congress appropriated approximately $11 million for the USGS to study the hydrology and geology of the Madison formation. This appropriation was prompted primarily by ETSI's proposal to withdraw water from the Madison and one of the objectives in the USGS Plan of Study was to evaluate the effects of ETSI's proposed withdrawal. To date, this USGS study report has not been completed. Our Office of Geological Survey has been advised by the USGS that a great deal more data on the Madison formation geohydrological system is available within that agency than was utilized by Woodward-Clyde in the <u>Well Field Hydrology Technical Report.</u> This additional data has not been made available to the public. However, USGS personnel have advised that the data should be available by the spring of 1981 (verbal communication between Merlin Tipton, South Dakota Geological Survey and Al Clebsch, USGS, November, 1980). Since the results of modeling such a complex geohydrologic unit with only limited data are subject to questions of accuracy and interpretation, we recommend that the draft

EIS not be finalized and that the model be re-run when the additional USGS information becomes available. Those results should be circulated for comment and the environmental impacts should be re-evaluated. The use of all available data can only make the model results more accurate.

In conclusion, BLM did not meet its requirements under NEPA because it did not consider all available information in evaluating the impacts to the Madison Formation and overlying aquifers, and it did not present a worst-case analysis even though the results of the hydrological model are fraught with scientific uncertainties.

ETSI

C. <u>The Impacts on South Dakota are Inadequately Addressed</u>

The draft EIS and accompanying technical reports predict major impacts on South Dakota from withdrawal of 20,200 acre-feet of water per year from the Madison Formation for use in ETSI's proposed coal slurry pipeline. These impacts are related primarily to 1) lowering of the potentiometric surface (water level) of the Madison and other aquifers, 2) reduction in spring and stream flows, and 3) deterioration of water quality. The relevant facts and the inadequacies of the draft EIS associated with the identified impacts are discussed in the following sections.

1. <u>Lowering of the Potentiometric Surface</u>

The most obvious impact of the proposed ETSI project will be the lowering of the potentiometric surface of the Madison aquifer and other artesian aquifers over large areas of western South Dakota (no matter which well field site or combination thereof is decided upon). Present and future users in South Dakota of the Minnelusa, Madison, Inyan Kara Group, and other aquifers will be adversely impacted due to increased pumping lifts and associated increased costs, installations of pumps and appurtenant equipment, providing power supplies to wells which cease flowing, replacement of wells which are unsuitable for pump installation, replacement of wells which are totally dried up or are no longer capable of producing adequate water, loss of water for irrigation and other beneficial uses, and other associated impacts. (Reference p. 4-11 to 4-14 of the draft EIS which states that the decline in the potentiometric head in the confined portions of the Minnekahta Limestone, Spearfish Formation, Sundance Formation, Hulett

Sandstone, and the Inyan Kara Group were estimated to be as large as 90 percent of those calculated for the Madison Aquifer.) Although the impacts predicted on groundwater quality appear to be minimal, waters of marginal quality for irrigation or other purposes may be adversely impacted. Areas dealing with groundwater that are not adequately addressed in the draft EIS are listed bleow.

a. A large number of farmers and ranchers in Fall River and Custer Counties rely on the Inyan Kara Group (Lakota and Fall River Formations) for domestic and livestock watering uses. An inventory of water wells in the Western half of Fall River County was completed by the South Dakota Geological Survey in 1973. (Reference: Ground Water Resources of the Western Half of Fall River County, South Dakota, Report of Investigation No. 109; Jack R. Keene, South Dakota Geological Survey, 1973.) This report would contain a partial inventory of existing wells. The draft EIS does not identify the number of individuals who will be impacted, the magnitude of the impacts, or who is responsible for mitigation of adverse impacts.

b. The proposed Niobrara County well field would affect large portions of Custer and Fall River Counties. The report states that existing Madison and Minnelusa water users would have increased pumping lifts and that substantial flow reduction would occur in many of the flowing wells. Other affected aquifers are also used in this area.

How many individuals in South Dakota will be impacted?
What will be the economic, physical and environmental magnitude of the impacts?
How will the adverse impacts be mitigated?

27

Who will mitigate the impacts?
Will existing groundwater rights be interfered with?
(A list of existing water rights are available upon request).

c. The proposed Crook County well field would affect a large portion of Butte and portions of Lawrence and Harding Counties. The report states that many existing Madison and Minnelusa water users would have increased pumping lifts and that substantial flow reduction would occur in many of the artesian wells. Other affected formations such as the Spearfish and Sundance formations are also used in this area.

How many individuals in South Dakota will be impacted?
What will be the economic, physical and environmental magnitude of the impacts?
How will the adverse impacts be mitigated?
Who will mitigate the impacts?
Will existing groundwater rights in South Dakota be interafered with? (A list of existing water rights are available upon request).

d. Good quality groundwater in arid Western South Dakota is an extremely valuable resource. A substantial portion of the recharge to the Madison formation for the proposed project would originate in South Dakota and likewise a substantial portion of the recharge of the entire Black Hills area would be used by the proposed project. What future beneficial uses of groundwater in Western South Dakota will be foreclosed by the development of this project? What are the impacts of this sacrificed use on the economy and quality of life in South Dakota?

28

e. The Minnelusa Formation which is located above the Madison aquifer contains high concentrations of total dissolved solids. With the projected drawdowns for the Madison aquifer and the acknowledged leakage expected from the Minnelusa, we are concerned that significant deterioration of water quality in the Madison aquifer will occur. We believe that additional modeling using different assumptions should be developed to further define potential water quality impacts, especially within localized areas which are projected to have substantial reduction in potentiometric surface.

If water quality deterioration occurs to the extent of eliminating or limiting existing beneficial use of the water:

How will the impacts be mitigated?
Who will mitigate the impacts?

f. There are numerous natural caves located in the Black Hills area, including Jewel and Wind Cave National Monuments. These caves derive much of their natural beauty and value from flowing underground water and its associated formation of stalagmites, stalagtites, and other features.

How will the proposed ETSI withdrawal from the Madison formation impact these natural caves and National Monuments?
How and by whom will adverse impacts be mitigated?

The comments identified above relating to lowering of the potentiometric surface are all based on the total inadequacy of addressing specific impacts and mitigating measures for the State of South Dakota. Therefore and in conclusion, BLM did not meet its

29

requirements under NEPA because it did not specifically address significant adverse environmental impacts expected to occur in South Dakota, nor did it propose any mitigation measures for expected adverse impacts.

2. Reduction in Flow of Streams and Springs

Perhaps the most significant environmental impacts which would result from the proposed Madison formation withdrawal would be the reduction of streamflows and spring flows in the Black Hills. The model does not appear to be able to predict what the effects would be on the reduction of flows from many small springs and streams which are extremely important from an ecological systems viewpoint, are important to the economy of the state, and are very fragile ecosystems. The Well Field Hydrology Technical Report also does not adequately explain how it derived its predictions. The reduction of flow of the larger springs and streams which the model does predict together with the unpredicted reductions in small springs and stream may seriously impact existing water uses, localized aquatic habitats, fisheries, abilities of the streams to assimilate wastes, etc. Depletions of streamflows and spring flows due to the ETSI withdrawal from the Madison is especially serious because it will cause a reduction, not in the flows due to runoff, but in the base flows. It is the base flows which sustain streams and springs during droughts and periods of very low flows. That is, the project will aggravate conditions during dry periods because base flows will be reduced. Many streams receive the majority of their flow from base flows. Past records indicate that, during any 50 year period, occurrence of one or more severe droughts is very

30

likely. Statistical analyses should have been incorporated in the DEIS to more accurately evaluate the probability of such an event, because drought conditions, combined with a reduction in base flows would cause serious impacts to fisheries and other aquatic resources, instream beneficial uses, and other established water uses and rights, and may cause violations of the South Dakota Surface Water Quality Standards (ARSD 34:04).

Streams are an important aspect of the Black Hills attractiveness for recreation and tourism, thereby having a major influence upon the area's economy. In Pennington County, for example, there is a fishing demand of 361,474 user-days and a supply of 316,753 user-days. Hence, a deficit of 44,721 days exists, indicating the inordinately high demand for fishing opportunity within this area.

Consumptive requirements presently tax existing water supplies. The situation has been intensified by past decline of natural streamflow due to closure of the forest canopy. Rain waters that once permeated the vegetation and entered the ground water table are now intercepted by trees and evaporated back into the atmosphere. Remaining streamflow is generally fully appropriated for agricultural, domestic, and industrial uses. Any further reduction of flow will intensify competition for water within the region.

Examples of areas impacted by reduction of surface water flows which are not adequately addressed in the draft EIS are identified below.

a. We do not believe that predictions can be made with any degree of accuracy close to the recharge area and near the springs. The

structural geology near these areas is complex and is believed to be the controlling factor. Without a site specific investigation, these impacts are impossible to determine. Detailed geologic mapping and identification of springs and the sources of these springs need to be undertaken to evaluate the impacts of the proposed withdrawal from the Madison formation. The WFHT Report does not adequately explain how it derived its predictions of stream and spring flow reductions. In summary, South Dakota is concerned that reductions in stream and spring flows may be significantly higher than those values presented in the draft EIS.

b. According to the draft EIS, withdrawal of 20,200 acre feet of water per year from the Madison formation in the proposed Crook County well field would reduce base stream flows in South Dakota by 11 CFS. Many of the stream segments in this area are fully appropriated with long established adjudicated rights.

> How will this impact existing water uses and water rights in South Dakota? (A list of existing water rights are available upon request.)

c. According to the draft EIS, withdrawal of 20,200 acre feet of water per year from the Madison formation in the proposed Niobrara County well field would reduce base stream flows in South Dakota by 7 CFS.

> How will this impact existing water uses and water rights in South Dakota? (A list of existing water rights are available upon request.)

d. The draft EIS lists 28 individual springs (Table 3-1) in South Dakota that will have from a 1 to 4 cfs decrease in discharge rates; however, it does not identify which ones would experience the decrease nor to what extent. Of these 28 springs, the annual discharge of 20 of them is, at present, 4 cfs or less. A 1-4 cfs decrease in annual discharge may virtually eliminate the springs. The draft EIS also does not examine the impact that elimination of the springs would have on the terrestrial wildlife that depend on this water source. Neither is there any discussion of measures to mitigate the impact this will have on either wildlife or agricultural interests. There are additional springs and seeps in the Black Hills feeding trout streams such as French Creek, Battle Creek, and Beaver Creek (to name only a few) that have not been mentioned in the draft EIS. The draft EIS does not identify whether such springs receive water recharge from the Madison Aquifer or whether these will be lost or affected. If these springs are adversely affected, the impact on wildlife in Custer State Park, Wind Cave National Monument, and the Norbeck Wilderness Area would be severe.

e. The South Dakota Department of Game, Fish and Parks (GF&P) is gravely concerned over the long term effects of this project on the streams in the Black Hills area. Water yield to the Black Hills streams is currently one of the major problems presently confronting fish management in the Black Hills. Low stream flows caused by withdrawals, pine forested interception, evapotranspiration and channelization has diminished the fishable trout waters from 1,004 miles in the early 1900's to less than 270 miles in 1964. Pumping the Madison formation to the extent planned under the proposed action

would affect many streams in the Black Hills be reducing the base flows. This would be disastrous to trout streams especially during the months of July through November. It is reasonable to suspect that during the dry months of the year all the streams in the southern and eastern Black Hills would be incapable of maintaining trout fisheries as they presently exist. GF&P and DWNR have conducted investigation of minimum stream flow requirements for some Black Hills streams and this information is available upon request.

Additionally, it is quite possible that operation and production of Cleghorn Springs State Trout Hatchery, which is currently operating on minimum spring flows, would be seriously curtailed or put out of operation. Likewise, if Spearfish Creek flows are affected to the extent indicated in the draft EIS, McNenny National Fish Hatchery located northwest of Spearfish could be seriously affected.

While the draft EIS concentrates on basin mainstems because flow duration data are generally only available for these mainstem stream sections, it assumes that tributary streams would be biologically altered to a greater extent than their mainstems. Thus Coxes Lake, Crow Creek, Redwater Creek and other waters of the northern hills are not mentioned nor impacts to them addressed. The same can also be said for numerous small streams in the southern hills. We agree with the aforementioned assumption and feel the proposed plan would seriously impact the Black Hills fishery.

f. In accordance with SDCL 34A-2, all surface waters in the state have been classified for specific beneficial uses in the <u>South Dakota Surface Water Quality Standards</u> (ARSD 34:04). The beneficial uses have been determined and assigned based on the public interest and the present and future capability of each respective stream to support a given type of use. In addition to beneficial use classifications, the South Dakota Surface Water Quality Standards also specify limitations on physical, chemical, and biological parameters which must be met in order to protect the classified beneficial uses. Beneficial uses contained in the regulations include:

(1) Domestic water supply waters;

(2) cold water permanent fish life propagation waters;

(3) Cold water marginal fish life propagation waters;

(4) Warm water permanent fish life propagation waters;

(5) Warm water semipermanent fish life propagation waters;

(6) Warm water marginal fish life propagation waters;

(7) Immersion recreation waters;

(8) Limited contact recreation waters;

(9) Wildlife propagation and stock watering waters;

(10) Irrigation waters; or

(11) Commerce and industry waters.

A copy of the South Dakota Surface Water Quality Standards are included as Attachment 3.

Several important cold water fishery streams are likely to be affected by reduced flows. These streams and their beneficial uses are listed in Table 1.

Table 1

Stream	Beneficial Uses
Redwater River	2,8,9,10
Spearfish Creek	1,2,7,8,9,10
North Fork Elk Creek	2,8,9,10
Elk Creek	2,7,8,9,10
Rapid Creek	1,2,7,8,9,10
Castle Creek	2,8,9,10
Boxelder Creek	2,8,9,10
Spring Creek	3,7,8,9,10
Grace Coolidge Creek	2,8,9,10
French Creek	3,8,9,10
Beaver Creek	2,8,9,10
Fall River	1,3,8,9,10
Battle Creek	2,8,9,10

There is no indication in the draft EIS of how the reduction in stream flow would affect the ability of Black Hills streams to support the classified beneficial uses nor what minimum flows would be retained such that the suitability of each respective stream to support its beneficial uses will not be impaired. Before the impacts of a Madison aquifer drawdown may be adequately assessed, it will be necessary to determine instream flows required for support of each beneficial use.

In addition to the streams in the Black Hills, three major rivers lying outside the Hills would also be impacted by decreased inflow from Hills tributaries. These include the Belle Fource River, the Little Missouri

River, and the Cheyenne River. Lesser tributaries within the Hills, however, would be more adversley affected, since flow within these streams is more directly dependent upon the Madison formation. During drought periods, for example, flow from springs provides the only water source to these streams.

Surface flow reductions will manifest several adverse effects on water quality including increased water temperatures, lowered dissolved oxygen, increased silt deposition, and decreased assimilation capacity of streams for both point and non-point pollution. Given that demand for cold water fisheries is increasing, the few remaining miles of high quality trout waters are of paramount importance to local residents and to the tourism industry. Degradation of these streams would cause severe negative impacts to tourism, industry, agriculture, fishing, domestic uses and to the region's economy.

9. Most of the streams in the Black Hills are classified as water quality limited segments under the U.S. Environmental Protection Agency's Continuing Planning Process established pursuant to Section 303(e) of the Federal Clean Water Act. This means that wastewater dischargers to these streams must meet more stringent effluent limitations than those required for secondary treatment in the case of municipal dischargers and for technology based limitations in the case of industrial dischargers. Therefore, the effluent limitations for most dischargers in the Black Hills area are based on requirements for meeting State in-stream standards and are determined by the development of a wasteload allocation (WLA). In the WLA process the amount of flow available for dilution and assimilation of wastes in the receiving

stream under low flow conditions is an extremely important variable. The more flow available the less restrictive are the treatment requirements, and conversely the less flow available the more restrictive are the treatment requirements. By regulation, the design low flow conditions for use in the WLA process are the 7 consecutive day-25 year low flow for cold water fishery waters and warm water permanent fisheries while the 7 consecutive day-5 year low flow is used for warm water semi-permanent and marginal fisheries. In either case, these statistical low flow conditions represent base flows, and any reduction in base flows of wastewater effluent receiving streams will require that more stringent and costly treatment be provided by the discharger.

DWNR has analyzed the impacts on treatment requirements and costs for the City of Hot Springs which would result from reduced base flows in the Fall River as projected by the draft EIS. The analysis which is included as Attachment 4 shows that effluent ammonia limitations would be reduced from 7.7 mg/l at present to 5.3 mg/l during the winter season and from 6.8 mg/l at present to 3.9 mg/l during the summer season with a decrease in base flow of 2 cfs as projected in the draft EIS. If the reduction in base flow should be 4 cfs, the ammonia limitations would be further reduced to 4.7 mg/l and 3.4 mg/l respectively for the winter and summer seasons. It is estimated that the increased treatment requirements for ammonia removal would substantially increase the City of Hot Springs' annual costs for operation and maintenance and construction debt retirement for upgrading its wastewater treatment system to meet these more stringent limits.

The 201 Facility Plan prepared by the City of Hot Springs in 1975 showed that a highly technological mechanical wastewater treatment plant would increase the annual equivalent cost $218,000 above the costs required for a less sophisticated mechanical plant. The reduction in base flow and the subsequent lowering of allowable ammonia limitations will require that the City either construct additional mechanical treatment capabilities beyond that now planned or go to an alternate treatment method, such as land application. It has been estimated that land application would increase the capital costs for upgrading the City's plant by $2.2 million dollars, which equates to an annual increase in cost of $210,000. Therefore, depending on the degree of flow reduction in the Fall River, it is estimated that cost increases to upgrade the City's wastewater treatment facility could easily range up to an additional $100,000-$200,000 per year.

While the increased treatment requirements and costs have been analyzed only for the City of Hot Springs as an example, other wastewater dischargers in the Black Hills would be similarly impacted by reductions in base flows of effluent receiving streams. These impacts are not addressed in the draft EIS.

The impacts of reduction in flow of streams and springs relating to aesthetics, recreation, fish and wildlife, water rights, water quality, and wastewater treatment requirements discussed above are all directed toward the inadequacy of the draft EIS in analyzing the impacts and identifying measures to mitigate the adverse impacts. DWNR also questions the accuracy and adequacy of projected reductions in surface water flows and quality.

In conclusion, BLM did not meet its requirements under NEPA because it did not adequately address the impacts and mitigation measures related to reductions in stream and spring flows, did not adequately explain how it derived its predictions, did not make predictions for numerous important springs and streams, and did not present a worst case analysis although substantial scientific uncertainty exists.

ETSI!

of a water right for TVA has not and will not be considered until the TVA EIS is completed and impacts are known.)

In addition to TVA, several other companies are conducting substantial uranium exploration activities in the Black Hills area. How will the proposed ETSI withdrawal impact the potential for uranium recovery by solution mining in the hydrologically affected area? How will the proposed ETSI withdrawal impact other proposed mining operations in the area?

d. South Dakota is currently developing the Madison Formation in parts of South Dakota as a geothermal heating source. The Town of Midland has heated its schools and other buildings with Madison water for a number of years. The Philip School District, the Diamond Ring Ranch - approximately 40 miles west of Pierre, and St. Mary's Hospital in Pierre have just completed projects which were partially funded with U.S. Department of Energy demonstration grants. In addition, the City of Lemmon has received a water right, Ellsworth Air Force Base and the City of Box Elder have attempted to drill a geothermal well, the City of Edgemont has completed a feasibility study for a project to heat its school buildings, and the Cheyenna River Sioux Tribe is planning a geothermal greenhouse project. Since the successful implementation of the Department of Energy demonstration projects, the development of geothermal heating projects in expected to increase in all of western South Dakota. The geothermal potential of the Madison formation is documented in <u>Geothermal Potentials in South Dakota</u>, Report of Investigations No. 110, Robert A. Schoon and Duncan J. McGregor, South Dakota Geological Survey, 1974.

How will the proposed ETSI withdrawal impact the Madison formation as a geothermal energy resource? Who will mitigate the adverse impacts?

All of the comments above relating to energy development in South Dakota are based on the lack of evaluation of impacts and mitigation measures in the draft EIS. Therefore, we conclude that the EIS is inadequate in these regards as it does not address impacts nor identify mitigating measures.

4. Socio-Economic Impacts

The draft EIS develops the scenario of a drawdown greater than 25 feet in the Madison potentiometric surface that would occur over an area of approximately 5,300 square miles for withdrawal from the Niobrara County well field and approximately 16,700 square miles for withdrawal from the Crook County well field. The draft EIS, however, does not adequately evaluate the potential impact of the drawdown on the socio-economic livelihood of the people that depend on this water for domestic, irrigation, stockwater, fish and wildlife, aesthetics, industrial, commercial, recreation, municipal and other beneficial uses. The only soci-economic considerations mentioned are those associated with population increases due to construction of the line and support facilities. Because the Black Hills is an important National area that depends in large part on fish and wildlife resources to maintain the tourist and recreation industry, the socio-economic impacts of this proposal on the tourism industry need also to be included in the draft EIS.

43

In summary, the draft EIS is inadequate in that is does not adequately address socio-economic impacts associated with withdrawals from the Madison aquifer nor does it identify mitigating measures.

44

D. Proposed Monitoring Program

If the Madison formation is developed as the water source for the proposed ETSI coal slurry pipeline, it is imperative that an adequate monitoring program for South Dakota be implemented. The proposed monitoring of surface and groundwater quantity and quality impacts for the State of South Dakota identified in the EIS is totally inadequate. Baseline data must be established prior to ETSI's development. Therefore, a comprehensive surface and groundwater monitoring network is necessary and only one proposed observation well, located in the Madison formation in South Dakota, is totally unacceptable. At a minimum there need to be monitoring wells in all aquifers that may be affected which would include observation wells in the Madison, Minnelusa, the Inyan Kara Group, the Red River and other formations. The six existing gaging stations identified in the EIS for surface water monitoring, are also inadequate. At a minimum those surface streams that serve as recharge for the underground aquifers or those which would possibly be affected by the projected drawdown in the Black Hills and surrounding area must also be monitored by means of surface water gaging stations. In addition, an adequate action plan to mitigate adverse impacts on South Dakota must be developed and included in the EIS under required mitigating measures.

45

D. The Proposed Monitoring Program Is Inadequate

If the Madison formation is developed as the water source for the proposed ETSI coal slurry pipeline, it is imperative that an adequate monitoring program for South Dakota be implemented. The proposed monitoring of surface and groundwater quantity and quality impacts for the State of South Dakota identified in the EIS is totally inadequate. Baseline data must be established prior to ETSI's development. Therefore, a comprehensive surface and groundwater monitoring network is necessary and only one proposed observation well, located in the Madison formation in South Dakota, is totally unacceptable. At a minimum there need to be monitoring wells in all aquifers that may be affected which would include observation wells in the Madison, Minnelusa, the Inyan Kara Group, the Red River and other formations. The six existing gaging stations identified in the EIS for surface water monitoring, are also inadequate. At a minimum those surface streams that serve as recharge for the underground aquifers or those which would possibly be affected by the projected drawdown in the Black Hills and surrounding area must also be monitored by means of surface water gaging stations. In addition, an adequate action plan to mitigate adverse impacts on South Dakota must be developed and included in the EIS under required mitigating measures.

ETSI3

46

ETSI's position that it wants a Missouri River water right now and a West River Aqueduct at its discretion is unacceptable to South Dakota. To be valid, a water right must be intended for use. To be used by ETSI a Missouri River water right requires a pipeline: The two go hand-in-hand. South Dakota is not responsible for ETSI's rejection of the Oahe alternative - ETSI is.

On page 1-52 of the DEIS the statement appears, "It is a requirement of the South Dakota Department of Water and Natural Resources that before it recommends a water right for ETSI for 20,200 acre-feet per year, approximately 10,000 acre-feet must be designated to the communities in western South Dakota."

This statement should read so that the portion after the comma states, "enough of the water must be designated to serve a significant portion of the needs of western South Dakota." The 10,000 acre-feet provision was a number established in an unsuccessful bill in the 1977 State Legislature. The state's subsequent attempts to construct a West River Aqueduct have been aimed to provide a better total package than did that 1977 bill. In discussions with ETSI, however, the figure discussed for delivery to South Dakota has been 7,000 acre-feet, but even that number is very tentative and is subject to revision. Enclosed as Attachment 5 is the 1981 Annual Report of the South Dakota Department of Water and Natural Resources outlining the state's negotiations with ETSI.

At the public hearing in Rapid City, one participant raised the question of Indian water rights interfering with the development of the West River Aqueduct. South Dakota believes this is not an issue.

47

There is sufficient water in the Missouri River to satisfy all forseeable needs for water in South Dakota including any Indian reserved rights, if they exist. Even if the tribes do have reserved rights to any or all of the Missouri River, such rights do not allow exploitation and exportation off of the respective reservations. In addition, the tribes cannot prevent the use of water they are not using themselves. Finally, the state has been dealing with one of its tribes on the West River Aqueduct and has every reason to believe that an agreement can be reached that will allow the development to proceed without delay caused by reserved rights.

The technical analysis of the West River Aqueduct shows that sufficient information on this alternative was either not available or not used by BLM. Enclosed for BLM's information are the draft state EIS (Attachment 6) written but not issued for the West River Aqueduct and a report on the cost of the project compiled by the Department of Water and Natural Resources' consultant (Attachment 7).

2. Wastewater Effluent Transportation System (WET System)

On page 1-71 of the DEIS, it is stated that sufficient wastewater flows for the proposed action do not exist in Wyoming. No consideration was apparently given to wastewater flows in South Dakota. It is estimated by South Dakota that in 1978 approximately 16,700 acre-feet of effluent were available annually on the eastern flank of the Black Hills from Rapid City and communities to the north. This figure is expected to rise to 22,400 acre-feet by the year 2000.

48

A project, the Wastewater Effluent Transport (WET) System, to provide this water for energy use in Wyoming and save treatment costs in South Dakota has been conceived by the state and the Sixth Planning and Development District. Enclosed are reports done by those entities and a consultant for the state on this project (Attachment 8). The WET System is also addressed in the draft state EIS and the DWNR annual report referred to earlier in this section and enclosed with these comments. The WET System is a viable alternative to the Niobrara well field and should be given detailed analysis by BLM.

A question about potential conflicts on water rights and the use of the WET System has been raised in other discussions. The state notes that no use of the wastewater currently exists downstream from most of the municipalities considered. Below the other municipalities, it is our interpretation that state law allows the removal of the wastewater from the basin of origin since these cities rely on either water stored under contract or ground water. In these cases these supplies are not truly "native" to the basin but must be considered as developed or imported water that need not be returned to the stream. In addition, either stored water or water from sources forgone by the municipalities saving treatment costs is present in sufficient amounts to replace water lost to downstream users.

3. The Crook County Well Field

The EIS fails to mention that the Crook County source requires formal action by a state authority before it can be used as do the West River Aqueduct and the Niobrara well field.

49

F. <u>The Protection Package Offered by ETSI</u>

At the hearing on the DEIS in Edgemont, South Dakota, an ETSI representative publicly offered the same protection to South Dakota water users as is currently in effect in Wyoming. The indemnification agreement with the State of Wyoming appears in Appendix C-3 of the DEIS. While the State of South Dakota recognizes that protection acceptable to each individual water user is a decision only that user can make, the following reservations about ETSI's offer are discussed here. The state offers this discussion to avoid any misapprehension that the offer made by ETSI is adequate. (The state notes here that there is a discontinuity in the agreement as printed in the DEIS between pages C-15 and C-16. Apparently some material was inadvertently omitted.)

First, the agreement allows too much time between the occurrence of any interference and the earliest possible date for corrective action. The complaint must first be investigated by the State Engineer's staff. If further investigation is necessary a process which may end up in arbitration or court is specified for choosing an outside consultant. If after a public hearing the State Engineer confirms the interference, he has several options to order as corrective action. The pump may be lowered, the well deepened, or a new well drilled at ETSI's expense; a substitute water supply may be provided; or if these are ineffective and after allowing ETSI the chance to correct the interference by whatever means are available, the State Engineer may order ETSI to cease and desist all pumping from the Madison Formation. ETSI is allowed two years to comply with an order under the last option.

50

F. The Protection Package Offered by ETSI Is Inadequate

At the hearing on the DEIS in Edgemont, South Dakota, an ETSI representative publicly offered the same protection to South Dakota water users as is currently in effect in Wyoming. The indemnification agreement with the State of Wyoming appears in Appendix C-3 of the DEIS. While the State of South Dakota recognizes that protection acceptable to each individual water user is a decision only that user can make, the following reservations about ETSI's offer are discussed here. The State offers this discussion to avoid any misapprehension that the offer made by ETSI is adequate. (The State notes here that there is a discontinuity in the agreement as printed in the DEIS between pages C-15 and C-16. Apparently some material was inadvertently omitted.)

First, the agreement allows too much time between the occurrence of any interference and the earliest possible date for corrective action. The complaint must first be investigated by the State Engineer's staff. If further investigation is necessary a process which may end up in arbitration or court is specified for choosing an outside consultant. If after a public hearing the State Engineer confirms the interference, he has several options to order as corrective action. The pump may be lowered, the well deepened, or a new well drilled at ETSI's expense; a substitute water supply may be provided; or if these are ineffective and after allowing ETSI the chance to correct the interference by whatever means are available, the State Engineer may order ETSI to cease and desist all pumping from the Madison Formation. ETSI is allowed two years to comply with an order under the last option.

surface water rights and preferred uses, wastewater treatment costs, etc., and will seriously effect established economies to which springs such as Hot Springs contribute greatly. These effects are discussed in more detail elsewhere in these comments. Until ETSI is willing to protect South Dakota against these effects, the state will continue to oppose the Niobrara well field even if individual ground water users may be protected to their satisfaction.

For these reasons, the state considers offers made by ETSI for indemnification of South Dakota interests in the Madison formation inadequate.

ETSIBI

G. The DEIS Rationalizes a Decision Already made by ETSI and Wyoming.

> The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government. It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. 40 CFR § 1502.1.
>
> An environmental impact statement is more than a disclosure document. It shall be used by Federal officials in conjunction with other relevant materials to plan actions and make decisions. Id.
>
> Environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made. 40 CFR § 1502.2(g).

In the opening pages of the DEIS, BLM states that the preferred alternative for a water source is the Niobrara well field.

> The Niobrara well field was selected, because determination of water rights is a state responsibility. The state of Wyoming has already issued well-field permits for the Niobrara well field. DEIS at 9.

That conclusion lacks even the most basic logic. If the Niobrara well field is preferred because a permit has been issued for that water source, the other alternatives must have been rejected because a permit or permits were absent. The absence of a permit is important because it indicates a requirement of additional formal approval before water can be supplied from that particular source. What the BLM ignores in its rationale is the fact that ETSI must also obtain formal approval from the State of Wyoming to withdraw the amount of water required for the proposed action from the Niobrara well field. ETSI proposes to use 20,200 acre-feet annually for fifty years. The Wyoming permit allows an average annual withdrawal of only 15,000 acre-feet for a 20 year

period with allowable yearly peaks of 20,000 acre-feet per year. Any increase in the average annual water use from the Niobrara well field above 15,000 acre-feet will have to be approved by the Wyoming state engineer. Although the Wyoming statutory authority for the Niobrara permits allows the permits to be increased to 20,000 acre-feet annually, any use beyond that amount will apparently require additional authorization by the Wyoming legislature. It is erroneous, therefore, to conclude that the Niobrara well field should be the preferred alternative simply because permits already exist for that source. Those permits will not supply enough water to support the proposed action.

More importantly, however, BLM's rationale indicates that its hands are tied in choosing the preferred alternative since the issuance of a water right "is a state responsibility." DEIS at 9.

> The purpose of NEPA is to "help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment." 40 CFR § 1500.1(c) (Emphasis supplied).
>
> Federal agencies shall to the fullest extent possible:
>
> (f) Use all practicable means consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment. 40 CFR § 1500.2(f).

Consistent with this mandate is the requirement that an EIS shall "include reasonable alternatives not within the jurisdiction of the lead agency." 40 CFR § 1502.14(c). Subpart (e) of the same section requires the agency to identify the preferred alternatives in an EIS.

There is little sense in requiring the evaluation of alternatives not within the jurisdiction of the lead agency and then allowing the lead agency to disregard certain alternatives because they are not within the agency's jurisdiction. Indeed, BLM lists the Oahe alternative water supply system as a "decision maker's option" in the statement. DEIS at 1-3. The purpose of an EIS is not to generate paperwork or options that cannot be preferred "but to foster excellent action." 40 CFR § 1500.1(c). If the option is a "decision maker's option," as it should be, it should be considered and evaluated on its merits and not ignored on jurisdictional grounds in violation of 40 CFR § 1502.14(c). To do otherwise, that is explore an option and then disregard it solely on jurisdictional grounds, only generates paperwork for no real purpose.

BLM states, "These alternatives are of two types: those chosen by BLM for analysis; and those specifically requested by ETSI which are system design changes that may be required . . . " DEIS at 1. Again, if an option outside the agency's jurisdiction cannot be excluded from analysis, it should not be excluded from consideration as a preferred alternative. Furthermore, BLM maintains that the Secretaries of Interior and Agriculture may not necessarily be bound by the EIS in making a final decision: "The actual options presented in the Secretarial Issue Document will depend on the findings of this DEIS, public comments on the draft, and formal actions of the applicant and public agencies." DEIS at 1. If this is so, the DEIS should be designed to make the best decision not the decision that is most expedient since, under BLM's premise, it is the final decision that can

55

take account of "formal actions of the applicant and public agencies" or, in other words, items not within BLM's jurisdiction.

The choice of the preferred alternative is flawed because it is based on two incorrect permises:

1) The implied assumption that no further permits are required to use the Niobrara well field; and

2) The erroneous conclusion that since BLM cannot control the issuance of water rights by Wyoming, it must accept the Niobrara well field as the preferred alternative.

The DEIS describes the Oahe Alternative as the most desireable of all the water supply alternatives and that option should, therefore, be the preferred alternative if the correct analysis is employed.

56

H. Conclusion and Summary

The DEIS for the ETSI coal slurry pipeline proposal is inadequate in the NEPA process employed in the factual analysis of the proposed action, alternatives, impacts and mitigation measures, and in the choice of a preferred alternative in a manner that reinforces a decision already made by ETSI and the State of Wyoming rather than evaluating all alternatives on their merits. The DEIS must be corrected, or even rewritten, to adequately address the issues raised in these comments.

The proposed action of withdrawing 20,200 acre-feet of water per year from the Madison formation for ETSI's proposed coal slurry pipeline will adversely impact South Dakota due to lowering of the potentiometric surface of the Madison and other aquifers. This will also cause a reduction of stream and spring flows in the Black Hills. We question the use of good quality groundwater for this purpose when alternative sources are available. If the Madison project is developed, adequate monitoring is imperative to protect the water resources of South Dakota, and an action plan to mitigate adverse impacts on South Dakota must be developed and be included in the EIS under required mitigating measures.

We strongly believe that the information contained in this document conclusively shows that the adverse impacts on South Dakota and potential mitigating measures are addressed in the draft EIS and that BLM has substantially failed to meet its procedural and substantive requirements under NEPA. We therefore, request that the involved Federal agencies refuse the action of granting requested permits to

57

H. Conclusion and Summary

The DEIS for the ETSI coal slurry pipeline proposal is inadequate in the NEPA process employed in the factual analysis of the proposed action, alternatives, impacts and mitigation measures, and in the choice of a preferred alternative in a manner that reinforces a decision already made by ETSI and the State of Wyoming rather than evaluating all alternatives on their merits.

The proposed action of withdrawing 20,200 acre-feet of water per year from the Madison formation for ETSI's proposed coal slurry pipeline will adversely impact South Dakota due to lowering of the potentiometric surface of the Madison and other aquifers. This will also cause a reduction of stream and spring flows in the Black Hills. We question the use of good quality groundwater for this purpose when alternative sources are available. If the Madison project is developed, adequate monitoring is imperative to protect the water resources of South Dakota, and an action plan to mitigate adverse impacts on South Dakota must be developed and be included in the EIS under required mitigating measures.

We strongly believe that the information contained in this document conclusively shows that the adverse impacts on South Dakota and potential mitigating measures are not adequately addressed in the draft EIS and that BLM has substantially failed to meet its procedural and substantive requirements under NEPA. We therefore, request that the involved Federal agencies refuse the action of granting requested permits, easements, and right-of-way for the proposed ETSI coal slurry project if the Madison formation is to be used as the source of water,

58

and if that is not done, then at a minimum, the DEIS be reformulated as a draft taking into consideration the comments of the citizens and State agencies of South Dakota.

ETS1B3

59

List of Attachments

Attachment 1	Comment Letters to: S.D. Department of Water and Natural Resources from S.D. Department of Game, Fish and Parks, S.D. Department of Agriculture and S.D. State Planning Bureau
Attachment 2	Statement Presented by the S.D. Department of Water and Natural Resources at the Public Hearings in Rapid City, South Dakota, December 15, 1980 and in Edgemont, South Dakota, December 16, 1980
Attachment 3	South Dakota Surface Water Quality Standards. ARSD 34:04
Attachment 4	Analysis of Impacts of Reduced Stream flow in the Fall River on the City of Hot Springs' Wastewater Treatment Requirements and Costs
Attachment 5	1981 Annual Report of the Department of Water and Natural Resources
Attachment 6	Draft (unissued) State Environmental Impact Statement on the West River Aqueduct.
Attachment 7	Addendum to the Report: The West River Aqueduct Conceptual Feasibility of Transporting and Using Missouri River Water in Selected Areas of Western South Dakota and Eastern Wyoming. August 1980
Attachment 8	Preliminary Analysis and Relationship of Wastewater Effluent Transport System to the West River Aqueduct by CH2M Hill September 10, 1980 and Wastewater Reuse Alternatives for the Black Hills Region. Prepared by: the Sixth District Council of Local Governments. August 1979

ETS14

ATTACHMENT 1

Comment Letters to:

S.D. Department of Water and Natural Resources

from

S.D. Department of Game, Fish and Parks

S.D. Department of Agriculture

S.D. State Planning Bureau

South Dakota

DEPARTMENT OF GAME, FISH AND PARKS

December 5, 1980

Vonnie Kallemeyn
Water and Natural Resources
Foss Building
Pierre, South Dakota 57501

Dear Vonnie:

Per your request this Department has reviewed the Draft Environmental Impact Statement on the Energy Transportation Systems, Inc. Coal Slurry Pipeline Transportation Project, and our comments are as follows.

The South Dakota Department of Game, Fish and Parks is gravely concerned over the long term effects of this project on the streams in the Black Hills area. Water yield to the Black Hills streams is currently one of the major problems presently confronting fish management in the Black Hills. Low stream flows caused by withdrawals, pine forested interception, evapotranspiration and channelization has diminished the fishable waters from 1,004 miles in the early 1900's to less than 270 miles in 1964. Pumping the Madison formation to the extent planned under the proposed action would effect all the streams in the Black Hills and allow more rapid infiltration and reduced flows. This would be disastrous to marginal streams especially during the months of July through November.

Though we lack specific data to evaluate the potential effects, it is reasonable to suspect that during the dry months of the year all the streams in the southern and eastern Black Hills would be incapable of maintaining trout fisheries as they presently exist.

Additionally, it is quite possible that operation and production of Cleghorn Springs State Trout Hatchery, which is currently operating on minimum spring flows, would be seriously curtailed or put out of operation. Likewise, if Spearfish Creek flows are effected to the extent indicated in the DEIS, McHenry National Fish Hatchery located northwest of Spearfish could be seriously effected.

The DEIS concentrates on basin mainstems because flow duration data are, generally, only available for these mainstem stream sections, it assumes that tributary streams would be biologically altered to a greater extent than their mainstems. Thus Coxes Lake, Crow Creek, Redwater Creek and other waters of the northern hills are not mentioned or impacts to them addressed. The same can also be said for numerous small streams in the southern hills. We agree with the aforementioned assumption and feel the proposed plan would seriously impact the Black Hills fishery.

Sincerely,

John C. Kirk

John C. Kirk
Interagency Coordinator

JCK/lle

Division of Administration ■ Sigurd Anderson Building ■ Pierre, South Dakota 57501

SOUTH DAKOTA

Department of Agriculture

OFFICE OF THE SECRETARY
Anderson Building, Pierre, South Dakota 57501
Phone 605/773-3375

RECEIVED
DEC 2 1980
DEPT. OF W... &
NATURAL R...ES

November 25, 1980

TO: Bob Neufeld, Secretary, Department of Water and Natural Resources

FROM: Rodgar Pearson, Secretary, Department of Agriculture

SUBJ: Comments on EIS for ETSI Coal Slurry Pipeline

Our area of interest is with the source of water for the project. There is disagreement about the impacts of withdrawing ground water for the project. The U.S. Geological Survey is due to issue a report soon on their study of the Madison formation. In view of this, we believe the State of South Dakota should request an extension of the period of review of the EIS until after the USGS has issued its report on the Madison aquifer. This will provide a better data base for analyzing the impacts on the aquifer as predicted by the EIS studies.

If South Dakota is successful in getting an extension of the review period for the EIS, we feel the state should take other actions in the meantime:

1 -- South Dakota should ask Wyoming for the specific criteria that state has on when it would require the company to cease pumping water or take other actions.

2 -- South Dakota should conduct hydrologic computations to determine if South Dakota's interests would be protected at the point of intervention by Wyoming.

3 -- South Dakota should attempt to negotiate with Wyoming to get formal coverage of South Dakota interests in Wyoming's "Limitations on ETSI Production Permits" and by the land under which the company will operate. This might avoid future litigation.

The Department of Agriculture will be interested in any future developments regarding the ETSI project.

RHP/gm

cc: Anselem H. Rumpca

STATE PLANNING BUREAU
State Capitol
Pierre, South Dakota 57501
605/773-3661

SOUTH DAKOTA Office of Executive Management

November 21, 1980

TO: Connie Tveldt

FROM: Anselem Rumpca

SUBJECT: Comments on the ETSI DEIS

A project of this magnitude generally has impacts that are not obvious to those writing the reports. Much of the information is misconstrued or delivered in such a way that the information becomes highly debatable or unreliable. For example, the report indicates that the drawdown for the Madison aquifer at Edgemont will be 303 feet after fifty years of pumping. This contrasts sharply with the projections of Dr. Perry Rahn from the South Dakota School of Mines. On the 10th of October, 1979, at a public hearing in Edgemont, South Dakota, Dr. Rahn indicated the drawdown on the Madison aquifer would be close to 1100 feet after fifty years of pumping. This large variation in drawdown projections should be clarified before the project is initiated. Other questions and concerns are as follows:

What methodology is used to determine the labor force and service population ratios?

Page 1-24, how will radio interference be mitigated for those pilots that use radio transmission or homing devices while flying at night?

What methodology was used to determine water quality changes for the affected aquifers, both as pumping occurs and after the fifty year pumping period?

How will the impacts to surface waters be mitigated? For example, change in flow rates and the associated destruction of aquatic habitat and fisheries?

How will irrigators be compensated for the loss of groundwater or increased pumping costs?

Will this loss of groundwater affect present or future water rights and appropriations?

How will ranchers be compensated for the loss of artesian head pressure or loss of water completely?

How will the municipalities be compensated for the increased pumping costs and possible water treatment due to the increased TDS in the water?

November 21, 1980
Page 2

What effect will the drawdown have on other aquifers in the area, for example, The Sundance, Inyan Kara or Minnelusa? How will these effects be mitigated? What effect will the drawdown have on any oil or gas fields in South Dakota?

How will subsidence be mitigated? This is a problem that should be thoroughly addressed.

Did ETSI look at the possible use of waste water from South Dakota as an alternative water supply? They did so in Wyoming, but no mention of South Dakota was made. For example, Rapid City discharges eight million gallons of effluent each day. This is projected to double within the next twenty years. However, its use during the summer could affect irrigators downstream from the discharge.

What economics impacts will South Dakota have due to the drawdowns on the Madison Aquifer or other aquifers? How will this be mitigated?

Page 4-12, how was the methodology determined for nonbasic employment? Why was the multiplier of .6 chosen?

If monitoring wells indicate problems that are more severe than those projected, will the project be allowed to continue? If so, how will these impacts be mitigated?

These concerns should be addressed in the final environmental impact statement.

JRR:AHR:mef

150

WILDLIFE CONSERVATION COMMISSION

JUD LITTLE, CHAIRMAN — JOHN D. GROENDYKE, MEMBER
DOYLE BURKE, VICE CHAIRMAN — BOB MATTHEWS, MEMBER
H. B. VAN PELT, SECRETARY — ROY BOECHER, MEMBER
ELLIS HOLLY, MEMBER — DON R. GREENHAW, MEMBER

GEORGE B. WINT, DIRECTOR
GARLAND FLETCHER, ASSISTANT DIRECTOR
STEVEN ALAN LEWIS, ASSISTANT DIRECTOR

OKLAHOMA

DEPARTMENT OF WILDLIFE CONSERVATION

1801 N. LINCOLN P.O. BOX 53465 OKLAHOMA CITY, OK 73105 PH. 521-3851

January 5, 1981

U.S. Department of the Interior
Bureau of Land Management
Special Projects Staff
555 Zang Street, 3rd Floor East
Denver, CO 80228

Dear Sir:

This letter constitutes the Oklahoma Department of Wildlife Conservation's comments on the Draft Environmental Impact Statement on the Energy Transportation Systems, Inc. Coal Slurry Pipeline Transportation Project, dated November, 1980.

Ruptures and Spills -

In discussing a coal slurry spill on page 4, reference is made to its "essentially nontoxic" nature, however, it is also stated that "Large volume spills in small streams would result in the largest losses to fish and other aquatic life. Small volume spills or spills in larger streams would result in more localized losses to aquatic organisms and short-term changes in the aquatic habitat, since the concentration of the coal slurry would be more quickly diluted to harmless levels."

If coal slurry spills will cause fish kills, what is the causative mechanism? Including a description of the chemical constitutents, nature, and interactions of coal slurry in an aquatic environment will help clarify the inconsistent characterization of coal slurry as "essentially nontoxic" with the implied toxicity of dilution to "harmless levels".

This discussion could also expand upon the toxic constituent studies referred to on page 4-107 and 4-111, Characteristics of Dewatering Plant Effluent and Relationship of Discharge to Existing Standards. A data summary of the cited references to supplement Table 4-36 through 4-40 should be included to graphically demonstrate the water quality and chemical characteristics of coal slurry and dewatering effluent.

Stream Crossing -

The EIS, in its discussion of stream, railway and roadway crossings for each project action, partly addresses trenching and boring techniques. However, it is not clear which technique will be used for individual stream crossings. The U.S. Fish and Wildlife Service, in conjunction with the Oklahoma Department of Wildlife Conservation, has previously identified significant

AN EQUAL OPPORTUNITY EMPLOYER

Draft EIS on ETSI's Coal Slurry Pipeline Project
Page 2

aquatic resources including important sport fisheries and has provided recommendations for the use of stream crossing techniques. We suggest that ETSI work with the federal and state agencies of each state to specify crossing techniques for specific streams prior to construction plan finalization.

We appreciate the opportunity to provide comments on this draft EIS.

Sincerely,

Steven Alan Lewis

Steven Alan Lewis
Acting Director

168

State of Kansas . . . John Carlin, Governor

DEPARTMENT OF HEALTH AND ENVIRONMENT

Joseph F. Harkins, Secretary

Forbes Field
Topeka, Kansas 66620
913-862-9360

January 5, 1981

Richard E. Traylor
Office of Special Projects
3rd Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

We have reviewed the draft ETSI Coal Slurry Pipeline Environmental Impact Statement and feel that the presentation is very well done and complete except in one area of activity.

There is considerable assessment devoted to potential environmental damage due to a spillage of coal slurry in the event of a pipeline rupture. We view a far more serious threat to the environment from the possible spillage of oil, refined petroleum, or salt water during the period of coal slurry pipeline construction. This concern was first mentioned in a discussion I had with George Detsis last summer when he visited Kansas. We assumed that as the state agency responsible for spill control that our comments would be taken seriously and pursued from the standpoint of environmental impact. Our review of the impact statement does not uncover anything about potential spillage of oil and gas.

All proposed routes of the coal slurry pipeline run transverse to the major crude and refined petroleum lines in Kansas. Most product lines run southwest to northeast whereas the coal slurry line trends northwest to southeast. In addition, each of the routes goes through several major oil and gas producing areas which have systems of smaller diameter oil lead lines and brine disposal lines. At the December 8, 1980 hearing in Hays, the representative of the Kansas Railroad Association mentioned the possible problems associated with having to put the coal slurry pipeline deeper than all other lines it crosses. It is our understanding that unless the companies having these other lines are willing to allow ETSI a variance, the coal slurry line would have to be placed deeper than the deepest existing line.

To perform this across a major oil producing state such as Kansas without causing at least a few spills would be a monumental task that would require both luck and coordination. We had heard that in many places, these other lines would have to be cut in order to install the coal slurry line. The impact statement should address the following:

(1) The temporary or long term loss of land productivity due to spillage of oil, refined petroleum and brine.

Richard E. Traylor
January 5, 1981
Page 2

(2) Needed spill prevention and contingency plans to satisfy both Federal and State pollution control statute and regulations.

(3) The temporary loss of income to oil and gas producers and first purchasers of oil and gas due to the cutting of lead lines and product lines. These are transportation arteries and should receive the same considerations of inconvenience and temporary loss of income as highways would.

(4) Major pipelines that carry gasoline and natural gas operate under several hundred psi. It seems that the impact of both safety and environment should be addressed in relation to the passing of the slurry pipeline under these other lines.

We also had our Biology Unit review the sections of the Impact Statement on Wildlife, Aquatic Biology and Threatened and Endangered Species. They found the DEIS generally comprehensive and appropriate and the only suggestion offered was that it would be appropriate to update the references for breeding range of the Least Tern. This work is available from Marvin Schwilling of the Kansas Forestry, Fish and Game Commission, Wildlife Research Office, 1803 W. 6th St., Emporia, Kansas.

We have appreciated the privilege to review this document and hope that the comments contained in this letter will be considered with the seriousness that we feel the subject warrants. If you have any questions, please feel free to contact me. I have enjoyed serving as Kansas Coordinator for this project.

Very sincerely yours,

DIVISION OF ENVIRONMENT

Marvin W. Stoffel for William R. Bryson

William R. Bryson, Director
Bureau of Oil Field and
Environmental Geology

WRB:mmp
cc: G. A. Stolotenberg
J.A. Power

194

Missouri River Basin Commission

Millard W. Hall
Chairman
Warren R. Neufeld, South Dakota
Vice Chairman

Suite 403 • 10050 Regency Circle • Omaha, Nebraska 68114

"A Presidential State-Federal River Basin Commission"

January 7, 1981

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
Third Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

The Missouri River Basin Commission staff and I have reviewed the draft environmental impact statement on the Energy Transportation Systems Inc. Coal Slurry Pipeline Transportation Project and offer the following comments.

Generally, the EIS addresses all aspects of the Council on Environmental Quality guidelines implementing the National Environmental Policy Act of 1969. From our perspective, we feel the Bureau of Land Management has done a commendable job in identifying the effects of the proposed action, especially the impacts on the area's water resources.

We do have concern about the protection of existing ground water users in South Dakota and Nebraska. The EIS shows that ETSI is liable for impacts in Wyoming created by its well field operations. Also, ETSI has taken steps with Edgemont, South Dakota to mitigate drawdown problems which might affect that community's water supply. Other users in South Dakota and those in Nebraska, however, are afforded no such protection. As there are legal and institutional ways to provide this protection, we feel they should be investigated and reported in the final EIS.

COMMISSION MEMBERS

Colorado; Iowa; Kansas; Minnesota; Missouri; Montana; Nebraska; North Dakota; South Dakota; Wyoming; Department of Agriculture; Department of the Army; Department of Commerce; Department of Energy; Environmental Protection Agency; Federal Emergency Management Agency; Department of Health and Human Services; Department of Housing and Urban Development; Department of the Interior; Department of Transportation; Yellowstone River Compact Commission; Big Blue River Compact Administration.

Mr. Richard E. Traylor
Page Two
January 7, 1981

I am sorry to be late in submitting these comments. However, we did not receive the EIS until mid-December. Since the Commission is responsible for coordinating State and Federal water resources planning in the Missouri River Basin, I will work with the Department of the Interior member to ensure that the Commission routinely receives copies of environmental impact statements at the time of distribution.

Sincerely,

Millard W. Hall

Millard W. Hall
Chairman

MWH/sck

cc: R.J. Bruning, MRBC Member, Department of the Interior
Terry Lynott, MRBC Alternate, Department of the Interior

214

SOUTH DAKOTA STATE LEGISLATURE
PIERRE, SOUTH DAKOTA

HOUSE OF REPRESENTATIVES

Oelrichs, S Dak
Jan 6, 1980

Mr Richard Traylor
Special Projects Staff
Bureau of Land Management
Denver, CO 80228

Dear Mr. Traylor:

Let me join the many South Dakotans, and especially those of Fall River and Custer counties who are very concerned about the impact of the ETSI coal slurry pipeline on the water of our area.

I attended the Edgemont hearing and got the feeling that although there was much well-prepared comments on the Draft Environmental Impact Statement, I still have questions about it.

Please extend the deadline for comment so that we have adequate time to study the DEIS — and please send me a copy.

Sincerely,
Violet S Beever, State representative for District 25

215

Arkansas Natural & Scenic Rivers Commission

Suite 500 • Continental Bldg. • Main & Markham • Little Rock, Arkansas 72201 • (501) 371-8134

January 8, 1981

Mr. Richard Traylor
ETSI EIS Project Leader
Bureau of Land Management
Special Projects Staff
3rd Floor, East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

I thank you for the opportunity to comment on the Energy Transport System, Inc. (ETSI) Coal Slurry Pipeline Draft Environmental Impact Statement. The cooperation of all state, federal, and private concerns is to be applauded. If this spirit of cooperation continues, then perhaps this coal slurry pipeline will be constructed in such a manner as to reduce its effects on nearby communities and the environment.

It seems that the pipeline's greatest impact will be felt on Arkansas' rivers and streams. Many water supply sources, quality recreational streams, and sensitive wetland areas will be crossed. Although not in the Arkansas Natural and Scenic Rivers System yet, many of these streams may be incorporated into it in the future. Because of this, we at the Arkansas Natural and Scenic Rivers Commission are concerned about possible effects of the ETSI coal slurry pipeline on Arkansas' rivers and streams.

The route of the pipeline is of paramount concern. I compliment ETSI on their efforts to avoid Arkansas Natural Areas, National Forest holdings, and sensitive watersheds such as those of the Ouachita Madtom and the Yellowcheek Darter. However, the Saline River is crossed twice. The Saline River, downstream of the pipeline crossing near Mt. Elba, Arkansas, has one of the highest fish diversities in this part of the nation (130+ species). This is because of good water quality, low turbidity, and the good gravel substrate found in this area. It is also the state's longest free-flowing stream, and boasts a good bass and catfish fishery. The lower end of the river, near its confluence with the Ouachita River, has numerous wetlands. A pipeline rupture would greatly damage this quality downstream segment, according to the ETSI spill scenario for the Saline River. I would ask that the Saline River be avoided if possible or protective measures (i.e., automatic shut-off valves, etc.) be specifically devised for the Saline River in the final EIS.

The question of the proposed market route is further complicated by the fact that the route seems to be improperly marked on your map (Map A-25, PM 1110-1170). When pieced together with Map A-24 and A-26, the proposed market route does not join. An addendum should be issued reflecting this fact and a new map segment produced for the final EIS.

An Agency of the Department of Arkansas Natural & Cultural Heritage • An Equal Opportunity Employer
100% recycled paper

-2-

RIVER CROSSINGS

The coal slurry pipeline will cross some of Arkansas' best waters. Of some 58 Section 404 and Section 10 permits needed (all alternate routes included), 28 of them are for Arkansas' rivers and streams. Some of the methods of crossing large rivers are vague. How does ETSI plan to cross major navigation channels such as the Arkansas, Saline, and Ouachita rivers? Please revise the final EIS to clarify this process.

Project Description (PD, 1-72): "The pipeline would be buried in a trench across each of these rivers [those requiring special permits]." Will other streams be crossed in a similar fashion or treated in some other way? The final EIS should be corrected to refer to all rivers and streams. It should specify what type of stream would not be crossed in the manner generally described in the draft EIS, and elaborate on the construction procedures to be used on these streams.

RUPTURE AND SPILLS

Of the 28 rivers and streams requiring special permits, 10 of them are, or will be developed as, primary water supply sources for area communities. The proposed market route crosses the watersheds of the water supply sources of major communities along the northern Arkansas Valley from Fort Smith to Atkins. The Independence Route crosses the watershed of the Little Red River near Greer's Ferry Lake and above water intakes for Searcy. The White Bluff leg of the pipeline runs across the watershed of Big Maumelle River, the water supply source for Little Rock. Along the Arkansas River Valley, good, potable water is scarce. If ruptures ruin the water supply of one of these communities, the alternate source is the Arkansas River. Its use is prohibited by the Arkansas Health Department, except in certain emergency situations. It is a highly unfavorable alternative at this time. Industries which rely on pure water could be forced to shut down if faced with the use of water polluted by a coal slurry pipeline rupture.

The effects of salts, such as sulfates (SO_4), on humans are well known. The spill scenarios and other data in the Aquatic Biology (AB) and Ruptures and Spills (R-S) technical reports developed by ETSI indicate the level, the concentration of pollutants, and the possible effects of ruptures on aquatic communities at various distances downstream. This information indicates that a method should be devised for protecting the watersheds of primary water supply sources crossed by the coal slurry pipeline. ETSI figures estimate one spill/1000 miles of pipeline/year, or 2 per year on the project. Since greater than 50% of the special permit rivers are in Arkansas, the chances of a rupture impacting one of these Arkansas streams are greater than 2:1. I believe that the installation of automatic valves (or some other device) at some point within the watershed would significantly reduce the amount of effluent available to escape from a rupture. Such valves would reduce the amount of damage and clean-up time after a rupture. Spill scenarios should be developed to predict damages to water supply reservoirs (large and small reservoirs and river withdrawals). These and the economic impacts of such occurrences should be incorporated into the final EIS. Such predictions would help in the location of shut-off valves. Development of emergency procedures for communities threatened with the loss of their water supply due to a coal slurry pipeline rupture would be of great benefit.

WATER QUALITY OF SLURRY

The aubject of water quality is of particular concern to the people of Arkansas. State water standards are high. Arkansas has been working with various agencies in an effort to improve the water quality of the Arkansas River for future use. Utilizing this resource will prevent the loss of valuable recreation streams and the inundation of prime pasture, farm, and timberlands to create water reservoirs. Many of the salts and metals present in the slurry water (e.g. SO4) to be dumped in the Arkansas and White rivers require tertiary treatment to be removed. Please specifically addresa the question of how the removal or reduction of these salts and metala will be accomplished at dewatering plants. If it is to be done by dilution, how will efforts to clean up large rivers be affected? Why is the possibility of a closed water system not explored? It would reduce waste of badly needed Wyoming water and pollution of rivers by dewatering plant effluent. Please addreas these points in the final EIS.

Only in the Surface Water Quality Technical Report (SWQ) is there a significant discussion of the pH of the slurry water (p. 10-15). Spill scenarios deal only with SO_4, Cl, TDS and BOD parameters. Why not pH? Arkansas Department of Pollution Control and Ecology personnel believe that pH of slurry from a rupture (aerobic conditions) will not be just "slightly acidic" (SWQ, p. 10), but moderately to strongly acidic. If this is true, chemical behavior of coal slurry under aerobic conditions should be more fully explored. Drops in pH will totally disrupt the aquatic community, causing massive mortalities and result in eutrophication of afflicted waters. Please specifically addresa the chemical behavior of alurry when it comes into contact with air or water (as in the case of a rupture) and effecta of low pH effluent on aquatic communities in the final EIS.

AQUATIC BIOLOGY

The list of "Fishes Inhabiting the Ouachita River . . ." (Table 42, p. 2-119, Aquatic Biology Technical Report) is a poor piece of work. Inclusion of fishes endemic to the upper Ouachita and Saline River drainages is totally unnecessary in discussions pertaining to the fishes of the middle and lower Saline and the lower Ouachita River drainages. This list is faulty in a number of cases (e.g., the Etheostoma microperca record from the upper Saline River drainage has long been known by Arkansas ichthologists to be invalid). This list is chaotic. It is the only one not in phylogenetic or alphabetical order. It is repetitive (e.g., Campostoma anomalum is mentioned twice). The groupings are arbitrary and insignificant. The credibility of its authors is at question when the pigmy sunfish (Elassoma zonatum), a Centrachid which reaches a maximum of 2", is included in the section called "Game Fishes". Please discard this list and contact either Dr. Neil H. Douglas at Northeast Louisiana University (Monroe, Louisiana), or Dr. H.W. Robison at Southern Arkansas University (Magnolia, Arkansas) for more qualified assistance and accurate information.

In the "Summary" (R-S, p. 99) the statements concerning "significant dissolved oxygen depletion" are misleading. As this paragraph is written, it implies that sudden decreases in DO are insignificant to an aquatic community. The effects of sudden DO decreases depend upon time (daily and seasonal) and the tolerance of that aquatic community to DO stress. This tolerance varies with regards to the nature of that atream (upland vs. lowland), temperatures, etc. Although apparently insignificant, DO reductions, especially during spawning season or periods of low flow, could devastate an aquatic community. Please adjust the final EIS to reflect this point and clarify the summary on the effects of ruptures and spills.

The statement concerning the high survival rates of "common fish" exposed to high TDS and SO_4 concentrations (R-S, p. 104, last paragraph) is misleading in that it implies that little damage would be done to a fish community by these pollutants. These "common fish", although tolerant to various parameters, could represent only a small portion of the standing crop of that particular community affected by a rupture. If the other fish present are not as tolerant as the "common fish", vast portions of the fishery could be destroyed. That would be a significant effect. Please have the final EIS reflect that high TDS and SO_4 concentrations could also have a "highly significant" effect on fish depending upon their sensitivity to coal slurry pollutants.

Apparently the ETSI coal slurry pipeline will be a reality. I am seriously concerned about the possible effects of ruptures and spills on Arkansas' waters, especially those which would threaten municipal water supplies. I am also concerned about the degradation of major rivers by dewatering plant effluent. I strongly urge you to consider the points and make the changes I have suggested in the final EIS.

If you have any questions concerning my comments, please contact me. Thank you for your cooperation.

Sincerely,

Stephen Winters
Technical Assistant

SW:dw

cc: Mr. Joe Rice
Ms. Jeanne Jackson

216

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Recreation Commission

604 EAST 25TH STREET CHEYENNE, WYOMING 82002

JAN L. WILSON
Director
777-7695

COMMISSION OFFICERS
E. LAWSON SCHWOPE
PRESIDENT
900 Foyer Avenue
Cheyenne 82001
CHARLES H. JOHNSON
VICE PRESIDENT
1121 Alder
Rawlins 82301
RICK KILMER
TREASURER
P.O. Box 51
Lusk 82225
MEMBERS
MRS. ROBERT FRISBY
3289 Forest Drive
Cheyenne 82001
FLOYD BARTLING
P.O. Box 172
Douglas 82633
WILLIAM MOFFAT
107 W. Jackson Avenue
Riverton 82501
JACK D. OSMOND
P.O. Box 216
Thayne 83127
ALBERT PILCH
1800 Morse Lee
Evanston 82930
DAN MADIA
1017 Victoria
Sheridan 82801

January 7, 1981

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, Colorado 80228

RE: Energy Transportation System, Inc.
Coal Slurry Pipeline Transportation
Project, 80-150

Dear Mr. Traylor:

Thank you for the opportunity to review and comment on this draft environmental impact statement (EIS).

I have enclosed recommendations concerning archeological and historical clearance of the draft EIS and concur with them.

At such time as a cultural resources survey can be reviewed by this office, a determination concerning cultural clearance can be made by the State Historic Preservation Officer (SHPO).

If you have any questions, please feel free to contact this office.

Sincerely,

LeRoy Greening
Acting Chief
Resources Division

FOR:

Jan L. Wilson, Director and
State Historic Preservation Officer

LOG:klm
Encls.
cc: Paul Cleary, State Planning Coordinator's Office

WYOMING RECREATION COMMISSION

STATE HISTORIC PRESERVATION OFFICE

REVIEW AND COMPLIANCE

Interdisciplinary Staff Comments

Archeology • History • Historical Architecture • Recreation Planning

TO: John F. Carlson, Chief

FROM: Michael A. Massie, Review and Compliance Officer M.A.M.

DATE: December 11, 1980

RE: BLM, Draft EIS, Energy Transportation System, Inc., Coal Slurry Pipeline

This draft EIS contains the necessary procedures to construct a thorough cultural inventories report on the area that the project affects. Through the memorandum of agreement, the BIA and the SHPO will be working closely throughout the project to assure that the state's cultural sites will experience little or no impact by the proposed operation.

As specified in the memorandum of agreement, the cultural survey team should consult or hire a historian to evaluate all the sites, structures, objects, or trails having historical significance. Some of the sites that pertain to Indians also contain historic importance.

The proposed project will center in Northeast Wyoming. Until now, this region has never been adequately surveyed. In addition to this BLM supervised inventory for the ETSI pipeline, Sharon Bollinger, the state's historical survey coordinator, will be conducting a study starting January, 1981 of Campbell and Converse Counties. Thus, in order to coordinate findings, the BLM may wish to contact the SHPO for information on Sharon's survey. I am looking forward to working with the BLM officials on all aspects of this project.

Since no cultural survey has been prepared yet, historical clearance cannot be recommended. Also, the SHPO should review any future historical survey and report.

WYOMING RECREATION COMMISSION

STATE HISTORIC PRESERVATION OFFICE

REVIEW AND COMPLIANCE

Interdisciplinary Staff Comments

Archeology • History • Historical Architecture • Recreation Planning

TO: LeRoy Greening, Acting Chief

FROM: Thomas E. Marceau, SHPO Archeological Section Head TEM

DATE: January 6, 1980

RE: BLM, Draft EIS, Energy Transportation System, Inc., Coal Slurry Pipeline

This Draft EIS represents an acceptable framework for cultural resource management. The establishment of a one mile survey corridor as well as the delimiting of "sensative areas" likely to contain archeological sites are noteworthy. However, it should be stressed that preliminary data on site distribution gathered from an existing records and literature search should not be considered a substitute for an intensive on-the-ground inventory of all areas to be impacted. The fact that no field surveys have yet been conducted precludes any cultural clearance at this time.

Regarding the attached Memorandum of Agreement (Appendix D-3), the 16 stipulations are well thought out and cover a number of critical topics. My comments are directed to the following stipulations as labeled:

#1, 7--I believe that it is most important that ETSI allocate funds and time in advance of construction for cultural resource inventory, review and management determinations.

#4--It is very important that any work undertaken for this project be conducted by qualified professional personnel.

#5, 12--The Wyoming State Historic Preservation Office appreciates the right to be involved in all pertinent aspects of this project particularly review and advice regarding its actualization.

#10--Issue is taken with the wording of this stipulation, i.e., "The opinion of the landowner will be submitted if immediately available for eligibility determinations." I would strike the phrase "if immediately available", I believe the landowner should have the opportunity to comment especially given the extended time frame of this project.

#11--I am in full agreement that every opportunity should be taken to avoid significant archeological resources through project redesign or relocation.

227

STATE OF ARKANSAS
DEPARTMENT OF LOCAL SERVICES
NUMBER ONE • CAPITOL MALL
LITTLE ROCK 72201

FRANK WHITE
GOVERNOR

KEN COON
Director

January 19, 1981

Mr. Richard Traylor
ETSI EIS Project Leader
Bureau of Land Management
Special Projects Staff
555 Zang St., Third Floor, East
Denver, Colorado 80228

Dear Mr. Traylor:

The Arkansas Department of Local Services appreciates the opportunity to review the Energy Transport System, Inc., (ETSI) Coal Slurry Pipeline Draft Environmental Impact Statement.

As Arkansas' Alternate State Liaison Officer (to the United States' Heritage Conservation and Recreation Service), part of my duties include monitoring government actions which could affect Arkansas' recreational environment. In reviewing the ETSI project, my main concern is with the possible serious consequences of the pipeline on the quality of our outdoor recreational resources.

It appears the Coal Slurry Pipeline will cross several prime recreational rivers, including the Illinois Bayou, Mulberry River, and Big Piney Creek. The pipeline will also pass within five miles of three National Forests, two State Parks and one National Wildlife Refuge. My main concern is with the possible adverse effects of a rupture or spill near these areas. I would have to concur with the Arkansas Natural and Scenic Rivers Commission on its recommendation to require the installation of automatic valves (or similar devices) at key locations. It seems the addition of these types of valves would be a wise investment. The extra cost could be offset, to some degree, by minimizing the amount of slurry escaping from a rupture. Cleanup costs and environmental losses might be kept to a minimum.

I would encourage you to give special attention, in the final EIS, to the problems I have outlined. Thank you for the opportunity to comment.

Sincerely,

Vance Simelton

Vance Simelton
Alternate State Liaison Officer

VS:DM:fbw

THE DEPARTMENT OF LOCAL SERVICES IS AN EQUAL OPPORTUNITY EMPLOYER

235

State of Louisiana

DEPARTMENT OF WILDLIFE AND FISHERIES
400 ROYAL STREET
NEW ORLEANS 70130

JESSE J. GUIDRY
SECRETARY

DAVID C. TREEN
GOVERNOR

February 3, 1981

Mr. Richard E. Traylor
ETSI EIS Project Leader
U. S. Dept. of the Interior
Bureau of Land Management
555 Zang Street
Denver, Colorado 80228

Dear Sir:

Personnel of our technical staff have reviewed the draft EIS and supporting documents relevant to the proposed coal slurry transportation project.

Our comments address the two operating facility components which would be constructed in Louisiana including the coal slurry pipelines and dewatering plant sites.

Construction of the proposed project would cause adverse effects to terrestrial species along the pipeline corridor by the direct destruction of nonmotile forms of those species and by removal of vegetation utilized for food and cover. Additional adverse effects to terrestrial habitat could result from land clearing activities associated with construction of the proposed dewatering plants. Aquatic environments would be adversely affected by direct disturbances to aquatic biota and their habitats resulting from the pipeline construction across water bottoms. Indirect effects would result from runoff from terrestrial areas, disturbed during construction activities, which would cause increases in turbidity levels and sedimentation in area waterways and during operations by nonpoint source pollutants including particulate coal fractions.

Should a pipeline rupture occur, coal slurry spilled into surface waters would cause detrimental impacts to aquatic species resulting from localized changes in water temperatures, decreased oxygen concentrations, increased dissolved solids, and the release of various polluting compounds leached from coal into the slurry water. Adverse impacts, including

An Equal Opportunity Employer

Mr. Richard E. Traylor
February 3, 1981
Page 2

mortalities, to benthic organisms, and fish eggs and larvae, would result from the formation of a layer of particulate coal on bottom sediments, and this would be of particular significance in areas where current velocity is low or nonexistent. These effects on water quality and the physical condition of water bottoms would result in decreases in invertebrate and fish production in affected areas.

Section 4-107. We are interested in receiving additional information concerning water quality characteristics of the dewatering plant effluent in view of the potential for alteration in carrier water quality due to long-term coal storage.

We recommend that the following measures be used to reduce adverse effects to fish and wildlife habitat and resources:

1. The proposed pipeline right-of-way should be limited to smallest width practicable.

2. All surface areas should be restored to preconstruction contours.

3. Erosion control measure should be used at all construction sites. These measures could include construction of sediment traps or basins as necessary. Annual grasses and mulches could be used in all areas denuded of vegetative cover for temporary erosion control, but the use of sodding and seeding with perennial grasses, and planting shrubs and trees suitable to the local environment is recommended for permanent vegetative stabilization.

Applications for the permits necessary for crossing Louisiana Scenic Rivers should be submitted in quadruplicate to the Administrator at P. O. Box 44095, Capitol Station, Baton Rouge, LA 70804.

We also recommend that the area supervisors of the Georgia-Pacific and Cities Service Wildlife Management Areas be contacted in advance of any proposed construction activity.

Sincerely,

Jesse J. Guidry

Jesse J. Guidry
Secretary

JJG/pc

23

Industrial
Development Committee

Mobridge Chamber of Commerce

Phone (605) 845-2387
December 10, 1980

Chamber Office
Box 132
Mobridge, S. Dak. 57601

Pat Morrison, Coordinator
Bill Jay, President
Norg Sanderson, Vice President
Pete Knott, Secretary-Treasurer

U. S. Bureau of Land Management
555 Zang Street, 3rd Floor East
Denver, Colorado 80228

Re: Environmental Impact hearing on ETSI coal slurry pipeline

Dear Sir:

We would like to file our objections to the environmental impact the proposed ETSI coal slurry pipeline would have on future irrigation around Lake Oahe and the effect it would have on water tables in western South Dakota.

We feel it is a tragedy to propose taking water from this arid region and using it to transport coal to some of the most humid regions of the nation. Water and food are becoming very scarce commodities around the world. In the future it will be vital to produce all the food possible in this arid region, and that will be possible only by reserving all the water possible for future irrigation. Proposals like the ETSI coal slurry pipeline would removed water that could otherwise be used for irrigation in the future, and it appears that the increased demand for food will become critical at about the same time ETSI would become dependent on Oahe water.

It should be noted that there are better alternatives for utilizing the coal in Wyoming that would not have this detrimental impact. Railroads are in place and have existing rights of way to handle this coal traffic with almost no additional impact on the environment. It would be far better to generate electricity in this area and move it cleanly over highlines . . . at least then the water used in generation would stay in the atmosphere in this arid region of the country, and possibly contribute to an increase in rainfall, and excess heat in this part of the country would have a value for fishing, farming or greenhouses that would be worthless in Arkansas.

The proponents of this pipeline are asking for something that has never been done before in this nation on this scale. They are asking approval to use water from an arid region simply as a liquid to transport coal. That is an unnecessary use that should have a very low priority, far below the priorities of irrigation to provide food and for water supply in the Hills area, since water tables would be lowered in that area. We would ask the Bureau of Land

Environmental Impacy hearing
Page -2-

Management not to approve this use blindly, but to first seriously consider the importance of water and the various priorities of its use. There is no realistic way to consider this proposal without first establishing priorities for the use of water.

Sincerely,

PBMr

Pat B. Morrison, Jr.
Coordinator

PBM/dt

R E S O L U T I O N

WHEREAS, there is not sufficient information available to determine what effect the proposed E.P.S.I. pipeline will have on the Madison formation; and

WHEREAS, it is believed that a draw down on the water level of the Madison formation by such pipeline would cause irrepairable injury to the geophysical structure of such formation;

NOW THEREFORE, BE IT RESOLVED that the Lawrence County Board of County Commissioners is opposed to the construction of the E.P.S.I. pipeline until adequate information is obtained that will fully apprise all concerned as to what effects, if any, said pipeline can be expected to have on the Madison formation.

Dated at Deadwood, South Dakota this 19 day of December, 1980.

BY THE BOARD:

R. Earl Schultz, Chairman

Boyd E. Larson

William G. Sleep

Gerald F. Apa

Henry Frawley, Jr.

ATTEST:

Sherryl Flanagan, Auditor

87

OFFICE OF

BOARD OF COUNTY COMMISSIONERS
LINCOLN COUNTY

NORTH PLATTE, NEBRASKA 69101
DECEMBER 31, 1980

RICHARD TRAYLOR
BUREAU OF LAND MANAGEMENT
555 ZANG STREET
3RD FLOOR EAST
DENVER, COLO. 80228

DEAR SIR:

THE LINCOLN COUNTY COMMISSIONERS WENT ON RECORD IN OPPOSTION TO THE PROPOSED "COAL SLURRY PIPELINE" EXTENDING FROM WYOMING TO ARKANSAS AND LOUISIANA. ACTION WAS TAKEN ON THIS AT THEIR MEETING HELD ON DECEMBER 29, 1980.

THE OPPOSITION TO THE PIPELINE FALLS IN FOUR MAJOR CATAGORIES:

1. WE ARE OPPOSED TO PUMPING OUT OF OUR UNDERGROUND WATER SUPPLY BECAUSE OF THE DRAWDOWN IN THE WATER WELLS IN NORTHWESTERN NEBRASKA AS IT WILL MEAN A DEPLETION OF WATER GOING INTO THE AQUIFIER OF OUR NORTH SANDHILLS IN NEBRASKA. WE ARE ALREADY CONCERNED ABOUT LOSING SOME OF OUR "WETLANDS" AND FALLING WATERTABLES. WE ARE ALSO CONCERNED THAT THE WATER PUMPED TO THE GULF WILL BE LOST TO OUR WATERSHEDS FOREVER.

2. WE ARE OPPOSED TO THE "COAL SLURRY PIPELINE" BECAUSE IT IS NOT THE MOST EFFICIENT TRANSPORTATION SYSTEM AVAILABLE. THE RAILROADS WOULD CONSUME ENERGY AT THE RATE OF 570,000 BTU'S PER TON OF COAL, WHICH MEANS THE RAILROADS ARE OVER FIFTEEN PERCENT MORE ENERGY EFFICIENT.

3. WE ARE ALSO OPPOSED TO THE "COAL SLURRY PIPELINE" BECAUSE THEY WOULD NOT BE EMPLOYING AS MANY PEOPLE AS THE RAILROADS WOULD. IN THIS TIME OF CRISES WHICH HAS BROUGHT ON INCREASING PRICES AND DECREASING EMPLOYMENT WE NEED MORE PEOPLE EMPLOYED TO STABILIZE OUR ECONOMY.

THE PIPELINE WOULD CREATE 1,624 JOBS DIRECTLY AND SECONDARY DURING CONSTRUCTION WHILE THE RAILROADS WOULD CREATE 2,500 JOBS TO OPERATE THE UNIT TRAINS AND 3,200 JOBS FOR MAINTAINENCE AND SUPPORT.

OFFICE OF

BOARD OF COUNTY COMMISSIONERS

LINCOLN COUNTY

NORTH PLATTE, NEBRASKA 69101

4. WE ARE ALSO OPPOSED TO THE LAND CONDEMNATION THAT WOULD BE REQUIRED TO ACQUIRE THE BULK OF THE RIGHT-OF-WAY FOR THE PIPELINE WHILE THE RAILROADS ALREADY HAVE THEIR RIGHT-OF-WAY.

WE REQUEST THAT THIS ACTION IS TAKEN INTO CONSIDERATION.

RESPECTFULLY YOURS,

LINCOLN COUNTY COMMISSIONERS

GERALD K. BROWN, CHAIRMAN

EUGENE F. HERRON

ROGER PAULMAN

101

VILLAGE OF HARRISON

OFFICE OF VILLAGE CLERK

HARRISON, NEBRASKA

69346

January 2, 1981

Richard E. Traylor
E.T.S.I.-E.I.S.
Project Leader
B.L.M.

Dear Mr. Traylor:

The Village Board of Trustees of Harrison, Nebraska wish to express their strong opposition to the coal slurry line.

The removal of the vast quantity of water required by the slurry line from this arid area could cause disasterous results in the future. The concept of sacrificing our most vital natural resource (water), in order to transport coal, when other methods of transportation are already available, is an impractical, shortsighted and dangerous solution to this Country's energy problems.

Sincerely,

The Village Board of Trustees
Harrison, Nebraska

110

City of Sundance

CROOK COUNTY

SUNDANCE, WYOMING 82729

January 2, 1981

Bureau of Land Management
Special Project Staff 3rd Floor
East 55 Zang Street
Denver, Colorado 80228

Dear Sir:

I am very much against the coal slurry pipeline getting the water it needs from the Madison Formation in Crook County Wyoming.

Wyoming is a semi arid state. Quite a few people and businesses depend on springs, shallow wells, small streams, and rivers for the water they do have.

If after the coal slurry the water is used for irrigation, why not bring the water up from a big river, take coal back then use it. It might be such a thing that some water could be used by some of the municipalities on the way up. The cost could be regained by resale and slurry use.

If the withdrawal was 20,200 acre feet per day, that would be enough water for the people of the state of Wyoming for approximately 80 days. For 2500 acre ranch with an annual rainfall of 16", it would be enough for a period of 6 years.

I don't think that the people or the state should let a project like this even get off the ground.

Sincerely,

Kenneth Glover

114

City of Fort Smith

January 5, 1981

Richard E. Traylor
United States Department of the Interior
Bureau of Land Management
Special Project Staff
3rd Floor, East
555 Zang Street
Denver, Colorado 80228

RE: ENERGY TRANSPORTATION SYSTEM'S INC.
COAL SLURRY PIPELINE
TRANSPORTATION PROJECT

Dear Mr. Traylor:

In response to the Enviromental Impact Statement filed with your office for the above captioned, the City of Fort Smith, Arkansas expresses its opposition of the placement of the coal slurry pipeline through certain portions of the Lower Lee Creek Drainage Basin. This area is more particularly described in Appendix A, Map A-19 of the Enviromental Impact Statement.

The reason for Fort Smith's opposition to the location of the proposed coal slurry pipeline is that we are presently developing plans for a water impoundment in the lower portion of the drainage basin of Lee's Creek. Enclosed with this cover you will find an area map indicating the boundaries of the proposed impoundment, a property ownership map which also indicates the boundaries of the proposed impoundment, and a copy of the resolution passed by the Fort Smith Board of Directors authorizing the design of the dam for the impoundment. You will note that the resolution indicates a 10 MGD impoundment. This will be the first phase of this project and will be expanded as Fort Smith and surrounding area water demand increases.

The porposed dam location is at mile 3.8 of Lee Creek. However, as indicated on the property ownership map enclosed, due to the topography the southern most portion of the impoundment will be approximately one (1) mile from Interstate I -40. The City of Fort Smith would not express any opposition to the above captioned providing the construction of the same would pass through the corridor between I -40 and the projected normal water level of the proposed impoundment. Additionally, we will have no opposition to the "Market Alternative" providing that it is routed clear of the northern portion of the normal water level of the proposed impoundment. This would basically be along the north line of sections 13 and 18, Township - 12-N, Range - 27-E of the State of Oklahoma.

623 GARRISON AVENUE • P.O. BOX 1908 • FORT SMITH, ARKANSAS 72902 • 501-785-2801

ENERGY TRANSPORTATION SYSTEM"S INC. -2- January 5, 1981
COAL SLURRY PIPELINE
TRANSPORTATION PROJECT

The City of Fort Smith is very much concerned as to the location of the coal slurry pipeline as it may affect the proposed impoundment which is vital to serve this areas future water needs. Should you have any questions or comments, please advise.

Cordially,

Steve Parke
Acting Director Public Works

rm

cc: Steve Lease, City Administrator

Energy Capital of the Nation
City of Gillette
P.O. Box 3003 Gillette, Wyoming 82716
Phone (307) 686-2222

January 6, 1981

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

This is in reference to the draft environmental statement on the proposed Energy Transportation Systems, Inc. coal slurry transportation project. The following are the City of Gillette's comments and concerns on the proposed project.

Since the project proposes the construction of three coal slurry preparation plants in the immediate vicinity of Gillette, the use of City water, and the infusion of 1,500 temporary workers, as well as 428 fixed-site employees by the fourth quarter of 1984, we feel that the proposed project would have merited a "hearing" in the City of Gillette. Even though you consider the project not having any "significant" cumulative socio-economic impacts on the City of Gillette, we question what you consider to be "significant". In our opinion, the project would result in short-term and long-term socio-economic impacts which would be considered "significant".

Much of the socio-economic analysis and methodology for arriving at your future employment and population projections are contained in a Woodward-Clyde Consultant's document which has not yet been published. It is difficult for the City to even comment on your methodology and analysis if we are not provided a copy of this report.

Can we be provided with a copy of the Woodward-Clyde Consultant's publication?

Your proposal to only monitor the drawdown levels of the Gillette well field does not go far enough. There needs to be a specific measure on assessing the drawdown impact on the Gillette well fields, and a mitigation proposal tied to this measurable index so that the water supply can be adjusted to off-set for the drawdown impact.

What specifically does ETSI propose as its mitigation action for off-setting the potential drawdown impact on the Gillette well fields?

Mr. Richard E. Traylor, Project Leader
January 6, 1981
Page 2

The statement assumes that the City will have expanded, or plans to expand, community facilities and services to easily accommodate the anticipated growth brought about by the proposed slurry pipeline, but does suggest that the cumulative impacts of all projects on the City's facilities would be substantial. It is unrealistic for ETSI to separate their impact on the City's facilities from other construction projects which may be on-going during 1984 through 1990. The EIS also assumes the expansion of the City's sewer capacity by 1984. As a mitigation measure on community facilities, it is recommended that ETSI assist the City with other government agencies, such as EPA, in order to expedite the City's grant application to expand our sanitary sewer plant, and that ETSI contribute a portion of the City's local match for the grant application.

What mitigation measures are proposed in order to assist the City in expanding community facilities and services for accommodating the anticipated growth brought about by the proposed pipeline?

It is estimated in the EIS that 840 temporary dwelling units would be needed in the Gillette area by the 1,500 workers building the pipeline for about 6 to 8 weeks in the fourth quarter of 1984. The City estimated only 497 hotel/motel rooms in the Planning District which could be designated for persons wanting to stay one week or more. Moreover, the EIS acknowledges a short-term housing shortage, and suggests that this could be handled with existing temporary quarters, travel trailers, and the sharing of rooms by construction workers. This is not a valid assumption since it does not take into consideration other demands on temporary quarters brought about by simultaneous construction projects planned for 1984. In addition, it assumes a rental vacancy rate of 5%, while City surveys indicate a rate closer to 1%. Since a short-term housing shortage is acknowledged, it may be useful to contact energy companies in the Gillette areas for assistance on finding temporary quarters during the construction of the pipeline through the Gillette area.

What measures will be taken to insure that the 1,500 temporary construction workers will have housing in the Gillette area during the 6 to 8 weeks of construction on the pipeline?

The statement estimates 428 fixed-site, or permanent, employees for the Gillette area as a result of the construction of the proposed coal slurry pipeline. It is assumed that these fixed-site employees could be absorbed into Gillette's permanent housing market, but the statement does not take into account the number of dwelling units which would be required for the secondary, or non-direct, employees which would be generated as a result of the project. The 428 fixed-site employees, as well as the non-direct employees generated by the project, would contribute

Mr. Richard E. Traylor, Project Leader
January 6, 1981
Page 3

further constraints on an already tight housing market in Gillette. Thus, it is recommended that ETSI, at a minimum, propose a mitigation measure for increasing the housing stock of the City by at least 428 additional dwelling units. This could be accomplished by loan guarantees, or by some other mechanism which would generate additional housing units in the City. It is vitally important that a substantive mitigating measure be implemented which would increase the City's housing stock.

What mitigation measures will be required in order to increase the housing stock of the City by 428 dwelling untis?

In conclusion, the statement seems to lose sight of the fact that other major construction projects may be occurring in the Gillette area which would substantially contribute to the cumulative socio-economic impacts. For instance, do you take into consideration the construction of Wyodak, Unit 11, or the Hampshire Synfuel projects in your cumulative socio-economic impact analyses?

The City appreciates the opportunity to review and comment on the draft EIS for the proposed slurry pipeline, and we trust that my comments and queries will be given serious consideration.

Sincerely,

Michael B. Enzi
Mayor

MBE/fer

210

g

a voluntary association of local governments serving creek, osage and tulsa counties

indian nations council of governments . 630 west 7th street . tulsa oklahoma 74127 . 918/587-3178

January 8, 1981

Mr. Richard E. Traylor,
ETSI ESI Project Leader
US Dept. of the Interior
Bureau of Land Management
3rd Floor East
555 Zang Street
Denver, CO 80228

RE: 123-80, EIS Coal Slurry Pipeline

Dear Mr. Traylor:

The Board of the Indian Nations Council of Governments, acting in its capacity of district clearinghouse, has reviewed the above project and forwards the following preliminary comments:

The review of this Environmental Impact Statement was coordinated with the Osage Tribal Council, the Osage County Commission, the Osage County Conservation District, the US Army Corps of Engineers, and the US Fish and Wildlife Service, and the Tulsa Metropolitan Area Chamber of Commerce. Extensive comments were received from the US Fish and Wildlife Service and the US Army Corps of Engineers. We concur with these comments, and additionally, wish to offer the following preliminary comments:

(1) Wasteload allocations for all wastewater discharges must be performed before discharge permits can be written or wastewater discharges can be made. The resultant wasteload allocations must protect receiving stream water quality and maintain the Oklahoma Water Quality Standards.

(2) No discharge should be allowed without valid, approved discharge permits required by Oklahoma and the US EPA. The draft Environmental Impact State (EIS) erroneously omits Oklahoma from the list of states requiring permits to protect water and air quality.

As Susan Young indicated in her phone conversation with you on January 8th, further comments will be arriving at the earliest possible date.

Jerry Lasker
Page 2

If you should have any questions relative to our review of the project thus far, please do not hesitate to contact this office.

Sincerely,

Jerry Lasker
Executive Director

JL:lb

Enc.

g

a voluntary association of local governments serving creek, osage and tulsa counties

indian nations council of governments . 630 west 7th street . tulsa oklahoma 74127 . 918/587-3178

January 14, 1980

Mr. Richard E. Traylor
ETSI EIS Project Leader
U.S. Dept. of the Interior
Bureau of Land Management
555 Zang Street, 3rd Floor East
Denver, Colorado 80228

Dear Mr. Traylor,

RE: 123-80, EIS Coal Slurry Pipeline

The Indian Nations Council of Governments has completed its review of the above project, and in addition to our communication of January 8, 1981 wish to offer the following comments:

(1) No mention is made in the EIS of the heavy metals concentrations in the discharges from the dewatering plants. This is especially critical for those facilities which will discharge into Public Water Supplies (e.g., Oologah and Pryor). Analyses of metals contents (e.g., cadmium, chromium, nickel, lead, etc.) should be made before discharge permits are issued.

(2) The exact discharge point of the Pryor dewatering plant should be carefully sited, so as not to adversely impact the City of Broken Arrow future water supply intake now under construction. (That is the discharge point should be downstream of the water supply intake).

(3) We request that the INCOG Environmental Management Division be consulted at the earliest possible times in the discharge permitting processes (e.g., NPDES permits) for recommendations concerning permit conditions for dischargers impacting our region. Water users downstream should also be highly involved in these permitting processes.

We greatly appreciate the accommodation that you have made to insure that our concerns are understood. We look forward to further communications regarding this project.

Sincerely,

Jerry Lasker
Executive Director

212

FIFTH DISTRICT PLANNING AND DEVELOPMENT COMMISSION

P.O. Box 640
365½ S. Pierre St.
Pierre, S.D. 57501

Phone: (605) 224-1623

EXECUTIVE DIRECTOR
Dennis W. Potter

PROJECT NOTIFICATION AND REVIEW SIGNOFF

State Identification Number EIS 050181 ETSI
Date Received 11/14/80
Review Terminated 1/8/81

(SEE ATTACHED FORM # 424)

THE REGIONAL CLEARINGHOUSE MAKES THE FOLLOWING DISPOSITION CONCERNING THIS APPLICATION

____ Recommend in favor of funding without reservations

____ Recommend in favor of funding with attached reservations

____ Recommend against funding without comments

✓ Recommend against funding with attached comments

____ No recommendations or comments

Dennis W. Potter

DENNIS W. POTTER
EXECUTIVE DIRECTOR
FIFTH DISTRICT PLANNING AND DEVELOPMENT COMMISSION

FIFTH DISTRICT PLANNING AND DEVELOPMENT COMMISSION

P.O. Box 640
365½ S. Pierre St.
Pierre, S.D. 57501

Phone: (605) 224-1623

EXECUTIVE DIRECTOR
Dennis W. Potter

January 9, 1981

The Fifth District Planning and Development Commission is opposed to the Bureau of Land Management preferred alternatives. The Division Commission:

1. Supports the comments of the Sixth District Council of Local Governments submitted to the Bureau of Land Management on December 16, 1980.

2. Urges the State of South Dakota to take all steps necessary including legal action, to prevent the utilization of ground water when the drawdown would impact South Dakota, as the water source of this project.

Copies to: Bureau of Land Management
Governor William Janklow
SD Department of Water and Natural Resources
SD A-95 Office
SD Congressional Delegation
District Six

219

DEPARTMENT OF PLANNING SERVICES
PHONE (303) 356-4000 EXT. 404
915 10TH STREET
GREELEY, COLORADO 80631

WELD CO.
COLORADO

January 5, 1981

Mr. Richard E. Traylor
Project Leader, ETSI EIS
U. S. Department of Interior
Bureau of Land Management
3rd Floor East
555 Zang Street
Denver, Colorado 80228

Re: Draft EIS - Coal Slurry Pipeline Transportation Project

Dear Mr. Traylor:

The Weld County Department of Planning Services Staff has reviewed the draft EIS for the ETSI Project and has several concerns.

1. The draft EIS identifies the long-term impacts versus short term gains of the proposed project (Chapter 5). Under that section the alternative well drawdowns for the Madison Formation were discussed. There was no comparable discussion found for rate of recharge of the Madison Formation within Chapter 5. Does that in effect mean that the time frame for recharge of the aquifers is so long-term as to nullify any ability to reuse the aquifers in the future? If that is true, perhaps more consideration should be given to the Oahe Reservoir alternative. The Oahe Reservoir alternative is not only a renewable resource, but will greatly benefit those communities along the water pipeline route by providing a domestic water supply for those communities. The low dollar cost of obtaining groundwater from wells in Wyoming should not be allowed to outweigh the long-term economic and social costs of the resource loss associated with the proposed withdrawal of water from and arid region. The significance of the effects to the water table will not be evident until municipal, domestic, or agricultural supply sources are needed in the future.

2. The second major concern of Weld County is the lack of information in the text with regard to the Colorado alternative. From the maps available in the EIS, the alternative may be described as a typical engineer's "straight-line approach" to routing the pipeline. The Weld County Department of Planning Services Staff is very concerned with potential negative impacts to the Pawnee Buttes area. Consideration should be given to routing the pipeline around the ecologically fragile Buttes area. An abandoned railroad right-of-way exists a few miles to the west of this route. This corridor

---

Mr. Richard E. Traylor
January 5, 1981
Page 2

could possibly be utilized without creating apparent significant impacts to the resource base of the area. The Draft EIS does not identify the location of the proposed emergency ponds other than to state that they will be associated with various pumping stations. The map shows a pumping station within the immediate vicinity of the Buttes. This proposed site may be a poor location for a pumping station and an unacceptable location for an emergency pond because of the potential value of the area as a national landmark.

3. A proposed electric transmission line will cross to the north of the Pawnee Buttes area and there will also be microwave towers in the vicinity of the Buttes. The impacts of this transmission line to the visual resources of the Pawnee Buttes area will be tremendous. An electric transmission line already exists in the area which may have a potential for utilization by this proposed pipeline. Additional overhead transmission lines will significantly impair the aesthetics of the Pawnee Butte area.

4. Finally the line may disturb fossil sites in the area. While those fossil sites are located on private land, consideration should be given to avoiding those areas in the event of a major archaeological resource being lost or damaged.

5. Under the existing Weld County Zoning Resolution, pumping stations and pipeline terminals require approval of a special use permit by the Weld County Planning Commission and Board of County Commissioners. Under new Zoning Regulations proposed to be adopted in the spring of 1981, the coal-slurry pipeline would also require a special use permit. The application for the special use permit must demonstrate compatibility with the surrounding area, harmony with the character of the neighborhood and existing agricultural uses, and need for the proposed use. The special use permit must show that there will not be negative impacts upon the immediate area, on future development of the area and the health, safety and welfare of the inhabitants of the area and the County (Section 3.3E.2 of the Weld County Zoning Resolution).

The Weld County Comprehensive Plan identifies certain areas which should be protected from development including floodplains; aquifer recharge areas; areas of steep slope, unstable geology and soils; and unique natural scenery. The Department of Planning Serivces feels that the Pawnee Buttes area has unique natural scenery that should be protected from adverse impacts from development. The poor ability of the ecologically sensitive ecosystems of the Buttes formations to withstand and recover from the impacts of man has been sufficient for the National Forest Service to close off the area to vehicular traffic. The close proximity of this pipeline route to the Pawnee Buttes may cause some secondary impacts to the Buttes from increased numbers of people and vehicles in the vicinity. Disturbance of vegetation and animal communities from

---

Mr. Richard E. Traylor
January 5, 1981
Page 3

air and noise pollution, erosion of unstable slopes or areas without vegetative cover, and negative impacts to the delicate water balance of the grasslands ecosystem are several potential problems that could occur from developement in the area.

Therefore, the Department of Planning Services would like to stress that the routing of the pipeline through this particular area may not be compatible with the surrounding environment. The applicant should be prepared to address all possible environmental impacts and provide the appropriate mitigation for negative impacts either directly or indirectly caused by the proposed pipeline route. It would be advisable to inform ETSI of Weld County's policies, plans and requirements.

6. Other concerns with the proposed Colorado route included the source of water for pump stations, control of construction efforts to minimize impact to areas in the vicinity of the pipeline and revegetation control over several years to insure successful reclamation of the pipeline corridor. These concerns can be addressed during the special use permit application process.

The Weld County Department of Planning Services staff appreciates the opportunity to review and comment on this draft environmental impact statement.

Respectfully,

Vickie Traxler/ad

Vicke Traxler
Assistant Zoning Administrator

Thomas E. Honn

Thomas E. Honn
Zoning Administrator

VT:ard
TEH:ard

221

Office of
COUNTY COMMISSIONERS
Crook County
SUNDANCE, WYOMING

January 7, 1981

RESOLUTION

WHEREAS:

Proposals are in existence whereby underground water from wells in Niobrara County from the Madison formation underlying the Powder River Basin is scheduled to be used by Coal Slurry Pipeline and

WHEREAS:

Proposals are in existence whereby underground water from wells in Crook County from the Madison formation underlying the Powder River Basin is scheduled to be used by Coal Slurry Pipelines and

WHEREAS:

Most of the Municipal water supply for the entire Powder River Basin area is dependent upon this Madison formation and

WHEREAS:

Most studies conducted show that this use of Madison formation water will have a very serious adverse effect upon the wells and surface streams of Crook County and

WHEREAS:

Existing Wyoming Statutes are not adequate to protect the present users of both underground and surface water

THEREFORE:

Be it resolved by the Crook County Board of County Commissioners that they be on record as being absolutely opposed to the use of Madison formation water for the purpose of Coal Slurry Pipeline and hereby urge the Governor of the State of Wyoming, the Wyoming Legislature, and the United States Department of Interior to do everything in their power to prevent this use of said water.

BOARD OF COUNTY COMMISSIONERS
OF CROOK COUNTY, WYOMING.

Jw Nuckolls
Chairman

Donald C. Gose
Member

Frank H. Harwood
Member

s/s Ruth E. Davidson
Crook County Clerk

229

Board of County Commissioners
Sequoyah County
P.O. Box 279
Sallisaw, Oklahoma

January 19, 1981

Richard E. Traylor
United States Department of Interior
Bureau of Land Management
Special Project Staff
3rd Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

Attached you will find a memo passed by the Board of County Commissioners of Sequoyah County opposing the current proposed location for a coal slurry pipeline. We are not opposing its construction but are opposing the location.

As stated in the memo the City of Fort Smith, Arkansas has planned a water impoundment in the same vicinity as the proposed line. The City of Fort Smith serves as the regional center for this area and as such they provide water to many small communities around them including several in Oklahoma. They are approaching a critical point so far as a future water supply is concerned and we support their efforts to increase their future supply of water by constructing an impoundment at mile 3.8 on Lower Lee Creek.

The route north of State Highway 101 at the Lee Creek Crossing would also put the line beyond a point included in any future impoundment extension.

The Board of County Commissioners of Sequoyah County is quite concerned about the proposed route and its long term consequences.

Sincerely,

Frank S. Griffin

Frank S. Griffin, Chairman
Board of County Commissioners
Sequoyah County, Oklahoma

FSG:bpw

cc:
Governor George Nigh
Representative Don Mentzer
Senator Joe Johnson
Steve Lease

COMMISSIONER	COMMISSIONER	COMMISSIONER
James E. Treat	Fred D. Gossett	Frank S. Griffin
DISTRICT 1	DISTRICT 2	DISTRICT 3

RESOLUTION

A RESOLUTION OPPOSING THE CURRENTLY DESIGNATED ROUTE OF A COAL SLURRY PIPELINE, BY ENERGY TRANSPORTATION SYSTEM'S INC., AS IT TRAVERSES THE LOWER LEE CREEK DRAINAGE BASIN. SAID AREA MORE PARTICULARLY DESCRIBED IN APPENDIX A, MAP A-19 OF THE ENVIRONMENTAL IMPACT STATEMENT.

WHEREAS, the Board of County Commissioners of Sequoyah County have certain responsibilities in the unincorporated areas of Sequoyah County, and;

WHEREAS, the proposed coal slurry pipeline crosses certain of those unincorporated areas in Sequoyah County, and;

WHEREAS, the currently proposed route of said pipeline would have detrimental effects on Sequoyah County and surrounding area if constructed, and;

WHEREAS, there are other locations that would not have such an effect.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF SEQUOYAH COUNTY THAT THEY OPPOSE THE PARTICULAR PROPOSED ROUTE OF SAID COAL SLURRY PIPELINE AS SET OUT IN APPENDIX A MAP A-19 OF THE ENVIRONMENTAL IMPACT STATEMENT.

BE IT FURTHER RESOLVED THAT THE BOARD OF COUNTY COMMISSIONERS OF SEQUOYAH COUNTY RECOMMEND THAT SAID COAL SLURRY PIPELING BE LOCATED FAR ENOUGH BELOW MILE 3.8 ON LEE CREEK SO AS NOT TO INTERFERE WITH A WATER IMPOUNDMENT PLANNED BY THE CITY OF FORT SMITH, ARKANSAS.

THE BOARD OF COUNTY COMMISSIONERS OF SEQUOYAH COUNTY WOULD HAVE NO OBJECTIONS TO A LOCATION ALTERNATE SOMEWHERE NORTH OF STATE HIGHWAY 101 AT THE BIG LEE CREEK CROSSING.

Approved this 19th day of January 1981 by the Board of County Commissioners of Sequoyah County.

Frank S. Griffin
Frank S. Griffin, Chairman

James Treat
James E. Treat, Member

Fred D. Gossett
Fred D. Gossett, Member

ATTEST:
Mayme Lillard
Mayme Lillard, County Clerk

8

South Dakota Resources Coalition

Volunteers in the Public Interest

Drawer G, Brookings, S.D. 57007

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, Colorado, 80228

January 2, 1981

Dear Mr. Traylor:

We suspect that you may receive these comments too later to enter into the formal record for the EIS on the ETSI Coal Slurry Pipeline. However, we send our comments with the hope that your Bureau might relent and give public interest organizations more opportunity to partake in this very important decision -- national policy favoring perhaps the development of slurry line complexes, a very high technological base, a vast commitment of nonrenewable resources, a first in perhaps many more slurry lines depleting the waters of arid regions and literally sending them to regions of high water supplies, and perhaps most important, an unknown committment of financial resources in times of urgency for capital needs in other areas of concern for the public.

We must protest

> that we as public interest organizations have not been allowed sufficient time to study in depth the EIS statement before the deadline date.
>
> that total socioeconomic impacts on society cannot be evaluated vis a vis the common good unless the economic costs of the projected slurry line are known. We have not had access to the technical report for this project. Nowhere in the EIS are listed precisely the dollars and cents costs of the plan One cannot compartmentalize environmental concerns and economic costs. They are interconnected--part of the whole picture. To treat them separately in our opinion has made this EIS in much part irrelevant to the real world.

We would suggest that the final EIS would consider the political, social and economic impacts on the whole body politic. For example, would the investment tax writeoff be 10% or 12%. Would there be tax-free bond exemption as suggested for the SD West River Aqueduct? How would this affect the efficiency of the slurry line. If these provisions were allowed for this first slurry line, what would other slurry line companies do -- also line up for the tax benefits? Should the more energy efficient railroads' decline as planned slurry lines come into operation be charged also against the energy efficiency of slurry lines as shown in this EIS?

SDSU Great Plains Alpine Club • Lakota Audubon Society • Black Hills Energy Coalition
National Catholic Rural Life Council, Sioux Falls Diocese • CRUD (Community Recyclers of Usable Discards, Sioux Falls)
Dakota Environmental Council • Friends of the Earth, South Dakota Chapter • South Dakota Lung Association
Brookings County National Farmers Organization • Lake County National Farmers Organization • South Dakota Ornithogolists Union
Dakotah Chapter of the Sierra Club, South Dakota Section • Soil Association of South Dakota

(THIS PAPER IS 100 PERCENT RECLAIMED WASTE PAPER.)

2

We would have appreciated knowing precisely what definite markets are assured, or have been contracted to buy the coal through the proposed slurry line. For a crucial element in the cost/benefit ratio is full use (capacity) of the line for thirty years. Are such long time supply contracts now in general use? Have the utility companies committed themselves to use, for thirty years?

SPECIFIC COMMENTS

1. The recommended route goes through an extremely fragile section of Nebraska known as the Sandhills, famous for their peculiar 'blowouts! Even such minor soil disturbances as telephone poles have problems. Yet recommended for soils treatment are ETSI's General Construction, Operating, and Reclamation Proceedures. (p. C 1)

2. The EIS seems to ignore the SD School of Mines and Technology, the University of Wyoming and the U.S. Geological Survey findings that all indicate that water availability would be dramatically decreased in southwestern SD as far northeast as Philip or even further. The solution seems to be ETSI's assurance that water would somehow be provided.

3 We note the frequent use of telephone conservations with local town and community clerks to dervive socioeconomic impacts. We cannot accept this method as complete objective methodology to find actual impacts on human beings.

4. In our opinion a precise example of the inadequacy of this report if the way in which slurry pipeline ruptures and spills were projected. We are not given the formula used in forecasting 2.70 spills over a ten year period in this 1800 mile slurry line using a one-spill event in the 293 long Black Mesa slurry line. We recall the testimony of Russell Train in his testimony before House Hearings on Coal Slurry Line Legislation (94-B) 1975, page 46

> According to Pacific Gas and Electric Compny engineers, problems continue with the Black Mesa pipeline mentioned in Senate Rept. 93-1072. Biologists from the University of New Mexico are continuing to report periodic large discharges of slurry fluids from that line at a location called Secret Pass in Arizona in order to avoid separation of the slurry and their clogging of the line. Discharge of such low quality water along with coal being slurried has a substantial potential for contamination of surface and ground water.

5. We note the bibliography and text makes use of Perry Rahner's work at the SD School of Mines and Michael Reiber's studies at the U. of Ill, yet in the interests of objectivity fails to note any real conclusion of the two scientists. Their conclusions in going through their studies were completely negative in the efficiency of coal slurry lines over present methods of transportation.

3

SPECIFIC COALITION CONCERNS

The Oahe Reservoir is considered as an alternative water supply system in the EIS. We in South Dakota must admit to past and present confusion about the actions of ETSI in our state. ETSI has been applying to federal bureaus for several years for SD water in addition to water from the Oahe Reservoir. ETSI had applied for water from the Shadehill Reservoir. In 1979, the company applied for 2 billion gallons of Belle Fourche River water. Our confusion has also increased as the mileage has increased for the pipeline. The proposals of ETSI seemed to have continually undergone change as well as participants in the consortium of companies. In 1976 ETSI told the press that the slurry line would bypass Nebraska, yet today the proposed route intersects that state. Who will determine the final route?

We also understand that the upcoming Wyoming legislature will face again the battle of rescinding the water permit of ETSI for water from the Madison aquifer. This time around, our sources say a real battle is being joined. If the Wyoming legislature decides against the pumping the Wyoming well fields, then obviously the Oahe alternative will again be a real possibility. The West River Aqueduct Study (Technical Report), showed in figure IX-4 that an aqueduct as planned bringing water to the coal fields would cost with interest almost four billion dollars, and one could only conclude that this would be a staggering investment to sell three and a half million dollars worth of water annually. Should these economics be part and parcel of determining efficiency in water and energy systems?

We conclude that although much earnest and well meaning work has gone into the preparation of this EIS statement, the 'optimist' view is presented everywhere and those of us who are conerned with the REAL FUTURE in a new kind of world which will not permit HIGH ENTROPY use of precious resources, rather at a loss in commenting on such a deterministic stance as shown in much of this EIS.

We would thank you for any reply you could give to us.

Sincerely,
Maxine McKeown
Maxine McKeown, Land Use Chairman
SD Resource Coalition
R.R. White, S.D. 57276

encl.

10

OKLAHOMA GAS AND ELECTRIC COMPANY
OKLAHOMA CITY

R. H. SMITH
ASSISTANT TO THE PRESIDENT

December 1, 1980

Mr Richard E Taylor
Office of Special Projects
3rd Floor East
555 Zang Street
Denver, CO 80228

Dear Mr Taylor:

We regret that we will be unable to attend the public hearing which is scheduled in Tulsa; however, we did want to submit the attached letter as documentation concerning our position in regard to the Coal Slurry Pipeline project.

Also, it is our understanding that Public Service Company of Oklahoma will attend the public hearing and present the views of the electric utilities in the state of Oklahoma.

Sincerely,
RHSmith

Attachment

OKLAHOMA GAS AND ELECTRIC COMPANY
OKLAHOMA CITY

J. E. WILSON
MANAGER, GOVERNMENTAL AFFAIRS

December 1, 1980

Mr Richard E Taylor
Office of Special Projects
3rd Floor East
555 Zang Street
Denver, CO 80228

Dear Mr Taylor:

We wish to submit this letter as written documentation concerning the position of Oklahoma Gas and Electric Company on the Energy Transportation System Incorporated's Coal Slurry Pipeline project.

The coal slurry pipeline will be of great benefit to the electric utilities and the electric rate payers in the state of Oklahoma. At present, we are obtaining low sulfur coal from Wyoming and having it shipped by rail. A coal slurry pipeline would tend to hold the cost of rail transportation down since there would be competition for this type of business, and it is more important now than ever to have competition since the federal government has deregulated railroad rates. All of our new generating units are coal-fired, and it is expected that there will be plenty of business for both the railroads and the pipeline.

The coal slurry pipeline will be more beneficial to the environment than the railroads. Nearly all of the land is restored and can be productive for growing crops over a pipeline right-of-way. A railroad occupies its right-of-way full time and, therefore, makes the land unproductive for other purposes. Also, pipelines use electricity made from coal, while the railroads use diesel oil as the energy to move the coal which increases imports of oil.

We trust that this information will be beneficial as our endorsement of the very much needed coal slurry pipeline.

Sincerely,

J E Wilson

30

North Platte Development Corporation
P.O. BOX [illegible] NORTH PLATTE, NEBRASKA [illegible]

December 17, 1980

Mr. Richard Traylor
Office of Special Projects
Bureau of Land Management
555 Zang Street
Third Floor East
Denver, Colorado 80228

Dear Mr. Traylor,

During the public hearing on the coal slurry pipeline project in North Platte on December 11, 1980, a public position was stated for the Chamber of Commerce and the Western Nebraska United Chambers of Commerce. Gary Toebben, Manager of the North Platte Chamber of Commerce, spoke for both of the above organizations in opposing the coal slurry pipeline.

I am the Executive Director of the North Platte Development Corporation. At our regular meeting on December 12, 1980, our organization voted in opposition to this project, also.

The North Platte Development Corporation's goal is to increase the job opportunities in our City and County. One hundred and fifty (150) local businesses financially support our efforts. Our most important job producing sector in Lincoln County is the Union Pacific Railroad. One of the most important functions of a local development corporation is to maintain the existing economic base and to seek means to assure it's continued growth. We view the pipeline(s) as a major deterrent to future growth in employment at the Union Pacific Railroad, and therefore, we oppose this construction project.

During the past eleven years, I have been involved in community and regional development across the State of Nebraska. Industrial growth has occurred primarily in Eastern Nebraska. As you know, energy related developments provide a unique opportunity for Western Nebraska to particpate in a balanced population growth for this State. The movement of coal through Western Nebraska has already provided growth in Alliance through Burlington Northern

Mr. Richard Traylor
Page 2

expansion, and the location of "rail car maintenance" facilities in Alliance, Scottsbluff and Sidney. North Platte hopes for continued growth as the Union Pacific carries more coal for power plants.

We find the tradeoff of a scarce water supply for Western Nebraska jobs unexceptable.

Thank you for the opportunity to state our views.

Sincerely,

Patrick J. Malloy
PATRICK J. MALLOY
Executive Director

PJM/ks

33

BLACK HILLS ALLIANCE
BOX 2508 RAPID CITY, SOUTH DAKOTA 57709 605-342-5127

December 23, 1980

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, Colorado B0228

Dear Mr. Traylor:

This document and its attachments comprise the comments of the Black Hills Alliance on the scope and adequacy of the Draft Environmental Impact Statement (DEIS) for the proposed Energy Transportation Systems, Inc. (ETSI) coal slurry pipeline. The Black Hills Alliance is a non-profit environmental group which emphasizes public education and outreach on energy issues in our area.

These comments will be limited to three issues, although our concerns about ETSI's proposal are wide-ranging. The issues we will concentrate on in these comments are: (1) the DEIS's systematic attempt to omit effects the alternatives would have on the Black Hills, particularly the southern Black Hills; (2) the omission of some key energy considerations from the DEIS; and (3) violations of the National Environmental Policy Act that would result from adoption of a pipeline alternative.

First, the scope and adequacy of the DEIS are seriously flawed by the lack of consideration of the effects the alternatives would have on the Black Hills, particularly on the southern Black Hills. Although we hope this was just an oversight, the omissions begin with the Cover Sheet (p. iii). Fall River and Custer Counties are not listed as areas that "Could Be Directly Affected" by the projects. Considering the drastic effects listed elsewhere in the DEIS (pp. 2, 2-8, 2-9, 3-2 - 3-29, 3-51 - 3-52, 3-60, 3-75, 4-4 - 4-17, 4-57, 4-122 - 4-123, 4-125 - 4-126, 5-1 - 5-3, 5-8, 5-11 - 5-12, 5-15), this was a major omission.

Second, several socioeconomic effects are omitted. The potential socioeconomic effects on South Dakota are completely ignored, except for the Oahe alternative (pp. 4-104 - 4-105). The effects on the Black Hills area for any of the pipeline alternatives could, and our experience says would, be extensive. The reason for this deficiency appears to be the flawed assumption that pipeline workers and railroad workers would live in Wyoming or in Alliance, Nebraska.

Our experience with the energy boom in the Gillette, WY., area has been that many people who work there are willing to commute eighty or more miles to live in the northern Black Hills in South Dakota ("Priority Listing Approved of Energy-Impacted Cities," Rapid City Journal, June 16, 1978; Sixth District Council of Local Governments, Energy Impacts and the Effects of a Severance Tax on the Western South Dakota Counties, 197B, pp. 4-5, 34). As the Niobrara well field would be about fifteen miles from Edgemont, and as the Crook well field would be about forty miles from the South Dakota border, we can expect similar population impacts from pipeline activities.

Two other socioeconomic impacts were excluded from all alternatives and all areas:

effects the proposals would have on community stability and on politics. These topics are usually included in analyses of boom town situations. For more information, see Davenport, The Boom Town: Problems and Promises in the Energy Vortex, University of Wyoming, 1980; United States Commission on Civil Rights, Energy Resource Development: Implications for Women and Minorities in the Intermountain West, U. S. Government, 1979; Murdock, Energy Development in the Western United States: Impact on Rural Areas, Praeger Publishers, 1979.

Also omitted under socioeconomic impacts, particularly for the southern Black Hills, is a consideration of the difference between the short-term jobs for pipeline alternatives and the long-term jobs for railroad alternatives. This is a key consideration for the Edgemont area, where recent expansion of Burlington Northern facilities has taken place. More jobs in relation to those facilities would provide long-term work, while pipeline construction would provide only short-term work. This difference is mentioned briefly (p. 2-12), but a thorough consideration of what the difference means to the local economy, social life, and facilities should be included in the Final EIS.

Under the general heading of the DEIS's failure to address impacts on South Dakotans, the DEIS also omits full consideration of water impacts in a variety of ways. South Dakotans do not now have any protection from water drawdown as a result of the pipeline alternatives. Local residents made it known at the recent hearings that the agreement between ETSI and the State of Wyoming would not be accepted by South Dakota, mainly because of lack of enforcement power and long delays in getting alternative water to those effected by drawdowns. Absolutely no further action should be taken promoting a pipeline alternative until an agreement is made protecting the water of South Dakotans.

We were disturbed to see that the study on potential water drawdown by Dr. Perry Rahn of the South Dakota School of Mines and Technology was not included in the DEIS. We understand that his work was included in the technical report; but his conclusions, based on a dozen years of study of Black Hills hydrology and supported by a U. S. Geological Survey computer model, were ignored in the DEIS (Rahn, "Effect of the Proposed ETSI Coal Slurry Pipeline on Water Resources in Wyoming, South Dakota, and Nebraska," Proceedings of the South Dakota Academy of Science, 1979; Testimony of Dr. Perry Rahn, ETSI Hearing, Edgemont, S.D., October 10, 1979). As there are many studies present on this particular issue, the least the DEIS should have done was draw a best case/worst case analysis of the potential effects. Also, more weight should be given to long-term study by local scientists than to short-term study by imported scientists.

In the same area, the DEIS notes that pumping, especially at the Niobrara field, would take place at a point where the recharge waters to the Madison aquifer are beginning to move horizontally (p. 3-10). The effects of pumping water from that particular point in the hydrological system might be particularly significant and should be looked into more closely.

Also omitted from the discussion of impacts on South Dakota are the effects that water drawdown would have on the Black Hills area's two main industries, agriculture and tourism. If ranching wells cease flowing or are drawn down, and if hot spring

and fishing stream flows are reduced (pp. 2, 2-8 - 2-10, 4-4 - 4-17, 5-1 - 5-3, 5-7 - 5-12), our economic base would be seriously weakened. This issue should be discussed from an environmental, as well as from a socioeconomic, viewpoint.

The DEIS completely ignores the potential affects that enforcement of Indian water rights would have on any of the pipeline alternatives. As the Hearing Board requested more information on this issue, we are attaching an explanation of the Winters doctrine (Attachment 1), a newspaper article on Indian water issues (Att. 2), a copy of the 1868 Fort Laramie Treaty (Att. 3), and a newspaper article on the current status of that Treaty (Att. 4).

Basically, until the Fort Laramie Treaty issues are resolved, all waters within the Treaty area should be considered to be owned by the Dakota (Sioux) Nation. Regardless of the legal outcome of the Treaty issues, under the Oahe alternative, use of Missouri River water would be effected by the water rights of the Standing Rock, Cheyenne River, Crow Creek, and Lower Brule Reservations.

Fourth, under the omission of effects on the Black Hills, we were distressed to see that the very well-attended Edgemont meeting was excluded from the work group and ballotting process (pp. 8-1 - 8-3). As this area will be heavily impacted by any of the coal-moving alternatives under consideration, the decision not to include a meeting in the southern Black Hills was, at least, absurd and, at worst, a demonstration of bad faith by the preparers of the DEIS.

In summary, if there was no systematic attempt to exclude the residents of our area from consideration, the scope of the DEIS makes it appear like there was such an effort. We suggest that a careful examination of the effects a pipeline would have on our area could only lead a decision maker to opt for the railroad alternatives. We see no logical reason for the DEIS's proclamation that pipelines are environmentally preferable over the existing railroads, as the evidence presented says just the opposite.

To magnify the problem, there are many energy projects proposed for our area, all of which would use water from a semi-arid region to the benefit of parts of the country which have ample water. Examples of these projects include: uranium mining and milling, synthetic fuels development (including Exxon's proposal to remove water from the Missouri River), coal mining and burning, and the population growth that goes with these projects. We believe that a regional environmental impact statement for water should be completed, along with the necessary base studies, before any further development is permitted.

Moving to our second area of comment, several key energy considerations are omitted from the DEIS that should be included in the Final EIS.

First, and most obvious, the consideration of the energy efficiency of the various alternatives should include the energy needed to make materials and to build the pipeline and related facilities. Considering that the railroads are already in place, these omissions seriously distort the alternatives' relative energy efficiency; although the No Action alternative is still called most energy efficient (p. 2-5).

Second, there is no examination of the potential effects that the microwave communications system for the pipeline alternatives would have on nearby people and animals. Because the Hearing Board specifically requested information on this topic, we are including a copy of an article from Science (Att. 5) and an article from Science for the People (Att. 6). We trust that the compilers of the Final EIS will use these documents to find out more about this potential problem.

Third, the DEIS excludes the possibility of using non-petroleum and non-coal fuels for the railroad alternatives (pp. 2-1, 2-6, 2-12). The mention of oil-derived diesel and undeveloped coal-based fuels should not end the discussion of railroad fuels, as renewable fuels are available: specifically alcohol and vegetable oils. Both, being renewable and produced in the United States, are safe fuel supplies bringing economic benefits to this country. As agricultural products, both might be produced near the point of need and, as developing technologies, both will be available within the decade. The Final EIS should include study of these alternatives in detail, both as to current feasibility and as to feasibility within the next fifty years.

Fourth, the DEIS assumes a growing need to produce electricity. The demand for electricity has slowed remarkably in the last few years, due to rising energy prices and increasing conservation. Utilities' predictions of need have proved to be very high, and as prices continue to rise, energy efficiency is improved, and renewable energy use becomes more prevalent, the demand can be expected to continue to sag ("Electrical Power Demand Dims," Sioux Falls Argus Leader, April 8, 1980, p. 78; Shenon, "Excess Energy: Many Electric Utilities Suffer as Conservation Holds Down Demand," Wall Street Journal, October 9, 1980, p. 1).

Trends in electrical demand are not mentioned in the DEIS. If followed to their logical conclusion, recent trends would lead one to question the wisdom of and the need for investing large sums to create more capacity to produce electricity. One should especially question investment in a technology, such as coal slurry pipelines, which have never been proved over a long distance and which are less energy efficient than the existing mode of transporting coal. In view of the nation's continuing energy crisis, energy efficiency should be a major, if not the major, consideration in any plan to move coal.

Turning to our third area of comment, we believe that adoption of any of the pipeline alternatives over the existing rail system would violate eleven of the twenty stated goals of the National Environmental Policy Act (pp. 5-17 - 5-18).

Goals 1 (responsibilities of each generation as trustee), 3 (assure healthful surroundings), 7 (widest range of beneficial uses without degradation), and 10 (widest range of beneficial uses without undesirable consequences) are violated simply by the fact that building a pipeline would hurt the environment more than the use of existing railroads. Goals 1 and 3 would be violated, more specifically, by the use and pollution of water for a pipeline or by a pipeline rupture.

Goals 11 (widest range of beneficial uses without unintended consequence), 16 (variety of individual choice), 19 (enhance quality of renewable resources), and 20

(maximum attainable recycling of depletable resources) would also be violated by water use for the proposed pipeline. We note here that water is renewable through natural systems, if those systems are allowed to work, but water is also depletable through over-use and pollution by human action. Number 11 is particularly unsettling, because a statement that that goal would not be violated would mean that water drawdowns and pollution are "intended" effects of a coal slurry pipeline. Use of water for a pipeline would violate goals 11 and 16 because once water was taken from wells and shipped south, it would limit our area's choice of water uses.

Under goal 20, it should be realized that the energy resources used to make materials, build a pipeline and attached facilities, and maintain that system would be use of non-recyclable resources in a wasteful manner. The energy used could not be recycled, and meeting a goal of "maximum attainable recycling" would obviously favor the rail system already in place.

Goals 6 (culturally pleasing surroundings) and 13 (preserve cultural national heritage) would be violated by the irretrievable loss of cultural and archaeological sites which would not be disturbed by the No Action alternative. If the shutdown of railroad lines resulted from building a pipeline, another type of violation would be present. Railroads are already threatened in the northern Great Plains and, besides being economically essential to agriculture, they are the base of the existence and history of many towns here.

Goal 5 (assure aesthetically pleasing surroundings) contains no comment in the DEIS, but it would clearly be violated by adoption of a pipeline alternative. It is obviously detrimental to the aesthetics of an area to have a pipeline put in, to lose trees to such a project in a relatively treeless area, to face increased dust in the air, to lose water in a semi-arid region, and to have the facilities associated with a pipeline.

In summary, the Draft Environmental Impact Statement is massively deficient. The document also, on its face and contrary to the conclusion of the drafters of the document, shows that the railroad alternative is preferable to a pipeline. The basic assumption on which the pipeline proposal is based, the need for increased electrical output, is itself questionable. Unless the Final Environmental Impact Statement massively distorts the facts shown and the facts ignored in the DEIS, building a pipeline to transport coal would be environmentally ridiculous, energy foolish, and morally questionable--in addition to being in violation of eleven of the twenty stated goals of the National Environmental Policy Act.

Representatives of Energy Transportation Systems, Inc., have repeatedly stated that a pipeline will be built, and that there is nothing that the citizens of this area can do to stop it. In view of this fact and the types of questions asked by the Hearing Board, we expect the main difference between the DEIS and the Final EIS to be wording shifts designed to avoid lawsuits when ETSI tries to build a pipeline. Besides being arrogant, this type of action would insult the intelligence of the American people, would ignore the obvious conclusion that people in western South Dakota do not want their water used for the profit of large corporations, and would show active collusion by our government with those corporations. If those promoting

Richard E. Traylor, Project Leader
December 23, 1980
Page Six

a pipeline are not concerned with these facts, they should be concerned with the environmental destruction and misuse of non-renewable resources that building a pipeline to move coal would entail--and with the harsh judgment our descendants would place on a society that allowed such a travesty to occur.

Sincerely,

Lilias C. Jones

Lilias C. Jones
for the Black Hills Alliance

cc: State, Local, and Tribal Officials
Local Newspapers
National Wildlife Federation

Enclosures

37

December 18, 1980
LaCrosse, Kansas

Richard E. Traylor
Office of Special Projects
Bureau of Land Management
Third Floor East
555 Zang
Denver, Colorado 80228

Dear Mr. Traylor;

The Rush County Farm Bureau Association believes that a coal slurry pipeline offers a safe, efficient and economical means to transport coal. We will support the construction of a slurry pipeline route through the State of Kansas provided that;

(1) The power of eminent domain shall not be exercised against private landowners; and
(2) Any corporation, traversing the State of Kansas with a slurry pipeline, shall guarantee to energy producing utilities an opportunity to purchase coal.

We further support a coal slurry pipeline provided that certain environmental considerations including;

(1) The routing around future watershed development sites;
(2) A deeper pipeline depth where conservation practices such as terraces and waterways have not been constructed;
(3) The reseeding of grasslands with an acceptable mixture of an adapted species, the reseeding to be done with a protective mulch;
(4) No use of Kansas surface or ground water to transport coal; and
(5) The extablishment of an indemnity fund for reclaiming land from a pipeline rupture.

Sincerely,

Les R. Reinhardt

Les R. Reinhardt, President
Rush County Farm Bureau

Lawrence E. Erbes

Lawrence E. Erbes, Policy Chairman
Rush County Farm Bureau

LSR/LEE/ms

CC: Kansas Senator Joe F. Norvell
Kansas Representative Robert Miller
KFB Public Affairs, Paul Fleener, Director
Energy Transportation Systems, Inc., Tulsa

40

KNOP-TV
Post Office Box 749
NORTH PLATTE, NEBRASKA 69101
TELEPHONE 308/532-2222

Dear Mr. Trayler,

I am definitely opposed to the coal slurry line.

First of all, I feel it would damage the economy of our state. The number of railroad jobs lost would be staggering.

Secondly, the amount of water needed for this coal slurry line is enormous.

We are already having problems with the shortage of water in our state. It would be foolish to further compound this water problem.

Please consider seriously these two disastrous consequences of a coal slurry line.

Peace,

Ulysses

Ulysses A. Carlini,
Vice Pres & Gen'l Mgr.

UAC:md

Richard Traylor
Bureau of Land Management
555 Zang Street
Denver, Colorado 80228

December 23, 1980

46

Powder River Basin Resource Council
48 North Main Sheridan, Wyo. 82801 (307) 672-5809
624 N. 6th St. Douglas, WY 82633 358-5211

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

December 18, 1980

Dear Sir:

Re: ETSI Draft EIS

Please accept the following comments from the Powder River Basin Resource Council on the Draft Environmental Impact Statement prepared by the BLM.on EMergy Transportation Systems Inc.'s Coal Slurry Pipeline.

1) Need for Project, (p. 1-2, Section 1.C). The suggestion that pipelines "could provide considerable savings to consumers of electric energy," implying that slurry lines would have an economic advantage over railroads, should be deleated unless a section is added to the document to support this argument.

2) Authorizing Actions, (p. 1-25). Two necessary permits within the state of Wyoming have been overlooked. These are: a) A permit from the Wyoming State Engineer to appropriate the final 5,000 acre-feet from the Madison Formation, and b) Approval from the Public Service Commission to operate the pipeline.

3) Alternatives Considered but Eliminated from Detailed Analysis (p. 1-71). The reasons given for eliminating a return water line from detailed consideration are inadequate. The added energy cost of constructing and operating a return line should be directly compared to the cost of constructing and operating the various well-field-and-water-pipeline alternatives. Note that this return water pipeline alternative, even with its additional energy requiremnts, is more efficient than the coal cleaning alternative, which was given detailed consideration in the EIS. Moreover, the requirement for 1090 additional acres for construction of the return line is insignificant compared to the total acreage disturbed by the project, and should not be adduced as a reason for eliminating this alternative from consideration.

4) Energy Efficiency (p. 2-1, Sec. 2.A and Appendix E) There is some confusion and controversy surrounding the energy efficiency of coal slurry lines. The calculations presented here seem straightforward and reasonable, but they do little to resolve questions that have been raised in previous studies. We suggest that these sections in the DEIS be rewritten to respond directly to all available information on slurry line efficiency.

Specifically, we would direct you to a 1978 EPA study which stated that the Black Mesa pipeline system encounters total energy losses equivalent to 25.6% of the Btu content of transported coal (U.S. Environmental Protection Agency. 1978. "Environmental Assessment of Coal Transportation." Interagency Energy/ Environment R&D Program Report. EPA-600/7-78-081. National Technical Information Service. Springfield, VA. 141p.). You might also review a study by the Upper Midwest Council (cited in the above EPA report) which calculated a total energy cost of 16.3% of coal energy content for a hypothetical 700 mile pipeline transporting 12 million tons of Sarpy Creek coal per year.

While we are not experts in this field, we would like to suggest a possible line of inquiry concerning energy efficiency reports. Some of the confusion surrounding slurry line efficiency seems to stem from assumptions about the role played by coal fines. These fines result from the grinding process and from communition in the pipeline. They comprise 16-20% of the coal shipped in the Black Mesa line and might account for an even higher percentage of ETSI coal because of the grinding characteristics of Powder River Basin coal. Some energy efficiency studies, such as yours, appear to proceed on the assumption that these fines can be recovered and combusted as efficiently as larger coal particles.

Other studies assume that the fines fraction is extremely difficult to de-water, and has less efficient combustion characteristics than other slurry pipelines. We urge you to pursue these questions vigorously, and to present a more complete discussion of dewatering and combustion efficiency in the final EIS.

5) Railroad-related Employment. Several errors and inconsistencies crop up in the discussion of employment under the no-action alternative. On pages 1-62 and 1-72 crew members needed for all rail operations are numbered at 2470, with an unexplained, parenthetical 1290 workers on page 1-72. On page 2-7 all 2500 rail workers are shown under Wyoming employment and an additional 3200 support workers are added to their force for a total of 5700 workers within Wyoming.

Finally, on page 4-11, it is noted that these 5700 workers will be distributed over the entire rail system. However, in this discussion the support staff workers are numbered at 2500 rather than the previously noted 3200. Clearly, this entire subject requires some reworking.

6) Duplication of Transportation Systems. On page 4-35 it is briefly noted thataall ETSI markets except Wilton will be served by rail prior to the completion of the pipeline. This duplication of transportation facilities should be studied more closely, with specific attention to redundant rights-of-way, energy and resources devoted to a short-term rail operation, and capitol losses incurred by the railroads, the mines, and the generating plants due to their investments in a short-lived rail system.

7) Impacts of proposed action on vegetation and aquatic biology. The entire discussion of the impact of pipeline construction on streams, rivers and wetlands should be expanded and the impacts quantified where possible. The impacts on these areas must be detailed in this decision document because the approval of 50 or more river crossings is one of the major federal actions under study in this EIS. If accurate quantification is not possible for parameters such as BOD and turbidity, then worst case analyses must be performed.

8) Water Resources, Niobrara Well Field (Sec. 4.A.1., pp. 4-11 and 4-14). Declines in water levels or flows from wells drilled into the Minnekahta Limestone, the Spearfish Formation, the Sundance Formation, the Hulett Sandstone, and the Inyan Kara Group are expected to be as great as 90% of the drawdown in the Madison, in confined portions of these aquifers. The implications of such a serious reduction of the water table for domestic and municipal users of this water are significant, and merits detailed analysis. The confined and unconfined regions of these aquifers should be mapped, the drawdowns explicitly calculated, and the impact that this would have clearly defined.

The primary impact, or area of concern in ETSI's project is the affect of pumping water out of the Madison for export, upon the hydrology of the region. The hydrologic impacts upon shallow aquifers, and consequently upon the individuals or communities reliant upon those aquifers, deserves the greatest scrutiny in the EIS. Reference should be made to the interaction between the Madison and shallower aquifers, where drawdowns in these aquifers are expected to occur, and how great they will be. An effort should be made to identify the wells in areas which could be affected, and an impact mitigation program established to set up a mechanism that would respond to complaints of well water level reductions, and provide adequate compensation in case of damage.

At a minimum, a worst case analysis is called for on systems upon which the level of impact is uncertain.

9) Trends Having a Significant Impact on Environmental Values (p. 5-15). The use of large quantities of water for coal transportation is the major issue raised by this proposal. Failure to address the implications of this water use is a major flaw in the DEIS, despite the fact that water use permits are not within the jurisdiction of the federal government. As detailed above, the Statement makes a cursory study of potential hydrologic effects on ground and surface waters, but makes no attempt to address far-reaching social and economic effects of this water use. In order to present an accurate account of the proposed action's impacts, this statement should contain an assessment of overall water supplies in the Powder River Basin; potential water requirements within the area, and the effects of alternative water uses on the social and economic future of the area.

10) Relationship of Proposal to National Environmental Policy Act Goals (p. 5-16). We suggest deleting the statement that "the proposed project would contribute to energy production in a manner that minimizes the environmental impacts." This is not substantiated by the referenced tables which indicate that the impacts of the no-action alternative are less severe than the impacts of the proposed action. The DEIS indicates that the all rail alternative would not require any significant disruption of land, would not consume any significant amount of water, already serves the markets proposed by ETSI (and a great deal more), would not require any transmission lines be built, and would not strain struggling electrical distribution and generation facilities. Since both the all rail, and slurry alternatives accomplish the same end coal transportation goals, the proposed action can in no way be claimed to "minimize" the environmental impacts.

11) Power Requirements and Source Identification: Proposed Action, (Table 1-20, p. 1-87 through 1-89 in Project Description, Technical Report). This table indicates that 88 miles of new transmission lines will have to be constructed in Wyoming, and will carry 115.3 MW of electricity to the slurry line and ancillary facilities. The routing of these transmission lines is a critical issue to landowners in Campbell, Weston, and Niobrara Counties, and the impacts associated with the taking of land for right-of-ways should be evaluated. The specific routing alternatives for transmission lines need to be identified in the EIS, along with whose land the lines will cross, how ETSI will obtain the land, and how much consideration will be given to landowner routing preferences.

Table 1-20 also shows that the Niobrara Electric Association, Inc., and the Tri-County Electric Assoc., Inc., will be the source of 38.4 and 76.9 Megawatts respectively, for slurry line consumption. According to Tri-State Generation and Transmission Association's 1980 Power Requiremnts Study (September 1980), the peak demand expected by Niobrara Ele. Assn. Inc. by the year 1983 will be 19.0 Megawatts. To supply ETSI's slurry pipeline, Niobrara will have to more than double its power purchases from Tri-State, and if Tri-State does not have excess power available, expensive alternate sources of power will have to be found. This could entail purchasing power from another generating association at high rates, or the construction of additional generation capacity within Tri-States service area.

The EIS should look into the consequences of putting this additional burden of supply on power distribution organizations which would serve the pipeline. Impacts could range from an increase in electric rates of consumers within the service areas of the Electric Associations, to the impacts felt regionally by the construction of additional electrical generation facilities.

12) The EIS should assess the need for the slurry line in light of the projected depressed state of the coal market. Published by the Geological Survey of Wyoming in 1980, "Wyoming Coal Production and Summary of Coal Contracts," reports that Wyoming's present mining capacity will only be operating at 63% by the year 1990. Demand for Wyoming coal is currently low, and is expected to remain low far into the foreseeable future. The cost of the environmental, economic, and social disruption resulting from the slurry line must be weighed against the benefits which would come from providing redundant coal transportation systems.

13) There are several significant differences between the provisions of the Forty-Second Legislature of the State of Wyoming which authorized ETSI to appropriate underground water subject to the approval of the State Engineer, and certain codicils of the third party agreement between the Office of the State Engineer and ETSI which was finalized subsequent to the authorizing legislation and dated September 24, 1974.

The most significant of these differences is the twenty-four month compliance time granted to ETSI, once they have been ordered by the State Engineer to cease and desist pumping. The legislation has specific provisions for protecting Wyoming's water resources and the administrative steps to be followed in accomplishing these requirements and provisions. However, the third party agreement goes beyond the legislative authorization by allowing ETSI to continue pumping for two years after their pumping

has been determined to be detrimental. The implications of this for agriculture are severe: two years is a very long time when your well has gone dry and your cattle are thirsty. This matter should be investigated in greater detail, and the discrepancies cleared up.

Another authorization of the third party agreement would allow ETSI, with the concurrence of the State Engineer, to appropriate wastewater of any preferred user and either spread or inject said wastewater into the underground in order to satisfy ETSI's substitute water supply requirement in whole or in part. By definition, preferred water users are the cities of Newcastle, Upton, Moorcroft, Osage, Gillette, Sundance, and one "New City." It seems there should be a clear definition of what this waste water should be, prior to being injected into the ground. One would hope that it would not be raw sewage. Could this waste water be used in the slurry line?

We hope our comments will help your efforts to develop a more adequate EIS, and to assess the full impact of the slurry line on Wyoming.

Sincerely yours

Jon Huss, for the
POWDER RIVER BASIN RESOURCE COUNCIL
624 N. 6th St.
Douglas, WY 82633

60

Madison Water Committee
P.O. Box 629
Edgemont, SD 57735
December 30, 1980

Sen. Larry Pressler
Sen. James Abdnor
Sen. John Melcher
Rep. Tom Daschle
Rep. Clint Roberts
Rep. Mark Andrews
Gov. William Janklow
Gov. Ed Herschler
Secretary of the Interior
Secretary of Agriculture
Mr. Richard Traylor, B.L.M.

Gentlemen:

On December 16, 1980 two hearings were held in Edgemont, S.D. by the Bureau of Land Management on a Draft Environmental Impact Statement prepared for the Energy Transportation Systems, Inc. proposed coal slurry pipeline and their request to use 20,500 acre feet of Madison Aquifer water from a well field just 12 miles west of Edgemont in Wyoming. People from the surrounding area responded with a tremendous amount of both technical and fundamental information. The E.I.S. completely disregarded the social and economic problems of the 70,000 + people living in the southern and western Black Hills region and the loss of their potable water.

We believe the E.I.S. should be modified or delayed until all information by the United States Geological Survey is available for their model that is being used to show the characteristics of the Madison Aquifer in this area. If any damage to our area water supply is shown by further study, we request the Department of the Interior and the Department of Agriculture to insist that the number one cost effective choice, the no action rail alternative, be followed or use water from another source.

It seems inconceivable that we should have to fight a large multinational corporation and also our own government to save our most valuable asset, our potable water, when other sources of water and transportation are available.

I would hope that the B.L.M. would make a copy of the transcript of the December 16 meeting held in Edgemont available to each of you for you and your staff to study. This transcript would bring you up to date on our position in this area.

We are counting on you to help us defend this most important asset to our lives.

Respectfully yours,

Matthew J. Brown

Matthew J. Brown
Madison Water Committee

69

COLORADO
WHEAT Administrative Committee

December 23, 1980
Mr. Richard E. Traylor
ETSI - EIS Project Leader
Bureau of Land Management
Office of Special Projects
555 Zang Street
3rd Floor East
Denver, Colorado 80228

Dear Mr. Traylor,

The Colorado Wheat Administrative Committee, which represents some 17,000 wheat producers in the state of Colorado, at their regular Board of Directors meeting in December 1980, discussed the proposed slurry pipeline project. Although this project would not focus on Colorado's resources perse, it would indeed invoke a very unique disadvantage to Colorado and the counties of Weld and Yuma. It is our understanding that two slurry pump stations would be required of some 20-25 acres each.

The Colorado Wheat Administrative Committee's Board of Directors are also deeply concerned in regard to the anticipated impacts in Colorado. The construction disturbance where the proposed pipeline would cross the Arikaree River and the Pawnee Buttes areas are both regarded as National and scenic landmarks. These concerns have in turn spawned another fear in that if the proposed pipeline suddenly begins to leak or plug up, when, then, or how would you dispose of the liquid coal at the point of stoppage? We certainly would not want it released onto the agricultural lands in the counties of Weld and Yuma.

In conclusion, the Colorado Wheat Administrative Committee Board of Directors felt that the proposed slurry pipeline could not benefit Colorado's environment, nor did they feel that the exporting of water from any state in this manner could benefit the arrid West.

The Board has gone on record to oppose the ETSI proposed project.

Sincerely,

Ronald E. Walker

Ronald E. Walker
Executive Vice President

Denver Tech Center • Building No. 3 • 5031 South Ulster/Quebec Pkwy. • Denver Colorado 80237 • 303/779-8178

73

KANSAS CITY POWER & LIGHT COMPANY
1330 BALTIMORE AVENUE
P.O. BOX 679
KANSAS CITY, MISSOURI 64141

January 2, 1981

Mr. Richard E. Traylor
Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

Dear Mr. Traylor:

Please find the enclosed comments by the Electric Companies Association of Kansas regarding the Environmental Impact Statement on the proposed ETSI Coal Slurry Pipeline Transportation Project. These comments represent a formalization of those which were presented verbally in the hearing at Hays, Kansas on December 8, 1980.

If you should require additional information regarding this statement or you desire additional copies, please notify me. Thank you for this opportunity to present our comments on this vital matter.

Sincerely,

Ronald G. Wasson

Ronald G. Wasson
Manager of Fossil Fuels

RGW:pg

Enclosure

cc: A. J. Doyle
D. T. McPhee
A. L. Samuels
D. Wayne Zimmerman (The Electric Companies Association of Kansas)

TESTIMONY BEFORE BLM REGARDING ETSI SLURRY PIPELINE

I am Ronald G. Wasson, Manager of Fossil Fuels for Kansas City Power & Light Company. In this presentation I represent all members of The Electric Companies Association of Kansas, which include Kansas City Power & Light Company, Kansas Gas and Electric Company, Kansas Power and Light Company, The Empire District Electric Company and Western Power Division of CTU.

The Association supports the construction of the proposed coal slurry pipeline by Energy Transportation System, Inc. for the following reasons:

1. Construction of this pipeline will contribute to increased coal usage, thereby lessening our nation's dependence on expensive imported oil.
2. This pipeline will provide less of an adverse environmental impact than alternate methods of shipping coal.
3. This pipeline will provide potential economies for coal transportation, thus minimizing electric utility service costs to the public.

We believe the construction and operation of this pipeline facility will contribute to our national energy goals of: (a) reducing oil and gas burned for electric generation and, (b) increasing the utilization of coal by offering an assured transportation capability for such purposes.

In order to put the goal of increased coal usage into the proper perspective, consider the following facts:

1. U.S. annual coal consumption in 1979 was approximately 700 million tons[1] and represented about 19 percent of the total U.S. energy consumption of 80[2] quadrillion btus or quads. However, nearly 22% of that total energy consumed in this country was imported from foreign sources in the form of oil and liquified natural gas.[3]

2. Total U.S. annual energy consumption is expected to grow to about 115 quads by the year 2000, assuming "hard conservation" by industry and consumer alike will reduce the Pre - 1973 embargo rate of growth by about 50%.[4]

3. While synthetic fuels derived from coal may provide energy in both liquid and gas forms, which will be useful for many purposes including transportation and electric generation, the economical use of coal will continue to be as a boiler fuel for electric generation. In 1970, electric production required about 22 percent of total U.S. energy consumed. By 1978 that figure had grown to 30 percent and in 1979 to nearly 32 percent. We estimate that by the year 2000 electric generation will require nearly 50 percent of the country's total energy consumption or some 58 quads of energy.[5,6]

4. To replace existing oil and gas fired electric generation and provide additional electric generation to meet that 4% per year growth, the expected use of coal for electric generation must nearly triple the 1978 670 million tons and approach 2 billion tons per year by the year 2000. It is anticipated that at least 50% of this 2 billion ton amount will come from "western coals" - and if shipped by unit trains, would require the movement of up to 2000 unit trains per week from the western coal states.[7,8,9]

5. The Wyoming Geological Survey predicts that shipments of western coal to just the six state area of Arkansas, Kansas, Louisiana, Missouri, Oklahoma and Texas will increase from 17.7 million tons in 1978 to 73½ million tons by 1990, an increase of over 300 percent.[10]

Faced with these staggering increases in the use of western coals, including those from the Powder River Basin, the largest western coal reserve, utilities in this area are concerned with the ability of the railroads to move these anticipated large volumes of coal. The utilities are interested in assuring themselves, their customers and their investors that adequate capacity to transport the coal will be available.

Let me explain the transportation capability from the viewpoint of a utility which uses "western coal" at a remote site, by discussing how unit trains operate under normal conditions. When unit trains are committed to service, they typically leave the powerplant site, empty of coal, headed back to the supplying mine. Upon arrival at the mine, the 110 or more cars are loaded, generally within 4 hours, and weighed, then are hauled to the plant where they are unloaded, normally within 4 hours and begin the cycle again. The time interval for each round trip is called "cycle time" and is the controlling variable which determines how much coal the train can move per year. Typical cycle time for trains in service between the Midwest and Wyoming mines is between 3 and 6 days. Cycle time is primarily a function of the railroads' ability to haul and congestion of the rail system because the loading and unloading periods represent only small protions of the entire time involved. In simpler terms, the amount of coal hauled from mine to plant is a function of the number of trainloads of coal moved and the primary controlling factor is how quickly the railroad can move the trains. The utility can control only by adding or removing trainsets from service and is essentially at the mercy of the railroad. Control of turnaround time is essential to an assured supply of coal for a generating facility which is supplied by unit trains. At present, the utilities and the railroads plan together to determine expected delivery amounts and cycle times for future periods. The question facing all utilities that use western coal is: "What will the future hold in terms of turnaround time and rail capability?" At present, rail capacity appears to be adequate, but a joint DOT-DOE study - National Energy Transportation Study reports that rail congestion may occur in the Kansas - Nebraska area as a result of the increased amounts of coal shipped from Wyoming to points east by 1990 and perhaps sooner unless the planned and announced construction plans of the railroads are implemented. How certain are these construction plans? The president of

the Burlington Northern said in a speech in Denver this fall, that continued investment in coal hauling capability could be halted unless the business is made more profitable. He continued, saying "We will be very careful about future investments in coal."[11] All of this illustrates that utilities are concerned with a great deal of uncertainty regarding the future capability to transport coal from Wyoming to the Midwest. The coal slurry pipeline makes two important contributions to reduce that uncertainty:

1. It will provide an assured supply of coal to those utilities which participate, independent of railroad cycle times.
2. It will reduce congestion of the rails and improve the supply outlook for utilities which continue to move their coal by rail, by reducing train traffic by approximately 20 unit trains.

The reduction of uncertainty, we believe, will allow utilities to make a firm commitment to the use of coal as a boiler fuel and will ultimately contribute to the accomplishment of our national energy goals. Failure to increase coal utilization may result in either:

a. increased rather than decreased dependence on expensive imported oil, and/or,
b. a decreased standard of living in the United States.

Secondly, we believe the proposed pipeline will have less of an adverse impact on communities than unit coal trains in the following areas:

1. Safety - The proposed pipeline will be safely buried underground and operate at a relatively low pressure. Unit trains travel through communities at speeds up to 70 miles per hour or more

and pose crossing danger to pedestrians and motorists who venture into their path.

2. Convenience - In many communities the railroad tracks bisect the town and travel across town becomes difficult if not impossible when trains pass through town. The proposed slurry pipeline will not cause such interruptions of surface transportation.
3. Noise - Unit trains are noisy as they trundle through town. The proposed pipeline will be nearly noiseless.
4. Oil Consumption - Unit trains are powered by diesel locomotives and moving the equivalent tonnage by rail will require about 2.8 million barrels or 118 million gallons of diesel fuel each year. The pipeline will be electrically powered and while slightly less efficient (approximately ½ of 1 percent) will be powered by coal fired generation. These 28 million barrels of diesel fuel can be used by the farmers and others in this region for planting, cultivating and harvesting crops.[12]
5. Rail Congestion - Since the pipeline will avoid the addition of twenty trains to service in this region, rail congestion will be lessened. This lessened rail congestion is important not only to utilities which must ship coal by rail, but also to other shippers in the region who must count on rail transportation to move farm products and manufactured goods in a timely manner.

Finally, we believe that successful construction and operation of this pipeline will provide economies to the companies that use it since they will be able to "lock in" their costs and not be subject to diesel fuel and other typical railroad rate escalations.

Economies should also be realized by surrounding utilities since the pipeline will provide competition to the railroads. Under the recently enacted Rail Deregulation Act, which was signed into law by President Carter on October 14, many of the constraints on rate escalation which had been enforced by the ICC were removed. The shippers are in a "whole new ball game" at this point and may expect little or no protection from the ICC in terms of rate matters.

(6)

If rail ratas are allowed to increase dramatically, as the law providea, two unpleasant results will occur:

1. Electric consumers will pay more. Transportation costa presently are 2/3 of the cost of western coal delivered to this area and fuel costs represent up to half of a typical utilities operating cost.

2. The consumption of western coal will not increase as dramatically as anticipated, and based on the ICC's own studies, the future use of gas and oil to produce electricity in this area could be as much as 43 percent higher if rail rate increases remove the present economies realized from burning western coal.[13]

The construction and operation of this pipeline will provide competition in terms of an alternate mode and delivered price which should induce the railroads to remain competitive rather than charging what the market will bear. The benefits of this inducement will accrue directly to the electric consumers of the area.

Thank you for the opportunity to present our viewpoint on this important matter.

END NOTES

1. Energy Information Administration, Annual Report to Congress, 1979, Volume III (Washington, DC: Government Printing Office, 1980), p. 74.

2. Ibid., p. 46.

3. Ibid.

4. Edison Electric Institute, Economic Growth in the Future-II Executive Summary (Washington, DC: Edison Electric Institute, 1980), p. 14.

5. Energy Information Administration, p. 46.

6. James F. Hanley, Energy Perspectives: 1979-2000 (Kansas City, 1980), p. 27.

7. Edison Electric Institute, p. 15.

8. Energy Information Administration, Annual Report to Congress, 1978, Volume III (Washington, DC: Government Printing Office, 1979), p. 214.

9. Reddy Communications Inc., Fact Sheet/June 1980 (Greenwich, CT: Reddy Communications Inc., 1980), p. 1.

10. The Geological Survey of Wyoming, Wyoming Coal Production and Summary of Coal Contracts (Cheyenne, WY: Pioneer Printing and Stationery Company, 1980), pp. 11-13.

11. "President of BN Weighs Investment, Yield in Coal-Hauling Service," Traffic World, September 15, 1980, p. 28.

12. Bureau of Land Management, Draft Environmental Impact Statement on the Energy Transportation Systems Inc. Coal Slurry Pipeline Transportation Project, Volume 1, pp. 2-1 thru 2-4.

13. Interstate Commerce Commission, Draft Environmental Impact Statement Ex Parte No. 347 Western Coal Investigation - Guidelines for Railroad Rate Structure, p. 6-17.

74

THE Missouri Breaks Chapter
NATIONAL AUDUBON SOCIETY
P.O. Box 832
PIERRE, SOUTH DAKOTA 57501

January 2, 1981

Richard E. Taylor, Project Leader
8ureau of Land Management
Dffice of Special Projecta
3rd Floor Eaat, 555 Zang Street
Denver, Colorado 80228

Dear Mr. Taylor:

The Missouri Breaks Chapter of the Audubon Society, Pierre, South Dakota, has reviewed the Draft Environmental Impact Statement (DEIS) for the Energy Transportation Syatems, Inc. (ETS1) Coal Slurry Pipeline Transportation Project. We are providing the following comments on the adequacy of the DEIS and the impacts that will result from thia project.

We believe that the DEIS doea not meet the intent and purpoae of an EIS required by the Council of Environmental Quality (CEQ) in the final rules and regulationa (Fed. Reg. Vol. 43, No.230) for implementing the National Environmental Policy Act (NEPA). The DEIS on page 8 and 9 states that it is the Energy preferred alternative to aelect the proposed route and that water for the ETS1 pipeline would be supplied by the Niobrara Well Field. Thia ia contrary to the intent of NEPA, Section 1502.2(f), that atatea that Agencies shall not commit resourcea prejudicing aelection of alternativea. The fact that well field permita have been obtained ahould not limit the full development of, nor preclude the thorough inveatigation of all reasonable alternatives. In the aame light, (Section 15D2), we believe that it would be more appropriate that the DEIS be developed aa a planning document, that ia, the DEIS ahould inveatigate all the feasible and prudent methoda to move coal from Montana, Wyoming or other coal producing atatea and not be written to provide aupport for a project that may or may not be either socially or environmentally aound.

The major environmental impact identified in the DEIS is the impact that will reault from dewatering the Madiaon Aquifer by using either the Niobrara County well field or the Crook County well field. We do not believe that the DEIS doea an adequate job of aaaeasing the impacta that will result from the drawdown from either of theae well fielda. We will therefore liat the additional concerns that ahould be addreaaed.

The location of the well fielda indicates that ETSI intends to place the major environmental effecta of their project on the people of South Dakota. The well fielda are located eaat of geologic anticlinea that cauae the majority of the potentiometric drawdown to extend eaatward. ETS1 doea not have any kind of agreement with South Dakota that would force them to stop pumping if aevere damagea to the 8lack Hilla occurred. In the aame light, the agreement that ETSI has with Wyoming doea not inaure that a rancher who loaea hia well will receive prompt relief. It could take up to two yeara, according to the agreement in Appendix c-3, for ETSI to cease interference with an injured party. The EIS should not be approved until an interstate pact is worked out that would insure that South Dakota would have an equal control on the well field permits ahould adverse impact occur to South Dakota.

The DEIS does not include a complete analysis of all the alternative methods to move the coal. The alternatives that we feel are not adequately explored are the all rail alternative, the Crook County Water Supply, the Dahe Alternative and the addition of an alternative to use processed aewage water as a water source. Another site for the well field should also be considered. It would be more appropriate to restrict the impacta from aquifer drawdown to the state that has legal control over well field permits.

The all rail alternative, although it is not fully explored, atill appears to the Audubon Society, Missouri 8reaka Chapter, to be the best way to move the Nation's coal, particulary from an arid region that has a shortage of good quality water. The DEIS further confirms that railroads are capable of moving the coal and would have the neceaaary equipment and tracks on line in the same or ahorter time frame as the ETS1 coal slurry line. The DEIS further confirms that the railroada are as cost and energy efficient as the ETSI plan. The DEIS lists as an adverse impact the disruption that railroads create to towna, however we do not believe this to be a valid point and at any rate it is something that could be solved by intelligent engineering. The DEIS does not develop fully the socio-economic impact that the coal slurry pipeline will have on the railroad's existance. In particular, will the delivery of coal by pipeline cause railroads to close down tracka thus causing a loas of servicea to small communities? It is alao noteworthy that the life of the coal alurry line is estimated to be 50 years. At the end of this time will there be any other means of tranaporting coal?

We do not feel that the DEIS adequately evaluates the impact of dewatering the Madison Aquifer at either the Niobrara or Crook County Well fields. We have concern about the effects on the fiah and wildlife habitat of the 8lack Hilla from both well aites. In particular, the DEIS doea not preaent a 'worst case analyais' of what could happen to surface and ground water as a result of the drawdown. Section 15D2.22 of the CEQ rules and regulationa atate that in the case of incomplete information a 'worst case analyais' and an indication of the probality or improbability of its occurance will be presented. This section of the CEQ rega.,are applicable as the DEIS acknowledgea on page 4-11 that there are many uncertaintiea aasociated with the aquifer parametera uaed in the numerous models to predict drawdown.

The DEIS acknowledges that the drawdown will cause the decrease in the potentiometric head from the Niobrara well field to occur over a aurface area of 38DD square milea and from the Crook County well field over a surface area of 16,700 square miles. The DEIS atates that the drawdown will affect the ground water discharge of several surface water streams including the Cheyenne River, Cascade Springs, Hot Springs, and Spearfish Creek Springs in South Dakota. The DEIS does not give a complete listing of all the atreams and springs in the Black Hills that will be impacted. The DEIS does identify a 1 to 4 cfa decrease in discharge for the main springs however, it does not state if the smaller springs will be eliminated. There is also no mention of the cumulative impacta upon the major trout streama of the increaaed stress that this reduction in base flow will have. During dry years, which are as evident as wet years, it is the base flow that maintains a trout fishery in the 8lack Hills. The DEIS also does not adequately address the impact this project will have upon the two Federal and one State Fish Hatchery that utilize stream flows for operations. We might add that the Spearfish National Fish Hatchery is on the National Register of Historic Sites and that any loss in base flow of Spearfish Creek would jeopardize its operation.

The aquatic biology portions of the DEIS are inadequate for both the Niobrara and Crook County well fields. These portions do not make it clear that the decrease in stream flows will be cumulative for all watersheds in Western South Dakota. As an example, the DEIS states there will be a one (1) cfs decrease in the Cheyenne River, where as, in fact it will be a seven (7) cfs decrease (if not more) due to the cumulative decrease of Hot Springs and Cascade Springs. The DEIS states that there will be an increase in the duration of time the Cheyenne River will be dry from 14 to 33 days. The DEIS does not consider this significant but realistically and statistically it is and biologically it will certainly cause a decrease in species diversity. The DEIS also does not discuss the impact that a decrease in base flows will have upon other surface drainages in the Black Hills. The DEIS should identify the minimum flow requirements for these streams and provide South Dakota recourse to stop withdrawals should these drainages be jeopardized.

The DEIS also does not examine the impact that elimination of small surface springs would have upon terrestrial wildlife or livestock. The DEIS should also identify which surface springs would be eliminated and if there is a connection between recharge in the Lokota, Fall River and Sundance Formations and the Madison Aquifer. Finally, the DEIS does not provide any discussion of or means to mitigate damages caused to fish and wildlife. Section 1502.14(f) of CEQ regs state that agencies shall "include appropriate mitigation measures not already included in the proposed action or alternatives".

We are also concerned that the DEIS does not mention or adequately evaluate other impacts that will occur from dewatering the Madison Aquifer. We note that the DEIS makes no mention of a decrease in the recharge capacity of the Madison Aquifer at project end. The DEIS should also explain what impact this project will have upon the development of geothermal energy resources and the increased socio-economic costs to those institutions that currently are using geothermal water.

The socio-economic portion of the DEIS for the water supply system is particularly weak. The impact that dewatering will have upon the livelihood of residents that depend upon the water for irrigation, stock watering, recreational, institutional or municipal uses are not investigated. There will be increased costs to operators that have flowing wells if they need to pump water and in many cases this increased cost could be sufficient to cause economic hardship. The Black Hills are also an important national recreational area that depends in large part upon the fish and wildlife resources to maintain the recreation and tourism industry. The DEIS does not mention what the impact will be on this industry.

The DEIS needs to expand the socio-economic portion for South Dakota to include the complete costs this project will have on towns like Hot Springs, Edgemont and the rural farmers and ranchers that utilize flowing wells. The DEIS does not mention the existing wells that are in the Lakota and Fall River Formations and whether these wells will be lost. The DEIS should also take into account other uses (or non-uses) of water that will likely occur in Fall River and

Custer counties. There is currently active plans to dewater the Fall River and Lakota Formation during uranium mining activities in these counties. The DEIS should explain if the dewatering of the Madison Aquifer will produce cummalative impacts upon the people that depend upon this water. We can forsee a situation where wells will go dry, livestock producer, will go broke and ETSI and the Uranium Producers will point the finger at the other party and say they were not responsible for the loss of the agriculturists' water. The injured party will then only have legal recourse which may or may not rapidly deliver needed water.

The portion of the DEIS that discusses the Oahe Alternative is very poor and clarifies the fact that the DEIS was written to justify the ETSI slurry line using the Niobrara well field. The route that is shown on the maps indicates several sensitive areas that should be avoided. Some of these areas are at Oahe Dam, where the pipe is located in a recreation area, at Hayes Lake and at Bear Butte State Park. The Oahe Alternative does not have the potential adverse impacts that dewatering the Madison Aquifer would have. The impact of withdrawal of 30,200 acre feet/year is also fairly well known. It is also possible to extimate the cumulative impact that this drawdown would have upon Oahe reservoir. The Oahe Alternative section does not develop the socio-economic benefits that could result to the communities in western South Dakota nor does it completely evaluate any adverse impacts coused by line (route) selection.

We would like to conclude this letter by stating that we hope the Bureau of Land Management (BLM) takes its responsibility during the NEPA process seriously and thoroughly evaluates all the alternatives for moving the Nation's coal. We hope that BLM considers this process to be a part and parcel of resource management planning. It should also be considered in this process that the coal source lies in an area that has a shortage of good quality water. This is semi-arid land and the people and wildlife depend upon the existing water supplies for their existance. If BLM decides to grant right-of-way permits, for the pipeline in lieu of environmental considerations, just so another company can make a fast buck, then BLM should consider that organizations and agencies that take the NEPA process seriously can only decide that the BLM has violated its public trust and these organizations and agencies will have to act accordingly.

We also would like to make the point again that we do not believe it is possible to objectively review this document and arrive at the decision that BLM says is the agency-preferred alternative on pages 8-9 of the DEIS.

We appreciate the opportunity to provide comments upon this document and hope our comments will be given serious consideration.

Sincerely,

Rex E. Riis

Rex E. Riis
President

78

Pulaski County Audubon Society

11811 Pleasantree Dr.
Little Rock, AR 72211
January 2, 1981

Mr. Richard E. Traylor
Bureau of Land Management
Special Projects Staff
3rd Floor East
555 Zang St.
Denver, Colorado 80228

Dear Mr. Traylor:

The Pulaski County Audubon Society (PCAS) wishes to comment on your draft environmental impact statement - 1792 (142) EISI- for a coal slurry pipeline from Wyoming to Louisiana.

The PCAS would like to see a better comparison of the proposed action and any alternatives concerning major environmental impacts. We believe several factors were not adequately evaluated, such as wetlands, water quality, flood plains, air quality, and terrestrial and stream ecosystems. Specifically, the wetland areas in Pope and Conway counties of Arkansas which the pipeline plans to cross were not even mentioned in the EIS. Our organization would be opposed to any construction through these areas and would like to recommend a slight change in course to the east to avoid them. There are also several wetland areas south of Little Rock, Arkansas which might be affected by the pipeline. In regard to water quality, we believe the impacts of dewatering plants were not properly addressed. We think a list of probable contaminates and their concentrations should be included. The statement that the effluent would met appropriate standards is not sufficient.

We also believe the EIS didn't adequately discuss the effects of spills or pipeline ruptures on stream ecosystems. To alleviate some spill problems and to reduce any possible environmental damage, we recommend you consider and evaluate the possibility of placing cut-off valves on both sides of streams that flow year round.

Thank you for this opportunity to provide these comments. Please keep us informed of your progress and put our name on any future mailing list for public hearings in Arkansas on this project.

Sincerely,

Fae Andrews Burkhart

Fae Andrews Burkhart
PCAS Conservation-Education Chairperson

94

OKLAHOMANS for ENERGY and JOBS, Inc.

January 2, 1981

Mr. Richard E. Traylor
Office of Special Projects
Third Floor East
555 Zang Street
Denver, Colorado 80228

Re: Public hearings on the draft Environmental Impact Statement of the Energy Transportation Systems, Inc., Coal Slurry Pipeline

Dear Mr. Traylor:

With reference to the above mentioned coal slurry pipeline project, we respectfully request that this correspondence and attachment be made a part of the record of the public hearing process. We understand that written testimony will be accepted until close of business on January 6, 1981.

Oklahomans for Energy and Jobs, Inc., is a nonprofit citizens coalition dedicated to assuring adequate energy for Oklahoma's future. At present, we have a membership roster of more than 1,200 dues paying associates united for this cause.

Our Board of Directors is comprised of high-statured individuals representing a broad and diverse spectrum of Oklahoma's population. Our Board of Advisors is equally as distinguished.

On December 30, 1980, we formally adopted a resolution endorsing the construction of coal slurry pipeline systems that would traverse Oklahoma. A certified copy of that resolution is forwarded herewith.

Respectfully submitted,

Richard B. Risk, Jr.

Richard B. Risk, Jr.
Executive Director

Enclosure

cc: W. A. Hale, ETSI

A nonprofit organization dedicated to assuring adequate energy for Oklahoma's future

116 DEAN A. MCGEE AVENUE OKLAHOMA CITY, OKLAHOMA 73102 (405) 236-8486

STATE OF OKLAHOMA)
COUNTY OF OKLAHOMA) ss

CERTIFICATE OF RESOLUTION

I, Richard B. Risk, Jr., hereby certify that I am duly elected, qualified and now serving as Assistant Secretary of OKLAHOMANS FOR ENERGY AND JOBS, INC., an Oklahoma nonprofit corporation.

I further certify that the Executive Committee of said corporation at a meeting held in Oklahoma City, Oklahoma, on December 30, 1980, duly authorized and acting on behalf of the Board of Directors of said corporation, adopted the following resolution:

WHEREAS, the members of Oklahomans for Energy and Jobs, Inc., are deeply concerned over the ever increasing cost of electric service to Oklahoma consumers; and

WHEREAS, higher fuel costs and growing shortages of natural gas and oil contribute to higher power costs and make it imperative that we support efforts to develop domestic coal resources as a source of low cost fuel for electric generation; and

WHEREAS, the transportation of coal by slurry pipeline appears to be an effective and low cost transportation method which can supplement other methods of transporting coal to the benefit of electric power customers, providing an alternative that brings the benefits of competition and lessening dependence on one method of transportation; and

WHEREAS, in keeping with our support for development and appropriate utilization of existing and alternative energy supplies, and in the belief that a coal slurry pipeline offers a safe, efficient, economical means to transport one of those sources of energy,

NOW, THEREFORE, BE IT RESOLVED, That Oklahomans for Energy and Jobs, Inc., hereby endorses the proposed construction of a coal slurry pipeline in Oklahoma.

IN WITNESS WHEREOF I hereby set my hand and the seal of said corporation this 2nd day of January, 1981.

Richard B Risk Jr

96

Harrison Ne 69346
Jan. 2-1981

Richard Traylor
ETSI - EIS. Project Leader
Bureau of Land Management
Office of Special Projects
555 Zang st.
3rd floor East.
Denver Colorado 80228

Dear Mr Traylor.

As a representative of the 96 member Sioux County Cow-belle organization I am writing to protest the proposed use of water from the Madison Formation to transport coal via slurry pipeline.

We as an organization feel there are alternative ways - without using water - from a semi-arid area, to transport the coal.

The draw-down of water level to our area as designated by the map is of great concern to us.

Thank you
Madeline Grote -
by J. Derner
President
Sioux Co. Cow-belles -
Harrison. Neb. - 69346

98

ROY O. MARTIN LUMBER COMPANY, INC.

P.O. BOX 1110 ALEXANDRIA, LA. 71301

December 30, 1980

United States Department of the Interior
Bureau of Land Management, Special Projects Staff
3rd Floor East, 555 Zang Street
Denver CO 80228

Re: 1792 [142]
ETSI [Energy Transportation Systems, Inc.]

Gentlemen:

This letter shall serve as the written position statement of Roy O. Martin Lumber Company, Inc. regarding the Environmental Impact Statement on the ETSI Coal Slurry Pipeline Transportation Project.

Initially, we wish to concur with the decision of ETSI to drop the portion of the proposed slurry pipeline terminating in Baton Rouge, Louisiana, as stated by Mr. Walter Hale, midwest manager of ETSI, at a public hearing in Little Rock, Arkansas on December 3, 1980. We support this decision emphatically.

Even though our company is not directly affected or involved with the remaining alternatives, we wish to state that we favor the all-railroad transportation or the combination railroad-barge transportation system.

We are of this opinion simply because this system [or combination] would be the most energy efficient means of transportation. This means would also definitely be an economic boost to the railroads.

We feel that any decision, other than the above, would certainly have detrimental effects, not only economically speaking, but environmentally as well.

Thanking you for this opportunity to express our opinion and position regarding this matter, I remain

Yours very truly,

Ellis S. Martin
President

ESM/few

PHONE: ADMINISTRATIVE & EXECUTIVE OFFICES 318/448-0405
LAND & TIMBER 318/448-0493

115

Telegram western union

VF
WU AG LKWD

3:37 PM

OFA246(1645)(4-044499S005)PD 01/05/81 1634
ICS IPMBNGZ CSP
5012223880 TOBN MCGEHEE AR 96 01-05 0434P EST
PMS U S DEPT OF INTERIOR, BUREAU OF LAND MANAGEMENT SPECIAL PROJECT
STAFF RPT DLY MGM, OLR
3RD FLOOR EAST 555 ZANG ST
DENVER CO 80228
REFERENCE ENVIRONMENTAL IMPACT ENERGY TRANSPORTATION SYSTEMS
INCORPORATED COAL SLURRY PIPELINE
OUR BANK LOCATED 10 MILES FROM PROPOSED CONSTRUCTION SITE DEWATERING
PLANT ON MISSISSIPPI RIVER NEAR CYPRESS BEND. OUR OPINION THAT THE
SOCIO-ECONOMIC IMPACT IN THIS MATTER WILL BE LIMITED AND OF SHORT
DURATION. SHORT TERM HOUSING NEEDS CAN AND WILL BE SUPPLIED. SIMILIAR
REQUIREMENTS MET IN 1976. OVERALL IMPACT WOULD BE VERY POSITIVE.
PERMANENT RESIDENCE TO AREA WOULD RECEIVE NECESSARY SERVICES.

WE BELIEVE ETSI SENSITIVE TO NEED OF AVOIDING UNDUE DISTURBANCE OF
WILDLIFE HABITAT. IF DISTURBANCE SHOULD OCCUR WOULD BE LIMITED AND OF
SHORT DURATION DURING CONSTRUCTION.
FRED DENTON, PRESIDENT BOARD OF DIRECTORS FIRST NATIONAL BANK
MCGEHEE AR
PO BOX 728
MCGEHEE AR 71654
NNNN

ANN HUBBARD
1 CAPITOL MALL RM 4C300
LITTLE ROCK AR 72201

western union Mailgram

4-0426308005003 01/05/81 ICS IPMBNGZ CSP DVRB
2 5013711635 MGM TDBN LITTLE ROCK AR 01-05 0417P EST

US DEPT OF INTERIOR BUREAU OF LAND MANAGEMENT
SPECIAL PROJECTS STAFF
3RD FLOOR EAST 555 ZANG ST
DENVER CO 80230

THIS IS A CONFIRMATION COPY OF A PREVIOUSLY PHONE-DELIVERED TELEGRAM

THE ARKANSAS ECONOMIC DEVELOPMENT COMMISSION UNANIMOUSLY ENDORSES THE COAL SLURRY PIPELINE PROJECT FOR BENEFICIAL IMPACT FOR JOBS AND ENERGY FOR ARKANSAS AND SURROUNDING REGION.
ARKANSAS ECONOMIC DEVELOPMENT COMMISSION BY HENRY ANTHONY

16:17 EST

MGMCOMP MGM

TO REPLY BY MAILGRAM, SEE REVERSE SIDE FOR WESTERN UNION'S TOLL - FREE PHONE NUMBERS

ALEXANDER CONSTRUCTION COMPANY, INC.
WRECKING • SUBDIVISIONS • ROADS AND STREETS • COMMERCIAL WORK
Box 183 PHONE 888-9080
SEDALIA, COLORADO 80135

January 5, 1981

Bureau of Land Management
Denver Federal Center
Bldg. 50
6th Ave,.and Kipling
Denver, Colorado 80225

Dear Sir;

As an owner of a ranch in western Nebraska near the town of Redington, I am opposed to any coal slurry pipe lines anywhere except if they pump their own water from the sea up to the mouth of the pipe and use sea water for the water supply.

We, in the western part of Nebraska, eastern Colorado, southern and northern Dakotas cannot spare one gallon of water for this pipe line idea,. This is simply another way for big business to make a huge profit at the expense of the small farmer and rancher. If the truth be known most of these pipe-line companys are getting their money from the oil companys or oil related business.

Its a sad day when our government, who we jokingly say has our interest at heart (rancher and farmer) would approve of these types of construction thru the western states,. They can barely afford the increase of population let alone the extra water needed for these pipelines.

My family and I are landowners in both Colorado and Nebraska and know that the need to keep our water in our state is the only way we can survive in the ranch and farming business.

Noel R. Alexander

Noel R Alexander

Submission to Bureau of Land Management, Office of Special Projects, regarding Energy Transportation Systems, Inc., coal slurry pipeline transportation project, Environmental Impact Statement (draft, dated November 7, 1980)

FROM: Kansas City Southern Railway Company
DATE: January 3, 1981

CONTACTS: Mrs. Scootch Pankonin, Washingtoo Representative, 1710 R Street, N.W., Washington, D.C. 20009 - 202/223-0612

Mr. Phillip S. Brown, Vice President/Corporate Affairs, 114 West Eleventh Street, Kansas City, Missouri 64105 - 816/556-0325

The primary involvement and concern of the Kansas City Southern Railway Company (KCS) has beeo in the preparation of the so-called No-Action Alternative which is appended to the draft Eovironmental Impact Statement as Woodward-Clyde Consultants' Technical Report 19801. The Office of Special Projects ia aware that in order to provide the information requested for analysis of the No Action Alternative, the effected rail carriers established an informal task force. Comments on the No Action Alternative therefore became largely the responsibility of the Burlington Northern Railroad which originates the coal movements in question and which is responsible for the greater proportioo of traffic miles. KCS has reviewed the comments of Alleo R. Boyce, Assistant Vice President of the Burlington Northern, which were presented at BLM's public hearing io Lusk, Wyoming. We concur in his analysis and do not feel that we can make a significant addition to the hearing record he established.

We are most directly concerned, however, io a theme of the EIS which carries the implication that "competition" results unfailingly in cost saviogs for consumera of electric energy in ETS1's marketing area -- a geographic area in which the KCS is a primary carrier. There is substantial ground for concluding that the effect on cost to consumers for both rail and pipeline coal may be just the reverse.

Estimates of the total cost of the ETS1 pipeline, including interest rate and construction contingencies, are offered by project spokespersons in the range of \$2 to \$3-billioo. It seems clear that io the absence of an equity investment of a very substaotial fractioo of the total cost, debt financing secured by creditworthy purchase contracts (most likely from electric utilities) would be the most likely avenue to pursue. However, in examining the type of contract being offered by ETSI, it is clear that the contractual commitment is long-term in nature, generally no less than coterminous with the final maturity of the debt fioancing. Secondly, ETS1 must assure investors that the commitmeot of the purchaser is sufficieot to pay all operating and capital costs of the project, including, of course, bond interest and principal. In this case, it means that unless a special provisioo is made from other sources yet unidentified, the cootracting electric utilitiea would have to commit themselves to pay, every year for many years, an amount sufficient to cover the cost of the pipeline,

Page Two

no matter what it eventually costs to build. While no one expects an exact parallel, it should be mentioned that the Alaska pipeline eventually cost seven times the original estimates. It also means that the contracting utilities will be required to pay for the slurry coal whether or not it ia declivered. This, of course, shifts to the ratepayer of contracting utilities the risks of rupture, environmental violations resulting in shutdown or mitigation, interruption of coal supply, strikes, and, most important of all, cutoff of water supply. In addition, the costs associated with eovironmentally-satisfactory water treatment and disposal and of ash pits also become part of the irrevocable long-term commitment to coal slurry.

One of the most important principles in the regulation of electric utility rates is that they be set by bodies which are as close as possible to, and responsive to the needs of, the ratepayers. Needless to say, the act of entering into contracts auch as described above would automatically remove from local rate-setting jurisdiction one of the largest elements of cost in utility operations--fuel costs. In addition, the long-term commitment to a slurry pipeline necessarily destroys the utilities' flexibility of fuel supply, precluding the opportunity of switching to more economic sources as they become available. Furthermore, the existence of long-term contracts in the magnitude oecessary to finance a pipeline such as ETS1 proposes could well have the effect of crippling the credit of the contracting utilities, thereby making it substantially more expensive, at best, to fioance other necessary activities such as new power plants, transmission and distribution facilities, etc.

It is also quite possible to visualize a situation where the construction of a coal slurry pipeline could become a long-term economic burden on the customers of contracting utilities, while at the same time producing higher freight rates for coal and other commodities in the transportation area. Kansas City Southern testified before the 96th Congress that the amount of new business ETS1 expects to capture (34.6 millioo tons annually) is more than three times the amount of Western coal traffic which the KCS anticipates hauling io 1982. If ETS1 succeeds in delivering at its full proposed capacity, this would leave some 3.5 million tons to be handled by competing rail systems within the KCS territory. Bear in mind that the Kansas City Southern has invested some \$93-million over the past five years in track and equipment to accommodate increases in coal traffic. It appears, then, that whether the ETS1 line, once built, provea to be a bonanza or a disaster for the consumers who sponsored it, the effect on the railroads which would lose this traffic would obviously be significantly harmful. The necessity of rehabilitating and maintaining a strong, viable rail system in the United States has been clearly established as a matter of public policy by the Congresa, the Carter Administratioo, and the incoming Reagan Administration. It should be understood that under the economic conditions described, freight rates on the remaining commodities carried by the railroads would need to rise, probably in some cases substantially, if it becomes necessary to spread fixed costs over a smaller traffic base.

KCS recognizes that the financing of the ETSI pipeline aod resulting economic dislocation in the market area is a difficult matter to assess within the scope of an environmental impact atatemeot. Yet it is clear that this document carries significant weight in the permitting and public policy decisions to be made by federal, state and local governments. Drawing appropriate conclusions about the economic and competitive impact of the ETSI pipeline becomes particularly difficult in light of the numerous and critical changes in project description which occurred during the public scoping period, similar changes announced after the conclusion of the public scoping period, and a further change announced December 5, after the release of the draft EIS, that the Market Alternative to serve Oologah and Baton Rouge is no longer being considered.

As a more general observation on the economic analysis, it should be noted that only two coal slurry pipelines have ever operated in the United States. One, in Ohio, was shut down because it could not match railroad unit train rates. The other, Black Mesa, moves coal in Arizona at a rate higher than the average rail coal rate in the region. This underlines our contention that "competition" cannot be assumed to be effective or beneficial.

A copy of ETSI's proposed preliminary contract to the City of Wichita, Kansas, dated February 13, 1976, is attached. It provides some further background in our argument that these comments on the economic and competitive benefits should be addressed within the context of your analysis of competitive coal transportation systems.

The Project Description Technical Report WCC 1980 a requires some clarification in several areas.

Page 1-1 begins a description of water requirements (20,500 acre feet annually) for the project. Of that total, it indicates that Wyoming water sources will be depended upon to provide a total of 20,260 acre feet -- 20,000 acre feet for export in the coal slurry mix and 260 acre feet for plant washdown, dust suppression, evaporation make-up, etc.. Our reading of the Wyoming Legislature's action in 1974 indicates that they were very clear in their intention that the project be limited to the use of not more than 20,000 acre feet annually for all aspects of the project; i.e., that the limitation was not placed on export water alone. This suggests that the EIS may be based on an illegal use of Wyoming water. Similarly, the EIS indicates dependence upon 45 wells while permits exist for only 40. In addition to the production wells, there are to be five monitoring wells which also presumably require permits. (pps. 1-54 and 1-77).

The so-called "dump ponds" at each pump station present some credibility problems which might require special attention in the permitting stipulations. ETSI has indicated publicly over the past two years that dump stations were not needed along the entire length of the route. This caused no little consternation among residents along the proposed route. The EIS seems to require a stronger analysis of the need, design, and capacity of these stations. A further step might be indicated by the results of that analysis: a Secretarial stipulation that the project must include appropriate pond capacity. This problem is closely related to the surface water quality analysis, comments upon which will be presented in a later section of this paper.

A geologist with experience in the Powder River Basin was retained by the railroads for assistance on the water issue. He offered the observation that less pipeline would be required in the Crook County field for various purposes than in the Niobrara County field. For comparison purposes:

	Crook County	Niobrara County
Well field gathering system	31 miles	62 miles
Raw water pipeline to North Rawhide plant	43 miles	55 miles
Pipeline from North Rawhide to Jacobs Ranch plant	55 miles	68 miles

This raises questions as to why the Niobrara field is the preferred alternative when it is apparent that the Crook County field requires fewer wells and less pipeline mileage. An expanded discussion of the quality of the Crook County water, presence of water supply facilities drawing from the same source, and the presence of many oil fields in the area might resolve the issues surrounding the choice of the preferred alternative.

Page 1-98 of the Project Description begins a discussion of System Nonroutine Operations in which a variety of shutdown situations require pumping water from local sources into the system. It is not clear whether the 20,500 acre feet per year required by the project covers these contingencies fully. Black Mesa experienced highly irregular operations until a variety of technological "bugs" were eliminated. In the discussion of Nonroutine Operations and in other sections of the technical papers, it is not apparent that the consulting firm drew as fully as it might have from the Black Mesa experience. Our own conversations and on-sight inspections with Black Mesa management indicate that while virtually all environmental problems are within the state of the art to solve, the costs of correction and mitigation can be overwhelming. To the extent that these experiences at Black Mesa are more fully understood by BLM from the onset, the agency can make appropriate recommendations to the Secretary and permitting government offices about stipulations which might be necessary to insure adequate technology and mitigation. Particularly, the federal agencies should make the issuance of permits contingent on obtaining adequate prior water rights along the pipeline route to accommodate System Nonroutine Operations needs. It has been noted in Slurry Transport Association technical sessions that plugging problems are especially acute at the bottom of a slope where the pipeline levels out; technical specifications recommend limiting such slopes to no more than 13 degrees.

These nonroutine operations are discussed further on page 1-102 of the Project Description, stating that "A spill contingency plan for the pipeline would be prepared and approved prior to initiating pipeline operations." Because such spills present a significant hazard in environmentally sensitive areas, this contingency plan should be submitted for examination and inclusion in the final EIS and issuance of permits should be contingent upon its approval.

The Technical Report on Surface Water Quality, 1980c, is insufficient in its analysis of slurry filtrate water quality. It suggests on page 14 that coal/water combinations in the proposed project have not been analyzed, yet considerable data on the nature of the slurry water is used to support findings in other

sections of the EIS. This suggests that lacking analysis of the coal/water combinations, those findings are actually insupportable.

It was surprising to find no reference to work done in this area by the Environmental Protection Agency through its industrial Environmental Research Laboratory at Cincinnati. They released on April 30, 1978, the results of research undertaken by R. R. Faddick of the Colorado School of Mines, entitled "Environmental and Pollution Aspects of Coal Slurry Pipelines." While the report bore a disclaimer that EPA did not necessarily endorse or recommend the document for use, it, in fact, served as a basis for later EPA Congressional testimony on the issue. Findings from this research were incorporated into the testimony of the Laboratory's Dr. David G. Stephan before the House Committee on Interstate and Foreign Commerce on August 28, 1980.

Stephan expressed optimism that coal slurry lines can be built and operated in an environmentally acceptable manner, but cautioned that adequate consideration be given to environmental problems in a timely fashion. He suggested that careful attention to maintenance and operating procedures can minimize the possible environmental impacts he described and which were analyzed in the Faddick study. He points out that impurities in the transport water can be adsorbed on or occluded in the coal, creating air pollutants in the course of subsequent coal combustion. Slurry water which had been generally acceptable for irrigation at the upstream end of the pipe could, by the time it is discharged at the downstream end, have leached salts and other contaminants from the coal. Separated water is most commonly planned for use as make-up water in utility cooling towers. Stephan points out that at least a part of the water must therefore be discharged as "blow-down" to prevent the build-up of mineral solids; thus, portions of the transport water do eventually become wastewater. Stephan's discussion of the formation of carcinogens in the transport and disposal process is further illuminated by the work of Professor Howard S. Peavy, Director, Environmental Health Engineering Program, at Montana State University--an undated paper entitled, "Water Pollution Potential of Coal Slurry Pipelines." The Stephan testimony before Congress and Peavy's document are attached.

This points to a very serious environmental hazard which, as noted, we do not feel is adequately explored within the EIS. It is not enough to say that compliance with federal, State, and local water quality standards will be achieved. The draft EIS clearly states that no analysis has been made of pollutants these localities might be expected to receive and suggests that ETSI itself suffers insufficient knowledge on which to base its abatement and treatment design. We would suggest that no permits be issued until ETSI has satisfactorily demonstrated its expertise on the specific pollutants it will deliver at the terminal and its ability and intent to install appropriate technology to meet water quality standards.

Similar problems exist in the Technical Report on Ruptures and Spills, WCC 1980j. While the data presented may well be perfectly valid, it depends greatly on the integrity of the surface water analysis. Furthermore, most of the data here, and in other Technical Reports, was provided by Bechtel, Inc., which has a financial interest in the proposed pipeline. Again, the experiences and adaptations in technology by the Black Mesa project cannot figure too heavily into the analysis. Black Mesa officials have stated publicly that Bechtel design of their equipment was seriously deficient. Modifications were

designed and patented by Black Mesa itself so that this information is largely outside the expertise of Bechtel. Without a more precise analysis of coal/water combinations, engineering design, nonroutine operations, etc., the State and local permitting authorities are greatly disadvantaged in their ability to determine prudent stipulations for the project. Because many of the critical environmental standards are established by the Federal government but enforced locally, inadequacy in any key area of BLM analysis poses a great burden at local levels.

As a footnote on the ruptures and spills discussion, the geologist retained by the railroads feels it is questionable if previously settled coal could be resuspended from the deposits at the bottom of a lake unless the lake was very shallow and subject to bottom scour at the time of freshets. (Pg. 123)

The Technical Report on Socioeconomics, WCC 1980d, gives no consideration whatsoever to the use of water for slurry pipelines vs. its potential use for agriculture, other industrial purposes, or future domestic needs. Other areas of the EIS suggest that there is little competition foreseen during the 50-year life of the project, while, in fact, the Department of Energy has selected the Powder River Basin as a prime siting area for synfuels and other economic expansion can be reasonably expected in conjunction with the development of coal and other energy resources.

Some elemental mitigating measures are common to the construction of pipelines through communities and are normally a part of the Secretarial or permitting-agency stipulations associated with these projects. Those that we are suggesting are by no means a comprehensive list of necessary steps to protect local communities, but are set forth for your own consideration as well as at the request of community leaders who specifically requested that we address this issue:

1. Prohibit construction activity at night as appropriate in order to keep noise at tolerable levels in residential areas.

2. Require prepayment of property taxes in order to eliminate local budget deficits associated with increased demand for services during construction period. Prepayment should be arranged for the life of the project where local service agencies determine that project operation places a burden on the budget structure.

3. Reroute pipeline as necessary to follow gentler slopes and avoid environmentally sensitive areas.

4. Require bussing and carpooling of construction workers to reduce, as necessary, traffic congestion.

5. Require payment of incremental electrical power costs to prevent increased electrical power costs to other customers which would be caused by the project.

6. Implement a road management program by local road authorities which would monitor road use and require reimbursement for costs of road repair.

7. Restrict construction around seasonal recreation facilities and agricultural

Page Seven

areas in with the growing season and/or harvest might be adversely affected.

8. Establish public relations and coordination program to control labor supply in order to reduce an influx of unemployed job seekers.

9. Use stronger pipe in unstable and potentially unstable areas to absorb stress caused by slope failure and prevent pipe rupture.

10. The project calls for periodic sampling of drawdown at the well supply area. Similar sampling should be provided along the pipeline route and at the terminals to provide early warning of contaminated water.

11. Schedule construction activities to avoid periods of sensitivity which could reduce wildlife populations.

12. Water sprinkle disturbed soils in rural areas during construction to eliminate to the extent possible soil losses from fugitive dust.

13. Clear flood debris from streams at stream crossings; divert flow around construction area to reduce sediment concentration and siltation; and require barge or onshore storage of streambed spoils.

14. Revegetate corridor with plant species beneficial to wildlife, particularly in areas where valuable summer or winter food species would be removed; as appropriate, revegetate to control erosion. Vegetative screen may be useful in eliminating visual intrusion of right-of-way and facilities where the route crosses trails and scenic travelways.

15. Reroute pipeline to avoid subsurface drain tile in agricultural areas or modify existing drainage systems encountered to insure proper drainage. Existing pipeline fields, especially in Kansas, will require particular measures to protect the integrity of agricultural and other uses.

16. Require use of aerial, cable, or other special equipment and methods to transport material and equipment in areas wehre extensive road construction would be undesirable.

17. Require that construction activity be coordinated with other major construction efforts in the area.

18. Provide field medical personnel during construction to reduce demands on local medical personnel.

19. Remove waste rock from construction area to appropriate dump site, subject to approval of local authorities.

20. Avoid use of herbicides for corridor maintenance to the extent possible to eliminate impact on agricultural activities and human health.

21. Establish construction work hours to avoid established traffic congestion hours on access roads.

22. Maintain a buffer zone of one mile around bird nesting areas.

Page Eight

The conclusions reached in the net energy analysis, while favorable to the railroads, differ considerably from our own studies. Attached is a report submitted to the Kansas City Southern in 1978 providing the model which was discussed with Woodward-Clyde. Factors suggested by G. William Frick of the firm of Van Ness, Feldman & Sutcliffe are relevent to the analysis, but WCC has apparently chosen to segregate rail construction and utility plant operations in a manner which we feel is inappropriate.

One additional document is appended: a letter of February 28, 1980, from the U.S. Department of the Interior Geological Survey to Senator George McGovern which raises serious doubts in our minds as to the adequacy of the water data on which conclusions in the EIS are reached. Some effort should be made to respond to this letter, indicating the extent to which the necessary data was developed between March 1980 and issuance of the draft EIS.

In closing, it should be noted that the KCS was deeply gratified for the cooperation and consideration given by both the BLM Office of Special Projects and Woodward-Clyde personnel during the preparation of the draft EIS. Our obligation to the industry and the communities we serve to provide comment on the Draft is obvious, but is offered along with sincere appreciation for the congenial working relationship we've enjoyed with the Draft's authors.

United States Department of the Interior

GEOLOGICAL SURVEY
BOX 25046 M.S. 406
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:

February 28, 1980

The Honorable
George McGovern
United States Senate
Senate Office Building
Washington, D.C. 20510

Dear Senator McGovern:

This is in response to your request of February 20, 1980, for information concerning the U.S. Geological Survey's investigation of the Madison aquifer system in South Dakota and several adjacent states. Also, you requested information concerning the relation of Survey work to the Bureau of Land Management's plans to file a draft environmental impact statement on the proposed ETSI coal slurry pipeline between Wyoming and Arkansas.

The EIS is being prepared by Woodward-Clyde Consultants, San Francisco, California, under the direction of BLM. This office, at the request of BLM, has an advisory role in the preparation of the EIS and for this purpose makes available to BLM the services of a senior hydrologist. This advisory function is being carried out by Lee C. Dutcher, on the staff of this office, who has been closely associated with the regional studies of the Madison Limestone aquifer system since they began in 1976. Our current and anticipated role in the EIS, therefore, is to serve as technical advisor to BLM on hydrologic matters. We are not otherwise directly involved with the EIS preparation.

The data and evaluations of the Madison aquifer system developed by this office over the past four years are of vital importance to water managers in the five-state area of concern and, of course, to BLM and others charged with assessment of hydrologic impacts anticipated to result from the proposed ETSI coal slurry pipeline. The Madison study is continuing and we anticipate that it will be completed on schedule by October 1980. The targets for completing certain work elements for the EIS, however, will arrive prior to that October date. Therefore, in order to expedite the EIS preparation and to insure that the information gathered during the Madison studies can be used to best advantage by all interested parties, we have arranged for public release of parts of the studies as soon as internal review can be accomplished. Release will be accompanied by public announcement, in order to make the information available to all prospective users simultaneously.

2

The hydrologic model is scheduled for completion and release to open-file during May 1980. This accelerated release will be well in advance of the filing of the EIS by BLM; obviously, the results of the Survey's model will become an extremely important element in the analysis of impacts included in the EIS.

To some degree, BLM and the consultant will not be able to take full advantage of the Survey's data and interpretations, because release of final reports on results of the studies will not be available for public release prior to October 1980. However, the hydrologic model, water level maps for several regional aquifers, maps of water quality, and geologic data will be made available for the EIS. Assessment of regional impacts that may result from the proposed pumping will be with the Survey's regional model. However, specific water-level drawdowns at points near the proposed well field will have to be assessed by using a finer-scale model prepared for that purpose by the contractor. Therefore, your last question concerning the sufficiency of the data for assessing hydrologic impacts is an extremely difficult one. In our judgment, the possible errors of estimated impact cannot be determined because of uncertainty as to the true value of the parameters used in the model. Most parameter values used will be based on an interpretation of porosity and permeability values from a deep and complex aquifer system for which data points are few. Therefore, the approach to assessing the regional drawdowns will be to present a "most likely" or "most probable" estimate, and at the same time, through an analysis of data sensitivity, present "possible best" and "possible worst" estimates of impacts to show a range of impacts that result from possible errors in parameters used in the model. This is all that can be done considering the lack of precision in the data and our less than complete knowledge of the hydrologic system response to the stress proposed.

We sincerely hope that this answers your specific questions, that these answers will help assure your constituents that all interested parties will have equal opportunity to acquire data and information, and that the approach being used by the Survey in analyzing this complex hydrologic system is as objective as possible. Unfortunately, at this stage we cannot specify the accuracy of predictions that the model simulation will generate.

Sincerely,

Alfred Clebsch Jr.

Alfred Clebsch, Jr.
Regional Hydrologist
Central Region

Energy Transportation Systems Inc.
P.O. Box 3965, San Francisco, Ca 94119
Telephone (415) 764-7080/7081

February 13, 1976

Mr. Grover E. McKee
Director of Economic Development
City Hall - 11th Floor East
455 North Main Street
Wichita, Kansas 67202

Dear Mr. McKee:

Energy Transportation Systems Inc. (ETSI) proposes to finance, design, construct, own and operate a coal slurry pipeline system capable of transporting 8 million tons per year of coal in slurry form to a point in the immediate vicinity of Wichita, Kansas, and delivering dewatered coal. The City of Wichita will contract with ETSI for 8 million tons per annum, for which ETSI will charge the tariff described below.

Wichita and other shippers will be responsible for supplying coal and receiving coal and water, as scheduled, at agreed quantities and qualities. All risks, liabilities and indemnifications connected with such supply and receipt will be borne by each shipper in accordance with the terms of its tariff. The firm take-or-pay transportation agreements will require that each shipper pay the tariff even though coal is not actually available for transportation or coal and/or water cannot be received or utilized by shipper at the destination point.

Conversely, any shipper who furnishes coal for transportation in accordance with such contract, and is not prevented from receiving and utilizing coal and water, will be excused from payment of the tariff with respect to any period of time during which ETSI does not transport the coal as called for in the transportation contract.

The term of the transportation contract will be 30 years.

The tariff charged by ETSI will be $ * per ton. This tariff consists of a fixed charge of $ * covering all fixed costs and an escalatable charge of $ * covering escalatable costs.

*Supplied by sealed bid and subject to ICC approval.
To be opened when qualified competitive bids available.

Mr. Grover E. McKee
City of Wichita
February 13, 1976
Page 2.

This tariff proposal is based upon ETSI's best current estimates of capital costs and other costs related to the development of the project. Following construction, the fixed portion of the basic tariff will be adjusted to final cost (including capitalized interest) of the project to reflect any differences from the estimated capital cost, the assumed interest rate and the assumed debt equity ratio.

"Interest rate" means the composite costs of money, including all fees, commissions, discounts and other charges related to debt but excluding equity.

Also following construction, the escalatable portion of the tariff will be adjusted up or down to conform to the then forecasted cost of the items listed in Exhibit A. The escalatable charge is subject to escalation on the basis set forth in Exhibit A hereto(submitted in sealed bid only).

It is understood that the above mentioned tariff is based on a 35 million ton per year system - 8 million tons per year to vicinity of Wichita, 15 million tons per year to White Bluff, 12 million tons per year unallocated at this point. The tariff will of course be adjusted in equitable fashion when the final configuration has been fixed.

ETSI will assume responsibility for supplying water for the project and has rights to the water, but ETSI will agree to provide from this source enough water to transport Wichita coal. In the event this supply of water becomes unavailable, after completion of the pipeline, ETSI will develop a solution and perform the actions necessary to provide a water supply. ETSI will recover the net capital and operating costs thereof as a surcharge addition to the tariff rate, to include a return on equity of 15%.

If the above proposal is acceptable, we propose to execute a mutually agreeable transportation contract which will become effective when (1) commitments are in hand for the balance of the total 35 million tons per year throughput, (2) assurance is in hand that crossing of the railroads by eminent domain or other means is possible and (3) commitments are received for financing. This offer will remain open for 6 months and may be extended by mutual agreement.

Very truly yours,

E. J. Wasp
E. J. Wasp
Vice President

Approved: ________________
By City of Wichita
Grover E. McKee
Director of Economic Development

STATEMENT OF
DR. DAVID G. STEPHAN
INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON TRANSPORTATION AND COMMERCE
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
U.S. HOUSE OF REPRESENTATIVES
AUGUST 28, 1980

Mr. Chairman and Members of the Subcommittee, I am David G. Stephan, Director of the Environmental Protection Agency's Industrial Environmental Research Laboratory in Cincinnati, Ohio. In accordance with your invitation, I shall try to address the issues you raised concerning some of the environmental aspects of transporting coal through slurry pipelines.

We at the Environmental Protection Agency are well aware of the need for domestic energy production and are committed to the President's goals of energy independence, which call for increased domestic energy production consistent with the related need for environmental protection.

The proposals before the committee with respect to coal slurry pipelines will provide us with another alternative for transporting coal from its source to the point of consumption.

We are optimistic that coal slurry lines can be built and operated in an environmentally acceptable manner. Coal slurry pipelines can have environmental advantages. By providing a means of conveying coal from its origin to a remote point of use, the mined area is spared the additional environmental problems attendant to minemouth power generation, including air pollution and a far greater level of water consumption, a very important consideration in the West.

The use of coal slurry entails, as do other modes of coal transport, environmental impacts which can be minimized given adequate planning and precaution. Our primary concern, therefore, is that adequate consideration be given to environmental problems in a timely fashion. This is best accomplished by early, open discussion during the planning stage of a project. This leads me to the issues the Subcommittee requested we address today—the potential impact of wastewater discharges at the end of the pipeline and the environmental implications of leaks or ruptures in the pipelines themselves.

Before discussing these potential impacts I want to stress that the state of the art of pipeline technology is relatively advanced, and that careful attention to maintenance and operating procedures can minimize the possible environmental impacts I am about to describe.

Let me begin by noting that in some of the Western States where coal transport pipelines might originate, coal slurry pipelines might have to compete with other water needs, such as agriculture, industry, municipalities and even recreation. For this reason, water of low quality, less suited to fulfilling these other needs, has been and will continue to be considered as transport water. For example, municipal wastewater after treatment might be one source; the use of wastewater from the mining operations has been suggested; and use of saline underground water is a third possibility. In considering any of these and other sources of transport water, however, we must keep in mind that the nature of the effluent which must be disposed of at the end of the pipeline will be affected by the quality of the transport water employed. In addition, if impurities in the transport water are adsorbed on or occluded in the ~~coal itself~~ they could conceivably become air pollutants in the course of subsequent coal combustion. Further, as you are all aware, the physical removal of substantial volumes of water from one location to another can impact the hydrology of an area. While "water quantity" is not of concern to the EPA in the direct sense that "water quality" is, nonetheless, changes in quantity are of real concern environmentally when they impact quality through reducing the flow of rivers and streams, lowering the levels of lakes and reservoirs, or affecting hydraulic gradients in groundwater aquifers.

Operating experience is very limited as regards the environmental impacts of the discharge of slurry transport waters. The one operating system, the Black Mesa Pipeline, terminates at the Mohave Power Plant in the southern Nevada desert. Wastewater from the power plant is simply sent to evaporation ponds and, at this location, annual evaporation rates are sufficient to dispose of the water. There is, therefore, no surface discharge.

Most of the proposed pipelines, however, would terminate in relatively high rainfall areas making natural evaporation an impractical solution. Under these circumstances, several possibilities exist for disposal of the transport water. The most commonly mentioned are:

(1) Recycling for use in slurry transport. While attractive from an environmental and water conservation standpoint, recycling does not appear to be an economically viable alternative, at least at the present time. The additional capital cost of installing dual pipelines and pumping stations and the operating cost of pumping water twice as far impose a formidable economic obstacle.

(2) Agricultural irrigation - The key here is the quality of the transport water at the downstream end of the pipeline. If the slurry water has, for example, come from a saline aquifer, it would not be suitable for agricultural irrigation without extensive treatment. If the transport water has come from a municipal or industrial wastewater source, it might contain pathogens or toxic components which would render it unsuitable for irrigation without some type of wastewater treatment. Moreover, even if the slurry water had been generally acceptable for irrigation at the upstream end of the pipe, by the time it is discharged at the downstream end, it could have leached salts and other contaminants from the coal itself such that it no longer is a sutiable irrigation water without further treatment.

(3) Utilization by the power plant receiving the coal - At the present time, most coal slurry pipeline promoters advocate using the separated water in the power plant operations at the pipe terminus. The most common proposal is to use it as a part of the make-up water for cooling towers as is done at the terminus of the Black Mesa Pipeline. Although cooling tower water has reasonably few quality constraints, part of the water must be discharged as "blow-down" to prevent the build-up of mineral solids. Thus, portions of the transport water do eventually become wastewater even in this circumstance.

EPA has supported relatively little work in this area but we have completed two projects aimed at evaluating the pollution potential of slurry pipeline operations. The results of the first project were published in March of 1979 in a report entitled, "Environmental and Pollution Aspects of Coal Slurry Pipelines." This study attempted to point out potential environmental problems in the design, construction and operation of pipeline systems. Our second study, for which the report is to be published in the Fall of 1980, is devoted to a description and characterization of the potential environmental contaminants carried in one coal slurry mixture. It is this second study which goes most directly to the specific issues the Subcommittee requested EPA to address today - the potential environmental problems associated with disposal of wastewater at the end of the pipeline or arising from leaks or ruptures in the pipeline itself.

Preliminary results verify that pollutants in slurry water discharges come from three sources: (1) contaminants in the feed water used in the pipeline; (2) chemical interactions between the water and the coal as they move through the pipeline; and (3) chemicals deliberately added to control corrosion and pH and to aid in coal-water separation.

As I mentioned earlier, consideration has been given to utilizing low quality water for coal transport. If a wastewater is used, whatever pollutants might have had to be removed from it so as to allow discharge at the upstream end of the pipe will undoubtedly have to be removed at the downstream discharge point as well. If a natural saline water or brine is used, there are likely to be fairly stringent limitations on discharge of such water if it is to be discharged into any fresh water body such as a river or lake. And keep in mind that the removal of salinity from water requires, generally speaking, one of the more expensive treatment systems.

Saline water-coal interactions tests have indicated to us that salts from the water can actually adsorb onto or become occluded into the coal such that they remain with the coal when it is separated from the transport water. This causes corrosion problems in power plant equipment but can also lead to larger quantities of ash and ash from which salts may then leach back into the environment if left exposed to weathering. However, these impacts are likely to be trivial in comparison with the overall ash disposal problem.

Even assuming fresh water is used as the transport medium, the interactions between the coal and water as they move through a pipeline may result in wastewater at the terminus which would pose environmental problems for disposal. For example, a decrease in pH, i.e., an increase in acidity, appears likely as a coal slurry moves through a long pipeline. However, so long as the decrease in pH is relatively small, as suggested by the tests run to date on Western coals, it is unlikely that there will be significant dissolution of metals. If there should be a significant decrease in pH, then some dissolving of metals inherently found in coal could occur. Although metals found in coal, such as zinc, lead and chromium, can dissolve, generally we have found that concentrations of these metals can be expected to remain quite low.

Even without a reduction in pH, an increase in dissolved minerals may pose environmental problems. Sulfate and chlorides may dissolve to concentrations which might lead to potential water quality problems at the point of discharge. Very finely divided particles of coal and other minerals will obviously enter the transport water. These particles cause turbidity which will remain in the water even after centrifugal separation of the coal and water at the terminus. Too high a suspended solids level could present problems in meeting water quality discharge standards. However, special coal-water separation techniques can minimize this potential problem.

A possible problem which needs further study concerns the leaching of organic compounds from the coal into the transport water. If the water is subsequently chlorinated to disinfect it (it is a common practice to chlorinate cooling water to prevent biological films from growing on exposed surfaces in cooling systems), various chlorinated hydrocarbons, many of which are suspected carcinogens, can be formed. These, in turn, could result in human exposure if they find their way to downstream water supplies.

Chemicals added either to the pipeline or in the dewatering process will also affect transport water quality. For example, a common and effective corrosion inhibitor for use in pipelines is hexavalent chromium. This form of chromium is quite toxic and discharge limits are quite stringent (50 ppb). Treatment would undoubtedly be required. Phosphates are also utilized as additives to inhibit corrosion. Since phosphates, acting as aquatic nutrients, can trigger accelerated eutrophication of lakes and reservoirs, they too may need to be removed by treatment. In addition, a number of chemicals may be added to the coal dewatering cycle: caustic to readjust pH, coal and coagulants and coagulant aids would be common additives.

To this point, I have attempted to elucidate the variety of types of environmental quality problems that might arise from the use of slurry pipeline technology. On the positive side, it should be stated that control technologies to exist and are available for practical application to handle essentially all of the potential water pollution problems mentioned above. The one exception, about which too little is presently known, is the question of dissolved organic compounds which, if subsequently exposed to chlorination, may be precursors of various chlorinated organic materials. Research on this general problem, i.e., the conditions under which chlorinated organics are formed, their toxic effects on man and aquatic life and means to prevent their formation or to remove them, is under way in several of EPA's research Laboratories and elsewhere.

As for the treatment to remove the other troublesome pollutants, site-specific treatment trains would have to be designed to meet applicable quality requirements at the point of discharge. Such discharges would be subject to a National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act. Effluent guidelines for slurry pipeline discharges have not yet been developed by EPA but individual permits would be issued by EPA, or by States to whom permitting authority has been delegated, based on engineering judgement of best available technology.

The more highly contaminated the discharge water, the more complicated and more costly the treatment requirements will be if the transport water must be upgraded for discharge. As a point of reference, if treatment costs were to be $1.00 per 1000 gallons (this would provide quite a high degree of treatment), the impact on the cost of the coal transported would be about 25¢ per ton. If the treatment cost were only 10¢/1000 gallons, the impact on the cost of a ton of coal would be less than 3¢.

Let me turn now to another question you have raised -- the problem of possible pipeline leaks or even breaks. Because a "leak" involves a relatively small discharge volume, it is not anticipated that leaks per se will cause significant environmental harm prior to detection and correction. Coal slurries are simply not that "potent."

A rupture, on the other hand is more serious because it usually occurs instantaneously permitting a large volume of liquid to be released into the environment before corrective action, such as the closing of block valves, can be taken. The problem which could occur from a major pipeline break will depend on the quality of the water released and on the location and terrain in which the break occurs. The released water may seep into the ground, form in ponds or puddles, or drain into an existing waterway. Such releases of untreated slurry could pose substantial problems. These include any of the problems mentioned above in the discussion on discharges at the pipeline terminus such as pollution from corrosion inhibitors, toxic metals, salts, etc. For example, if saline water were used as the transport medium or if a strong corrosion inhibiting chemical were present in the pipeline, a volume of such water flowing into a fresh water pond or stream would pose a real danger to aquatic life or even to water supplies. If undisinfected sewage effluent were the transport medium, serious contamination of a water supply could possibly result.

Without intending to minimize environmental problems which might arise if a leak or a rupture of a pipeline were to occur, I do note the relatively advanced state-of-the-art which pipeline technology has reached. This includes methodologies to detect the location of leaks or ruptures and automatic valves for cutting off flow. Moreover, pipelines carrying slurried coal would seem to offer less of an environmental threat than those carrying oil, gas or other chemicals. It is believed, therefore, that with proper design and careful attention to maintenance and operating practices, the leak/rupture environmental danger should be relatively small.

I hope this has provided you with the kind of brief overview you were seeking. I shall be happy to try to respond to any questions you may have.

Coal Slurry file

VAN NESS, FELDMAN & SUTCLIFFE
1220 NINETEENTH STREET, N.W.
WASHINGTON, D.C. 20036

S. LYNN SUTCLIFFE
HOWARD J. FELDMAN
WILLIAM J. VAN NESS, JR.
G. WILLIAM FRICK
ALAN L. MINTZ

SUITE 500
TELEPHONE
(202) 331-8400

July 7, 1978

RECEIVED
FILE NO. ______
JUL 10 1978
Legal Department
Kansas City Southern Industries

Phillip S. Brown, Esq.
Assistant General Counsel
Kansas City Southern
Railway Company
114 West 11th Street
Kansas City, Missouri 64105

Dear Phil:

Enclosed is a copy of my revised net energy paper. Let me know if you have any suggested revisions.

I talked with the author of the PEDCo report. He is sticking with his data on the energy loss. I was a little skeptical of his computation of the heat loss if the "fines" were discarded so I did not use an exact number. He did say, however, that ponding the "fines" is not a desirable alternative for the companies. As with the other reports, his analysis is based almost exclusively on information from the Black Mesa Pipeline.

Very truly yours,

Bill

G. William Frick

Enclosure

NET ENERGY ANALYSIS OF
COAL SLURRY PIPELINES AND
RAILROAD UNIT TRAINS

Congress is now considering several bills that would provide Federal eminent domain authority for coal slurry pipelines to expedite their construction. Pipeline companies are particularly interested in transporting coal to Eastern electric utility markets from mines in Western states, an area now adequately served by railroads. As a result of this interest, there has been considerable debate over the various impacts of these two competing modes of transportation, e.g., economics, maintenance of competition, effect on railroad rates for other commodities, environmental considerations, and availability of water for pipeline use.

A key point which has not received sufficient attention, however, is the amount of energy that will be consumed in the transport of Western coal. Obviously, transportation requires energy and it is important that this energy consumption be minimized. Thus, when alternative modes of transportation are compared, decisionmakers need to know how much net energy will be available after the coal is transported for use in generating electricity.

1. The transportation-related energy requirements are identifiable.

Energy is consumed at a number of points in the transportation system. For railroads, diesel fuel is consumed by train engines, some coal is lost during handling and transport in the form of fugitive dust, and energy is required to pulverize the coal for use at the power plant. Power is required for preparation and transport of coal through coal slurry pipelines in the crushing of coal, the operation of the pipeline (primarily pumps), and de-watering and drying of the coal. The heating value of the delivered coal is also reduced because of increased moisture content.

The energy that goes into the construction of the transportation system itself, i.e., the energy needed to make the steel for construction of the pipeline or the railroad rails and equipment, is also a consideration.

2. Railroads consume less energy to transport coal than pipelines.

In every independent review of the energy costs of transportation where railroads and pipelines have been compared, railroads have proved to be the most energy efficient means of transporting coal. In other words, the country's supply of available

energy will be reduced less if coal is transported by rail rather than pipeline. From an overall net energy standpoint, railroads will leave more coal energy available for use in generating electricity than would a coal slurry pipeline.

In March of 1978, the Office of Technology Assessment compared the energy requirements, including steel production, of pipelines and railroads over four different routes.1/ OTA found in each case that the pipeline required more energy. Of particular significance is the wide fluctuation in energy requirements among coal slurry pipelines. To illustrate the comparative net energy impacts, OTA quantified the energy consumption as a percentage of energy content of the coal transported and found the pipeline consumed from 2.3% to 6.4% of the total energy transported; the energy required for railroad transport was only 1.9% to 2.4%. When compared to railroads, the coal slurry pipelines' use of energy ranged from 21% higher to as much as 166% higher.2/ These data show that only with extremely large capacity pipelines transporting coal over long distances does the energy usage even approach the efficiency of railroads. Of course, as the size of pipelines go up, the problems of water consumption, environmental harm, and availability of coal markets become more difficult.

3. Power plants will require additional amounts of coal to produce the same amount of electricity if slurry pipelines are used rather than railroads.

The discrepancy between the efficiency of pipelines and railroads would be even more pronounced had the OTA study included the reduction in heating value of coal moved by slurry pipelines attributable to the coal's absorption of water during transport. Although the slurry is de-watered, centrifuges are only capable of reducing the moisture content of the coal to approximately 20-25%. The Bureau of Mines study of coal slurry pipelines indicated that with the Black Mesa Pipeline, the only slurry pipeline operating today, the moisture content of the coal at the power plant is 28%, and additional drying using natural gas is required before the coal can be used in the boilers.3/

1/ "A Technology Assessment of Coal Slurry Pipelines", March 1978, Office of Technology Assessment, Congress of the United States, OTA-E-60, pp. 120-121.

2/ The OTA study includes the energy used to manufacture steel, but even if that factor is eliminated, the net energy impact of railroads remains less than that of pipelines.

3/ "Comparative Coal Transportation Costs: An Economic and Engineering Analysis of Truck, Belt, Rail, Barge and Coal Slurry and Pneumatic Pipelines, Volume 3. Coal Slurry Pipelines", Illinois Univ. at Urbana-Champaign, Aug. 1977, p. 3-6; prepared for the United States Bureau of Mines and Federal Energy Administration.

Moreover, even after much of the coal is separated, the water still contains a substantial amount of "fines", particles of coal less than 40 micrometer size. These can be partially separated and converted to "underflow" which can be introduced into the boiler with a moisture content of 80%. The combined effects of the moisture from the de-watered coal and the underflow is to reduce the heating value of the coal by, according to one estimate, as much as 22.7%.4/ If that reduction in energy availability is included with the other energy consumed, the total energy lost from pipelines may be almost 25% of the energy transported because of the coal slurry pipeline method. Of course, if the fines are discarded, that also represents an energy loss as well as an environmental problem. This means that to achieve the same amount of heat output for electrical generation at a power plant, substantially more coal would have to be mined and purchased by utilities should pipelines be employed rather than railroads. Other efforts to minimize moisture content, e.g., drying the sludge using other forms of energy such as natural gas, would still represent a major loss of energy.

4. Conclusion

As the Bureau of Mines report noted, "If water could burn, a slurry line would be ideal."5/ But it does not, and because moisture content will increase with coal slurry pipelines, the resulting heat loss must be considered. The enormous penalties must be recognized before the coal slurry pipelines become the chosen method of transport. The Federal response to the energy crisis should not be to support an energy-inefficient mode of transportation. The question of energy consumption for transportation needs to be given careful consideration before final decisions are made on legislation supporting coal slurry pipelines.

4/ "Environmental Assessment of Coal Transportation" (preliminary draft) PEDCo Environmental Inc., prepared for Industrial Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Contract No. 68-02-1321.

5/ "Comparative Coal Transportation Costs", supra, at 3-10.

Slurry

Table 3-8. SUMMARY OF ESTIMATED ENERGY REQUIREMENTS,

BLACK MESA COAL SLURRY PIPELINE (1975 DATA)

Source of energy loss	Btu/lb	Btu/ton-mile[a]	% of energy transported
Power consumption (slurry preparation, pumping, dewatering)	78	576	0.72
Gas consumption (required to dry incoming coal cake to furnace to prevent coal "plastering"	130	950	1.2
Heat loss (slurry heating with steam to 140°F, to increase efficiency of centrifuges and pulverizers)	107	782	0.98
Coal quality loss (due to 29% combined moisture content of coal cake and underflow, includes latent heat of vaporization plus sensible heat loss)[b]	2,467	18,035	22.7
Total	2,782[c]	20,343	25.6

[a] 1.03 x 10^9 ton-mi in 1975 based on 3,765,000 contract tons shipped a distance of 440 km (273 miles).

[b] Assumes a flue gas temperature of 280°F.

[c] Additional energy required to generate electricity to run pipeline not included (approx. 156 Btu/lb).

Metric conversion: 1 Btu/lb = 114.3 g-cal/kg
1 Btu/ton-mi = 172.6 g-cal/metric ton-km

53

Slurry

Table 3-13. ESTIMATED ENERGY REQUIREMENTS OF

VARIOUS COAL TRANSPORTATION SYSTEMS

Mode	Btu/lb	Btu/ton-mile	% of total Btu transported
Slurry line[a,b]	315 (2782)	2308 (20,343)	2.9 (24.4)
Unit train[a]	135	984	1.24
Barge[a]	105	767	0.97
Truck[c]	62	6150	0.57
Conveyor[d]	41	8200	0.36

[a] Based on 273-mile trip; 3,765,000 tons coal per year; 10,858 Btu/lb as received at the mine.

[b] Numbers in parentheses include heat loss because of additional water content of fired coal.

[c] Twenty-mile one-way trip, 30-ton payload.

[d] Based on telephone conversation with personnel at American Electric Power for the Meigs Mine Conveyor; 10-mile trip, 2000 tons/hr.

Metric conversion: 1 Btu/lb = 114.2 g-cal/kg.
1 Btu/ton-mile = 172.6 g-cal/metric ton-km

58

129

CERTIFIED
MAIL

Trout Haven Ranch
Box 63
Buffalo Gap, S.D. 57722
January 2, 1981

Bureau of Land Management
555 Zang Street, 3rd Floor East
Denver, Colorado 80228

ATTN: Richard Traylor

Dear Mr. Traylor:

Although Trout Haven Ranch sent a letter to the Bureau of Land Management concerning the effects of Madison Water Draw-down to our business, there was not a word mentioned in the D.E.I.S.

Our hatchery uses the water of Beaver Creek. The spring to this creek is nine miles northeast of Hot Springs, S.D. This is also the location of our trout hatchery. If E.T.S.I. causes a temperature increase of two (2) degrees farenheit or flow reduction of only 10% to our spring, we will be forced out of business because of economical reasons.

We are operating at capacity now on our constant flow of 10.61 second feet and temperature of 63 degrees farenheit. We have been monitoring this flow and temperature constantly for over fifteen years and it has never varied.

If we are forced out of business there will be over one million less rainbow trout for people to catch and eat.

The areas to suffer will be Colorado, Wyoming, Montana, Nebraska, South Dakota, North Dakota and Canada. These are the areas where we stock rainbow trout. We have also stocked trout in the nation's largest state park, Custer State Park in South Dakota and in the Fort Robinson State Park in Nebraska.

If we have a water loss or temperature increase to our spring, we will hold the U. S. Government and E.T.S.I. responsible.

Sincerely,

TROUT HAVEN RANCH

Steven C. Simpson
Steven C. Simpson

SCS/ms

131

HILLS EDGE AUTO SALES
HIGHWAY 385 NORTH
HOT SPRINGS, SOUTH DAKOTA

PHONE: AREA CODE 605 745-3773
POST OFFICE BOX 289
HOT SPRINGS, SOUTH DAKOTA 57747

DODGE • PLYMOUTH • CHRYSLER • DODGE TRUCKS • PARTS • COMPLETE SERVICE SHOP • COMPLETE BODY SHOP • PAINTING • FRAME STRAIGHTENING • GLASS AND WINDSHIELDS

1-2-81

Richard Traylor
Bureau of Land Management
555 Zang St., Third Floor East
Denver, Co. 80228

My name is James L. Sieg. I own and operate Hills Edge Auto Sales. My business is automobile and truck sales and service. This business is approximately 1 mile north of Hot Springs on Highway 385. My residence is also at the same location.

The only source of water for the business and residence is a deep well 380 ft. into the Minnelusa sands. My concern is the drying up of this well if ETSI pumps 20,200 acre feet of water per year. I know that the draw down of the aquifer in Niobrara County in Wyoming will directly affect my business, my employees and cause economic reverses to this community.

I also believe that if ETSI is allowed to pump water from this aquifer in Niobrara County, it will create a drastic and explosive situation between ETSI and affected people who have businesses and live in western South Dakota and western Nebraska.

Sincerely,

James L. Sieg

cc: Senator James Abdnor
Senator Larry Pressler

134

Evans Plunge

"World's Largest Natural Warm Water Indoor Swimming Pool"

P. O. Box 610 Hot Springs, South Dakota 57747

December 31, 1980

Richard Traylor
ETSI Project Leader
Bureau of Land Management
555 Zang St., Third Floor East
Denver, Colo.
80228

Dear Mr. Traylor:

I appeared at the ETSI Draft Environmental Impact Statement Public Hearing at Edgemont, S.Dak. December 16, 1980.

On my form I also notified the personnel in attendance that I would be forwarding a written etatement on behalf of Evane Plunge Inc.

Evans Plunge wae built in 1890 over numeroue sparkling warm water springs and has continued to be in existance since that year.

Millions of peopla have swam and enjoyed the water since the Evans Plunge began. We feel that the ETSI pumping of water from the Madison formation may hamper, or completely destroy one of nature's wonders.

We are not only concerned about the Evans Plunge, but most of the businesses in Hot Springe derive their source of income from tourists. Evans Plunge is the areas largest drawing card as far as tourism goes. What affects the Evans Plunge, will affect the Hot Springs community also.

I am enclosing four letters detailing the stream gaging of the springs involved at the Plunge. Also a letter dealing with the chemical analysis of the waters from within the Evans Plunge.

Once again, I would like to mention that ETSI cannot promise to supply ue with the same quantity of water, nor the same quality of water, nor the same temperature of water. Their One Million Dollar Bond wouldn't come within a fraction of a percent of the economic ruin that will be reaped if ETSI is allowed to pump Madison water for it's coal slurry pipeline.

Sincerely,

Joseph A Muller
General Manager

137

UNION PACIFIC RAILROAD COMPANY

1416 OOOGE STREET OMAHA, NEB. 68179

HARRY LUSTGARTEN, JR.
General Solicitor

January 5, 1981

The United States Oepartment
of the Interior
Bureau of Land Management
Special Projects Staff
3rd Floor East
555 Zang Street
Oenver, Colorado 80228

Attention: Mr. Richard E. Traylor
ETSI EIS Project Leader

Oraft Environmental Impact Statement
on the Energy Transportation Systems, Inc.
Coal Slurry Pipeline Transportation Project

Gentlemen:

I am attaching two copies of the Comments of Union Pacific Railroad Company on the Oraft Environmental Impact Statement on the Energy Transportation Systems, Inc. Coal Slurry Pipeline Project in accordance with the opportunity presented therefor in the letter of November 7, 1980, from Mr. Richard E. Traylor, ETSI EIS Project Leader, which was attached to the Oraft Environmental Impact Statement when it was distributed.

Very truly yours,

BUREAU OF LANO MANAGEMENT
OEPARTMENT OF INTERIOR

Oraft Environmental Impact)
Statement on the Energy)
Transportation System, Inc.)
Coal Slurry Pipeline)
Transportation Project.)

COMMENTS OF UNION PACIFIC RAILROAO COMPANY
ON THE ORAFT ENVIRONMENTAL IMPACT STATEMENT
ON THE ENERGY TRANSPORTATION SYSTEMS, INC.
COAL SLURRY PIPELINE PROPOSAL

Under date of November 7, 1980, a Oraft Environmental Impact Statement (hereinafter "Oraft Statement") covering the proposed Energy Transportation Systems, Inc. (hereinafter "ETSI") coal slurry transportation project was circulated among interested parties for comments.

Union Pacific Railroad Company (hereinafter "Union Pacific") submits the following comments on the Draft Statement:

1. One of the most important considerations in evaluating the environmental impact of the proposed ETSI coal slurry pipeline must be the availability and capability of alternative transportation systems to provide the same service without the severe potential depletion of present and future water supplies in the arid Western Region, which is a recognized and inevitable consequence of any use of the coal slurry pipeline system in this area.

The Oraft Statement properly recognizes the importance of this issue and devotes consideration attention

- 2 -

to the alternate ability of railroad unit trains to provide the same service within even higher energy efficiency than the proposed coal slurry pipeline and without affecting the fragile water environment of the region. At the same time, however, the Oraft Statement concludes that the additional coal traffic which railroads would handle in the absence of the coal slurry pipeline would result in substantial socioeconomic impact upon communities on the railroad lines involved. In making this evaluation, however, the Oraft Statement seriously erred in erroneously limiting its considerations essentially to the railroad route of the Burlington Northern and its connections and failing to recognize the alternate availability of the railroad route of the Union Pacific and its connections for the same transportation service proposed by ETSI. The failure to consider the alternate availability of the Union Pacific route, in turn, prevented a recognition of the fact that a dispersal of the coal traffic over several alternate rail routes would materially lessen the potential socioeconomic impact on communities and would thus make rail service a far more reasonable alternative to the coal slurry pipeline proposal.

In particular, in describing the rail alternative, the Oraft Statement erroneously limited its consideration to

- 3 -

a rail route over the Burlington Northern to Kansas City, Missouri and to four potential connecting lines from that point to final destinations. (Pages 1-57; Map 1-1) Having thus limited itself to the single Burlington Northern route between Wyoming and Kansas City, the Draft Statement concluded that this "would add an estimated 20 daily trains to the existing traffic between Wyoming and Kansas City", representing a "39 percent increase in traffic on the Burlington Northern segment". (Page 2-11).

The Draft Statement failed to recognize or consider, however, that Union Pacific offers an alternative rail route to Kansas City which is capable and suitable for handling the same coal traffic that the Draft Statement considered as being limited to the Burlington Northern for that portion of the route. Union Pacific connects at Northport, Nebraska with the Burlington Northern line from the Wyoming coal fields and has an existing rail route from there through North Platte, Kearney, Hastings, Nebraska and Marysville and Topeka, Kansas, to Kansas City from which there are numerous other connecting rail routes to the coal destinations, including the Atchison Topeka and Santa Fe, Illinois Central Gulf, Kansas City Southern, Missouri Pacific and the MKT. Substantial coal traffic from the Powder River region of Wyoming is already moving over this

- 4 -

Union Pacific route. For instance, during 1980, approximately 4 million tons of coal which originated in the Powder River area was interchanged from the Burlington Northern at Northport for transportation over this route to various points in the State of Kansas. It is anticipated that, in the next three to five years, this present traffic will grow to approximately 8,400,000 tons annually. This clearly demonstrates that this route is presently a viable and capable alternative to that of the Burlington Northern for transporting the coal traffic which would be handled by the proposed ETSI coal slurry pipeline.

2. The capability and attractiveness of the alternative Union Pacific route will, in fact, be greatly enhanced upon completion of the proposed connector line of the Chicago and Northwestern Railroad. The Draft Statement noted that this project is "the most important planned project affecting the all rail no action alternative" which "would provide an alternative means of moving coal by rail of the Powder River basin to Kansas City and other interchange points for delivery to connecting railroads" (Page 1-61).

This project contemplates the construction by the Chicago and Northwestern of a connector line from its existing line at Crandall, Wyoming to a new junction with the

- 5 -

Union Pacific line at Joyce, Nebraska and would provide a new connection for Union Pacific with the joint Burlington Northern-Chicago and Northwestern line to the Powder River coal fields. (Map 1-5, Page 1-64). This new route will offer a joint C&NW-UP alternate route for coal traffic from the Powder River area to Kansas City with numerous alternative connecting rail routes available from that point. It has been estimated that, when this new route is in operation it will attract coal transportation for the following tonnages to points in the South-South Central United States through the Kansas City Gateway:

(Millions of Tons)

1982 - .675	1983 - 4.35	1984 - 5.40
1985 - 10.05	1986 - 11.835	1987 - 13.385
1988 - 15.055	1989 - 16.68	1990 - 17.43
1991 - 17.43	1992 - 18.18	

The Draft Statement did take note of this project but chose not to include it in its analysis of impacts "(b)ecause the project's future is still uncertain and subject to funding approval". (Page 1-61). Union Pacific objects to the failure to consider the substantial effect this project will have both on the availability and capability of the alternate rail routes as well as its effect

- 6 -

in spreading the coal traffic over a number of rail routes and thus reducing the potential socioeconomic impact on communities through which the rail service would be provided.

On October 7, 1980, ICC Administrative Law Judge Beddow found that the public convenience and necessity require construction of the connector line, which is the principal component of C&NW's Powder River Basin Project. While that decision is subject to a pending administrative review filed October 27, 1980, the Commission's final decision on those appeals must be made by April 27, 1981 pursuant to 49 USC 10327(f)(2). Unless Judge Beddow's decision is modified or set aside, which appears unlikely in light of the Congressional attitude expressed in Section 702 of the Staggers Act (PL 96-448), the basic authority for construction and operation of a line of railroad by C&NW from Union Pacific to the Southern Powder River Basin will be in place with that authority.

Applications for loan guarantees to cover necessary financing are presently pending before the Federal Railroad Administration which is now processing the application. The F.R.A. Environmental Impact Statement on the project is scheduled for release within the next few months and Section 702 of the Staggers Act mandates final action on

- 7 -

the loan guarantee 75 days after the date of issuance of the F.R.A. Environmental Impact Statement. In view of the evidence which Judge Beddow of the ICC has already found warrants construction, it is probable that the financing necessary to construct the project will be made available.

It is obvious that the C&NW Powder River Project has a high probability of being constructed and operated and should not be casually dismissed as a non-alternative to a slurry line which is even less advanced in its financing and planning than the connector line alternative.

3. In addition to the above substantive comments, there are a number of procedural deficiencies which should be addressed:

(a) The draft EIS does not satisfy the requirements of the National Environmental Policy Act Regulations (CEQ Regulations) promulgated by the Council on Environmental Quality (CEQ). The draft EIS does not focus clearly or concisely enough on the most significant impacts of the proposed action, among them effects on water use. Instead, it includes masses of background data on and discussion of less significant issues, tending to obscure the important issues.

This may be corrected by two actions. First, the length of the final EIS should be reduced to 150 pages, as specified in the CEQ Regulations at 40 C.F.R. Sec. 1502.7. Second, the Purpose and Need chapter (Chapter 1) should be drastically reduced in length and the Comparative Analysis Chapter (Chapter 2) expanded. If efforts are taken to make accurate and objective analysis of the most important issues, the underlying purpose of NEPA review, will be facilitated by these two actions.

- 8 -

(b) A contractor preparing an EIS must be chosen solely by the federal agency with environmental review responsibility. 40 C.F.R. Sec. 1506.5. The draft EIS should diclose how the contractor, Woodward-Clyde Consultants, was chosen and how its efforts were directed and compensated in order to allow a judgment to be reached that there has been no conflict of interest in the NEPA review process.

(c) The Bureau of Land Management should demonstrate that, despite its failure to promulgate implementing procedures as required by 40 C.F.R. Sec. 1507.3, its review has otherwise fulfilled the requirements of CEQ Regulations.

(d) In order to assist a determination that a "systematic interdisciplinary approach" has (P. 1) been used in preparation of the EIS, the list of preparers should include qualifications for each person listed, as required by 40 C.F.R. Sec. 1502.17.

Harry Lustgarten Jr.

Harry Lustgarten, Jr.
General Solicitor
Union Pacific Railroad Company

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF INTERIOR

Draft Environmental Impact)
Statement on the Energy)
Transportation System, Inc.)
Coal Slurry Pipeline)
Transportation Project.)

COMMENTS OF UNION PACIFIC RAILROAD COMPANY
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON THE ENERGY TRANSPORTATION SYSTEMS, INC.
COAL SLURRY PIPELINE PROPOSAL

Under date of November 7, 1980, a Draft Environmental Impact Statement (hereinafter "Draft Statement") covering the proposed Energy Transportation Systems, Inc. (hereinafter "ETSI") coal slurry transportation project was circulated among interested parties for comments.

Union Pacific Railroad Company (hereinafter "Union Pacific") submits the following comments on the Draft Statement:

1. One of the most important considerations in evaluating the environmental impact of the proposed ETSI coal slurry pipeline must be the availability and capability of alternative transportation systems to provide the same service without the severe potential depletion of present and future water supplies in the arid Western Region, which is a recognized and inevitable consequence of any use of the coal slurry pipeline system in this area.

The Draft Statement properly recognizes the importance of this issue and devotes consideration attention

- 2 -

to the alternate ability of railroad unit trains to provide the same service within even higher energy efficiency than the proposed coal slurry pipeline and without affecting the fragile water environment of the region. At the same time, however, the Draft Statement concludes that the additional coal traffic which railroads would handle in the absence of the coal slurry pipeline would result in substantial socioeconomic impact upon communities on the railroad lines involved. In making this evaluation, however, the Draft Statement seriously erred in erroneously limiting its considerations essentially to the railroad route of the Burlington Northern and its connections and failing to recognize the alternate availability of the railroad route of the Union Pacific and its connections for the same transportation service proposed by ETSI. The failure to consider the alternate availability of the Union Pacific route, in turn, prevented a recognition of the fact that a dispersal of the coal traffic over several alternate rail routes would materially lessen the potential socioeconomic impact on communities and would thus make rail service a far more reasonable alternative to the coal slurry pipeline proposal.

In particular, in describing the rail alternative, the Draft Statement erroneously limited its consideration to a rail route over the Burlington Northern to Kansas City, Missouri and to four potential connecting lines from that point to final destinations. (Pages 1-57; Map 1-1) Having thus limited itself to the single Burlington Northern route between Wyoming and Kansas City, the Draft Statement concluded that this "would add an estimated 20 daily trains to the existing traffic between Wyoming and Kansas City", representing a "39 percent increase in traffic on the Burlington Northern segment". (Page 2-11).

The Draft Statement failed to recognize or consider, however, that Union Pacific offers an alternative rail route to Kansas City which is capable and suitable for handling the same coal traffic that the Draft Statement considered as being limited to the Burlington Northern for that portion of the route. Union Pacific connects at Northport, Nebraska with the Burlington Northern line from the Wyoming coal fields and has an existing rail route from there through North Platte, Kearney, Hastings, Nebraska and Marysville and Topeka, Kansas, to Kansas City from which there are numerous other connecting rail routes to the coal destinations, including the Atchison Topeka and Santa Fe, Illinois Central Gulf, Kansas City Southern, Missouri Pacific and the MKT. Substantial coal traffic from the Powder River region of Wyoming is already moving over this

Union Pacific route. For inatance, during 1980, approximately 4 million tons of coal which originated in the Powder River area was interchanged from the Burlington Northern at Northport for transportation over this route to various points in the State of Kansas. It is anticipated that, in the next three to five years, this present traffic will grow to approximately 8,400,000 tona annually. This clearly demonstrates that this route is presently a visble and capable alternative to that of the Burlington Northern for transporting the coal traffic which would be handled by the proposed ETSI coal slurry pipeline.

2. The capability and attractiveness of the alternative Union Pacific route will, in fact, be greatly enhanced upon completion of the proposed connector line of the Chicago and Northwestern Railroad. The Draft Statement noted that this project is "the most important planned project affecting the all rail no action alternative" which "would provide an alternative means of moving coal by rail of the Powder River basin to Kansas City and other interchange points for delivery to connecting railroads" (Page 1-61).

This project contemplates the construction by the Chicago and Northwestern of a connector line from its existing line at Crandall, Wyoming to a new junction with the

Union Pacific line at Joyce, Nebraska and would provide a new connection for Union Pacific with the joint Burlington Northern-Chicago and Northwestern line to the Powder River coal fields. (Map 1-5, Page 1-64). This new route will offer a joint C&NW-UP alternate route for coal traffic from the Powder River area to Kansas City with numerous alternative connecting rail routes available from that point. It has been estimated that, when this new route is in operation it will attract coal transportation for the following tonnages to points in the South-South Central United States through the Kansas City Gateway:

(Millions of Tons)

1982 - .675	1983 - 4.35	1984 - 5.40
1985 - 10.05	1986 - 11.835	1987 - 13.385
1988 - 15.055	1989 - 16.68	1990 - 17.43
1991 - 17.43	1992 - 18.18	

The Draft Statement did take note of this project but chose not to include it in its analysis of impacts "(b)ecause the project's future is still uncertain and subject to funding approval". (Page 1-61). Union Pacific objects to the failure to consider the substantial effect this project will have both on the availability and capability of the alternate rail routes as well as its effect

in spreading the coal traffic over a number of rail routes and thus reducing the potential socioeconomic impact on communities through which the rail service would be provided.

On October 7, 1980, ICC Administrative Law Judge Beddow found that the public convenience and necessity require construction of the connector line, which is the principal component of C&NW's Powder River Basin Project. While that decision is subject to a pending administrative review filed October 27, 1980, the Commission's final decision on those appeals must be made by April 27, 1981 pursuant to 49 USC 10327(f)(2). Unless Judge Beddow's decision is modified or set aside, which appears unlikely in light of the Congressional attitude expressed in Section 702 of the Staggers Act (PL 96-448), the basic authority for construction and operation of a line of railroad by C&NW from Union Pacific to the Southern Powder River Basin will be in place with that authority.

Applications for loan guarantees to cover necessary financing are presently pending before the Federal Railroad Administration which is now processing the application. The F.R.A. Environmental Impact Statement on the project is scheduled for release within the next few months and Section 702 of the Staggers Act mandates final action on the loan guarantee 75 days after the date of issuance of the F.R.A. Environmental Impact Statement. In view of the evidence which Judge Beddow of the ICC has already found warrants construction, it is probable that the financing necessary to construct the project will be made available.

It is obvious that the C&NW Powder River Project has a high probability of being constructed and operated and should not be casually dismissed as a non-alternative to a slurry line which is even less advanced in its financing and planning than the connector line alternative.

3. In addition to the above substantive comments, there are a number of procedural deficiencies which should be addressed:

(a) The draft EIS does not satisfy the requirements of the National Environmental Policy Act Regulations (CEQ Regulations) promulgated by the Council on Environmental Quality (CEQ). The draft EIS does not focus clearly or concisely enough on the most significant impacts of the proposed action, among them effects on water use. Instead, it includes masses of background data on and discussion of less significant issues, tending to obscure the important issues.

This may be corrected by two actions. First, the length of the final EIS should be reduced to 150 pages, as specified in the CEQ Regulations at 40 C.F.R. Sec. 1502.7. Second, the Purpose and Need chapter (Chapter 1) should be drastically reduced in length and the Comparative Analysis Chapter (Chapter 2) expanded. If efforts are taken to make accurate and objective analysis of the most important issues, the underlying purpose of NEPA review, will be facilitated by these two actions.

(b) A contractor preparing an EIS must be chosen solely by the federal agency with environmental review responsibility. 40 C.F.R. Sec. 1506.5. The draft EIS should diclose how the contractor, Woodward-Clyde Consultants, was chosen and how its efforts were directed and compensated in order to allow a judgment to be reached that there has been no conflict of interest in the NEPA review process.

(c) The Bureau of Land Management should demonstrate that, despite its failure to promulgate implementing procedures as required by 40 C.F.R. Sec. 1507.3, its review has otherwise fulfilled the requirements of CEQ Regulations.

(d) In order to assist a determination that a "systematic interdisciplinary approach" has (P. 1) been used in preparation of the EIS, the list of preparers should include qualifications for each person listed, as required by 40 C.F.R. Sec. 1502.17.

Harry Lustgarten, Jr.

Harry Lustgarten, Jr.
General Solicitor
Union Pacific Railroad Company

Energy Transportation Systems Inc.
330 South Center Street, Suite 219
Casper, Wyoming 82601
Telephone (307) 265-1800

ETSI

January 6, 1981

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
555 Zang Street, 3rd Floor East
Denver, Colorado 80228

SUBJECT: Energy Transportation Systems Inc. (ETSI)
Coal Slurry Pipeline Transportation Project
Environmental Impact Statement

Dear Mr. Traylor:

We congratulate the Bureau of Land Management and the independent consultants on a thorough and diligent approach. There are a few points where we differ with the conclusions drawn in the DEIS, or where further clarification is needed, or where results are contradictory and misleading.

We are confident that any concerns about adverse environmental impact expressed in the draft can be dealt with by corrective measures that reduce or eliminate the concerns. We submit the following specific comments for your consideration, as a contribution to addressing some of the above concerns and to making a good EIS better.

If you have any questions regarding this submission, please call me at (307) 265-1800.

Very truly yours,

Frank B. Odasz

Frank B. Odasz, P.E.
Vice-President

Attachments

"Slurry Pipelines — Moving The Nation's Coal Safely, Cleanly, Silently, Cheaply"

GROUND WATER RESOURCES -- DEIS

The Well-Field Hydrology Technical Report, upon which the applicable portions of the EIS are based, is a well-documented explanation of the methods used to estimate impacts in the future. The following comments demonstrate that the assessment is conservative (i.e., predicts impacts of large magnitude) and that the BLM recognizes this fact.

A single sentence in the Summary (at the top of page 2) is one of the most important statements in the entire report. It states:

> "Conclusive assessments of impact can be made only when the effects of large-scale, long-term withdrawals are carefully observed and documented."

An equally important concept or statement is unsaid in the EIS. Perhaps its inclusion is beyond the scope. Nevertheless it must be considered:

> "Ground water in the Madison aquifer is a renewable natural resource that is underdeveloped at the present time."

PREFACE

Page xxvii, First Para. "The purpose of this Environmental Impact Statement (EIS) is to present facts about the proposed Energy Transportation Systems, Inc. coal slurry pipeline...."

Comment: As will be noted hereinafter, much of the information included in the draft Environmental Impact Statement and the accompanying Technical Report is not always factual but in many instances is based on arbitrary assumptions and mathematical manipulation which in some cases does not reflect actual conditions either from the viewpoint of historic experience or future conditions as projected by computer model runs.

The basis for the effect on the streams has not been given, yet the results of the computer model are given as facts without qualifications.

Page 1-9, Table 1-3, Columns 2 & 3 and Page 4-17, Para. 5 of the DEIS. Pipeline hydrotesting is given as requiring a total of 1,650 acre-feet, taken from local sources.

Comment: This is misleading because the pipeline industry commonly performs hydrostatic testing one segment at a time, rather than the whole project at once as implied above. The DEIS itself recognizes this fact on Page 4-7, Para. 5, where it states that the maximum of 28 acre-feet would be used for the largest single test.

In practice, the water used for testing is saved and moved to the next segment, where the hydrostatic testing procedure is repeated. Then, as a conservation measure, the water from the last segment would be displaced to the next-to-the-last pumping station, where it would be stored. The figure 1,650 should be changed to 28 maximum, and the source should read Niobrara County well field.

The same table suggests that 105 acre-feet per year will be required from two local wells for Kansas booster pump stations. This is misleading as it implies that Kansas water would be used for the slurry line operation. This is not the case, and ETSI has stated all along that no Kansas water will be used in the pipeline.

Change this to reflect the fact that this requirement is simply water for domestic uses at the Kansas pump stations for drinking, flushing toilets, cleaning equipment and landscaping. Although prior to startup, water will be needed for ponds at various Kansas pump stations, this water will come from Wyoming through the pipeline. Occasionally, local water from Kansas wells at the pump stations will be used to make up for evaporation under the hot summer sun, not for pipeline operations, but merely to maintain a water balance at the pump stations.

NIOBRARA COUNTY WELL FIELD

Page 2, Last Para., Left Column and Second Para., Right Column. "These drawdowns would affect some existing Madison water users, primarily the City of Edgemont, South Dakota...."

"The predicted drawdowns would also affect groundwater discharge to several surface waters. After 50 years of pumping, the base flow of the Cheyenne River, Cascade Springs, and springs in the Hot Springs area of South Dakota would be reduced by one cubic foot per second (cfs), four cfs, and two cfs, respectively."

Comment: These statements are framed in very specific terms, and do not reflect the uncertainty of the predicted effects. In particular, the reductions in stream flows should be qualified so as to indicate the lack of factual data on which these figures are based. The assumptions involved in arriving at streamflow reduction figures are such as to raise serious questions as to their accuracy. The average reader would be led to a conclusion that these figures are much more reliable than the facts would support.

This comment applies to similar statements made throughout the dEIS and accompanying documents.

PROPOSED ACTION - WATER RESOURCES

Page 3-4, Para. 1, Left Column "In the area of interest, the Black Hills region of South Dakota and Wyoming and the eastern part of the Powder River Basin of Wyoming and Montana, the Madison group has not been fully developed...."

Comment: This is a significant statement that could be expanded and given more emphasis. If the Madison aquifer has not been fully developed, the draft EIS should spell out the extent of its underdevelopment. In a general sense, the documents indicate there is room for further development of the Madison aquifer, but there is little specific information to indicate the degree of underdevelopment.

For example, the October 10, 1977 report (Project No. C-108, SAI-1-064-03-029) for the Office of Technology Assessment by Science Applications, Inc. summarizes the potential of the Madison Formation as follows:

> "Ground water supplies from the Madison Formation could possibly be increased by about 50,000 acre-feet per year without exceeding present recharge."

PROPOSED ACTION - WATER RESOURCES

Page 3-15, First Para., Left Column. This paragraph discusses the method of determining the recharge rate to the Madison aquifer involving the determination of discharge from known point sources. The conclusion reached using this approach is that recharge is "in the range of 140,000 to 400,000 acre-feet per year."

Comment: The magnitude of the range between the low recharge and high recharge rates would lead to speculation that the accuracy of the determination leaves something to be desired. The measurement of discharge from all known springs and seeps in the Black Hills region as a basis for determining the rate of discharge from the Madison aquifer raises several questions. Several of these springs and seeps are shown to be downslope from the Madison outcrop, and consequently, there are overlying formations which could be adding to the spring or seep discharge. It was apparently assumed that the total discharge from these springs and seeps comes from the Madison aquifer, a conclusion which may not be totally accurate.

There is no information in the dEIS or in the Technical Report on Well Field Hydrology to indicate whether the 139,000 acre-foot per year figure cited as being the annual discharge from all springs and seeps in the Black Hills region is based on measurements conducted over more than one year nor how many measurements were involved and how many estimates. It is impossible to determine whether or not this figure is reliable, although the Technical Report indicates that the figure is probably on the low side.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page 3-22, Para. 4 "Historic changes in the Madison potentiometric surface could not be accurately determined from existing information because of a limited data base". Continuing to the next paragraph- "Calculated changes (emphasis added) in the potentiometric surface of the Madison aquifer--are shown on Map 3-8. Drawdowns greater than 25 feet occur only in the vicinity of Edgemont, Osage, Newcastle and Bell Creek (Table 3-5, Map 3-9)".

Comment: Map 3-8 and Table 3-6 should be adequately labeled to indicate the drawdowns are calculated.

Page 3-25, Table 3-4 of the DEIS. This table lists Edgemont as using 2.5 cubic feet per second (cfs), with a projected production at the same rate.

Comment: The customary factor of 150 gallons per day per person is only one-sixth of the amount Edgemont is using now and projected to continue to use in the future. There is a possibility that because the 1,610 population of Edgemont and the 139 population of Provo (1980 Census data) have artesian wells, they are allowing water to be discharged in an uncontrolled and wasteful way. Any monitoring program should consider conservation aspects of Edgemont water usage.

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 3-26, Last para. "Upward leakage from the Madison aquifer also accounts for part of the base flow of streams in the study area that do not directly drain from the Black Hills. Streams which probably contain a Madison aquifer baseflow component include the Belle Fourche River, the Little Missouri River, Inyan Kara Creek and the Cheyenne River."

Comment: Because the concept was adopted that these streams probably contain a Madison flow component, it is not surprising that simulation of pumping predicted a decrease in the base flow contribution from the Madison. However, if the assumption of probable contribution had not been made, no decrease would have been predicted. Although the assumption can be defended on the basis of probable leakance from the Madison system, a contrary view has been presented for streams of this type in the Powder River Basin.

A paper (copy attached) from the Fall Meeting of the American Geophysical Union was presented by Rankl and Lowry on the relationships of ground water and surface water. They state, in part, "the movement of water---is so restricted vertically there is little recognizable contribution of ground water from bedrock to most streams. Potentiometric data indicate the lower reaches of the Powder River should gain water from bedrock. However, the Powder River loses water to the alluvium even during the winter". They continue to explain, "Where base flow does occur it can be more easily attributed to local conditions rather than flow through a large regional system".

If the DEIS authors had assumed the small amount of upward leakage from the Madison eventually reached ground surface and was discharged by evapotranspiration rather than as "base flow" to streams, no decrease of base flow in the simulation model would have accrued.

H 25

GROUND-WATER AND SURFACE-WATER RELATIONSHIPS IN THE POWDER RIVER STRUCTURAL BASIN, WYOMING AND MONTANA

James G. Rankl (U. S. Geological Survey, WSD, Cheyenne, WY 82001)

Marlin K. Lowry (U. S. Geological Survey, WSD, Cheyenne, WY 82001)

(Sponsor: J. S. Rosensheim)

Idealized patterns of ground-water flow in the coal-bearing formations in the Powder River structural basin, such as those for a homogeneous, isotropic aquifer, are an oversimplification that could lead to erroneous conclusions with regard to ground-water and surface-water relationships. The movement of water in the sequence from the Fox Hills Sandstone through the Wasatch Formation is so restricted vertically, there is little recognizable contribution of ground-water from bedrock to most streams. Potentiometric data indicate the lower reaches of the Powder River should gain water from bedrock. However, the Powder River loses water to the alluvium even during the winter.

Part of the reason for the absence of base flow is that perching of water in individual sandstone aquifers results in discharge on hillsides above stream level. The quantity discharged at any point is usually so small that it is evapotranspired during the summer and stored as ice during the winter and therefore, does not contribute to base flow.

Where base flow does occur, it can be more easily attributed to local conditions rather than flow through a large regional system. The dominance of local systems over a regional system also is indicated by the chemical type of ground-water from shallow wells and springs. An increase in bicarbonate-type water northward would be anticipated from potentiometric data and known chemical reactions if a relatively large amount of water were moving through the regional system. However, the water is predominantly a sulfate type throughout the basin.

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 3-55 and 3-57. Explanations are presented of observed changes at major pumping centers. Bell Creek wells show that "Shut-in pressure at the third well showed a decline of 18 psi (42 feet) from 1972 to 1980". The length of recovery time before measurement of shut-in pressure at the third well is not known and it is possible that this well would be comparable to the other two wells after complete recovery. Although individual wells are different, the observed changes at Bell Creek (considered as a well field area) are less than calculated.

The Osage Area (46N-63E), as reported on p. 3-55, has one well that had the same shut-in pressure in 1951 and 1978. The oldest well, flowing since drilled in 1941, is described as having flow rate changes (both a decrease and an increase) but "nothing conclusive can be stated about changes in the potentiometric surface". However, the calculated change shown on Map 3-8 and Table 3-5 of the EIS is 70 feet.

The Osage Area (46N-64W and 65W) also is discussed in the Tech Report on p. 3-55. It is reported that the water level in one well declined 120 feet and had declined 147 feet in another after only two hours of recovery.

However, it is stated that "Smaller water-level declines were reported at the four other wells in the area". This is in sharp contrast with the calculated decline of more than 200 feet shown on Map 3-8 of the EIS.

The Newcastle area, as discussed on p. 3-57, contains similar anomalies between reported individual well data. The oldest well, City No. 1, is reported in Table 3-10 to have declined from 200 psi to 171 psi from 1949 to 1978. This is 67 feet not the "almost 100 feet" reported on p. 3-57. Furthermore, the shut-in pressure data from well No. 4 "was higher than that calculated from initial shut-in pressures at wells drilled in the early 1960s". Again, the calculated decline, as shown on Map 3-8 and Table 3-5 at 132 feet, is nearly double that shown by the historical data.

The Edgemont area discussion on p. 3-57 states, "The potentiometric surface remained fairly constant from 1911 to 1979, even though current production exceeds 2.2 cfs and all the wells are located within a very small area". According to the aforementioned map and table, the calculated decline was 44 feet.

Comment: On p. 4-4 of the EIS an explanation of calculated water level declines due to pumping has been summarized from the detailed discussion in Section 5 of the Tech Report. The parameters used to simulate the pumping from the Madison aquifer are explained in Section 4 of the Tech Report. In summary, (from p. 4-16) "Two approaches were used to estimate the effective regional transmissivity of the Madison aquifer. The first approach was to determine what range of values produced reasonable aquifer recharge rates when used in the steady-state model". The second approach was to determine what range of values produced reasonable calculations of historic drawdown". Although it is stated that (p. 4-17) a range of values "Produced a reasonable match between calculated and observed declines at historic pumping centers in the Black Hills region", the foregoing explanation of those differences clearly shows that the calculated declines were about two times (double) the observed declines. Although that can be considered a "reasonable match" for model calibration, it means that calculated impacts probably also will be larger than actual.

This contention is borne out by the discussion on p. 4-11 of the EIS where it is stated that, "The aquifer parameters used in the numerical models developed for predicting the drawdowns from the proposed ETSI Niobrara County withdrawals are the best estimates of these parameters on the basis of available data". The discussion continues, "In an attempt to evaluate the effect of this uncertainty on the predicted drawdowns, a

Monte Carlo technique was used to calculate the likelihood that drawdowns would be greater than or less than those drawdowns calculated". This procedure is explained more fully in Section 7 of the Tech Report. The EIS (p. 4-11) refers to Figure 4-3 as an example of the probability distribution. Unfortunately Map 4-3 appears instead. However, reference can be made to Figure 7-5 of the Tech Report which is the same drawing.

This figure shows that the value selected for the discussion of impact on users at Edgemeont (p. 4-4 of the EIS) due to water level declines has only a 28 percent probability. In other words, this confirms the calculation of historical declines larger than actual observed declines. Further, p. 5-6 of the EIS concludes, "This suggests that the values computed in Section 5 are conservative in the sense that they have a smaller probability of being exceeded rather than not exceeded". And, because the aquifer system properties used are the parameters that determine the calculated declines, the statement continues, "However conclusive documentation of aquifer system properties that may lead to regional assessments based on the proposed conceptual model will be available only when the effects of large-scale, long-term water production are carefully observed".

ENVIRONMENTAL CONSEQUENCES

Page 4-1, Third Para. "Water Resources. Impacts on the hydrology of the Madison aquifer system would be considered potentially significant if drawdowns in the potentiometric surface exceeded 25 feet, if stream flow was reduced by more than 0.5 cfs, or if measurable water quality changes occurred as a result of ETSI's groundwater withdrawals."

Comment: Determinations of the impacts of ETSI's groundwater withdrawals are based on a number of assumptions including recharge rate, transmissivity, and leakage coefficient. Variations in any of these assumed parameters can have substantial effects on the determination of significant impacts. Throughout the dEIS there are indications that the assumptions are "conservative", and that the impacts reflected by the computer model runs are more severe than have been experienced historically. It is also likely that the projected future impacts are more severe than will be experienced in reality.

To illustrate this point the following is quoted from the third paragraph of the left column on page 4-11: "The aquifer parameters used in the numerical models developed for predicting the drawdowns from the proposed ETSI Niobrara County withdrawals are the best estimates of these parameters on the basis of available data. Data on these parameter estimates, especially on those pertaining to the hydraulic connection between the Madison aquifer and the Minnelusa Formation were very limited. Consequently, uncertainty is associated with each of these parameter estimates."

WATER -- DEIS

Page 4-1, Para. 3 "Water resources. Impacts on the hydrology of the Madison aquifer system would be considered potentially significant...if stream flow was reduced by more than 0.5 cfs, or if measurable water quality changes occurred as a result of ETSI's groundwater withdrawals."

Comment: Suggest changing the cubic feet per second measure to a percentage, as has been done with other criteria including population, housing, and infrastructure. Percentage would provide a more useful measurement because 0.5 cfs for a stream that flows just 5 cfs is considerable, while for a stream flowing 100 cfs such a reduction is insignificant.

WATER -- DEIS

Page 4-4, Para. 6 "Several existing Madison and Minnelusa water users would likely have increased pumping lift as a result of the declines in the potentiometric surface (Table 4-2). Only at the Madison wells located near Edgemont, South Dakota, would drawdowns in the potentiometric surface exceed 25 feet."

Comment: Add after (Table 4-2), in para. 6, fourth line: "The effect of ETSI pumping on Minnelusa water users is insignificant. In comparing Plan I (Niobrara well field only) with current users and ETSI plus current users, only the Madison wells located near Edgemont, South Dakota would drawdowns in the potentiometric surface exceed 25 feet." Drawdowns of the Minnelusa at Hulett, Wyoming are zero.

Page 4-8, Map 4-1 of the DEIS illustrates calculated drawdowns in the Madison aquifer. When taken with Figure 4-1 on Page 4-9, the representation is technically correct.

However, the BLM's above illustrations fail to meet their own standards of clarity "to an average reader of newspapers" because a grim fear has arisen by a false - although not unnatural - misinterpretation. People who live in the contoured areas of this and the other similar maps read them to mean that all water levels will drop by the indicated amounts. That is, where a contour shows a 300-foot drawdown, the landowner reads this to mean that his private domestic well will have its water level drop 300 feet.

BLM should move away from technical jargon, like drawdown, and clarify the natural misinterpretation by some other means such as, for example:

- Cross section showing Madison and shallow wells
- Substitute the concept of bottom hole pressure for drawdown, or
- Use percentage change in hydraulic lift instead of drawdown, or
- Use BLM ingenuity to explain to these frightened and irrate landowners exactly what impacts they face.

Readers say . . .

'Impossible to stop'

Max Urbanek

Concerned rancher

Letter to the Editor:

Yours truly,
Mr. and Mrs. Edwin H. Andersen
Dewey Route
Edgemont, SD 57735

Page 4-11, Para. 2 of the DEIS. "Several small oil fields that produce from stratigraphic traps in the upper part of the Minnelusa Formation exist within the region in which declines in the potentiometric surface of the upper Minnelusa are greater than 25 feet. Reservoir pressures would decrease in these fields as a result of the oumping at the Niobrara County well field."

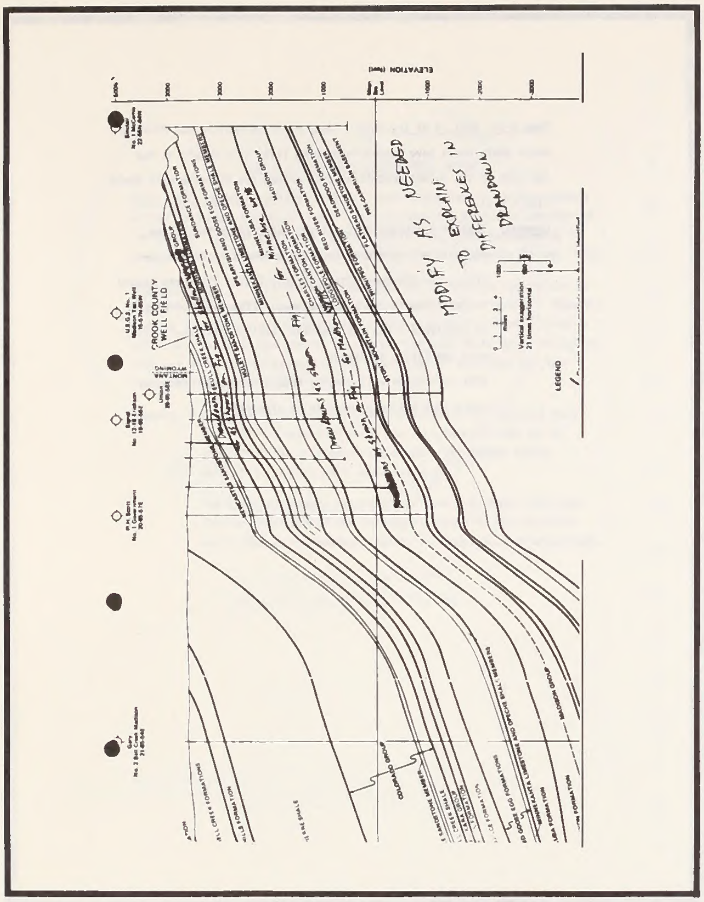
Comment: Suggest that this reference be deleted, to end of paragraph, as this is a qualitative statement and the complexities of the geology of the region do not allow that statement to be made with certainty. It is speculative. As indicated by the statement that "the geology is complex and further refinements concerning impacts other than these qualitative expressions cannot be made at this time," (Page 4-11, Para. 2.)

Oil stratagraphics are on west side of Old Woman fault. Hydrology basis for the computer program is that there is insignificant communication between east and west sides of the fault. Therefore, if the assumptions behind the hydrology are correct, the pressure change on oil traps is insignificant.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page 4-10, Figure 4-2 and Page 4-96, Figure 4-5. Drawdowns in the Madison Potentiometric Surface after 50 years of Pumping (Plan 1) and (Plan 3). These cross sections are identical to Figure B-16 and B-19 of the Technical Report except for the addition of the Madison potentiometric surface in 1980 and the calculated surface in 2035.

Comment: These do little for the average reader other than, perhaps, to show the vast thickness of sediments overlying the Madison. Of more use would be a diagrammatic cross section showing the relationship between wells in overlying aquifer units to the Madison and, more importantly, the calculated change in water level for wells penetrating those overlying units. A suggested example is attached. This is designed to supplement the suggested addition of drawdown maps for those units in the Technical Report.



DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page 4-11, last Para. and continuing on Page 4-14. "The declines in water level or flow that would occur in wells completed in the Minnekahta Limestone, the Spearfish Formation, the Hulett Sandstone, and the Inyan Kara Group after 50 years of pumping by ETSI were not calculated explicity. Water level drawdowns in the unconfined portions of these aquifers after 50 years of pumping would be small, but declines in the potentiometric head in confined portions of these aquifers were estimated to be as large as 90 percent of those calculated for the Madison aquifer".

Comment: This statement in the DEIS is unusual because it is the only mention of a major subject that is not derived or quoted from the Technical Report. Furthermore, no comparable statement concerning the Crook County well field exists in the DEIS. This is an extremely important aspect of the entire drawdown prediction and impact assessment because those formations are all included in the Upper Confining Unit of the computer model. The statement, as it now stands, does not allow the reader to know where the two different magnitudes of drawdown will occur. This also has a direct bearing on the request for preparation of drawdown maps for aquifers that lie above the Madison (see comment related to Page 5-1, Chapter 5).

Referring to Map 3-2 on page 3-5 of the DEIS, the surface outcrop area of the Unit designated KJ (Inyan Kara Group, etc) is the Upper Confining Unit of the computer model (see Figure 4-3 on page 4-7 of the Technical Report). This shows that the Black Hills is virtually surrounded by this unit and the upward leakage from the Madison to it (and through it) is diagrammatically shown on Figure 3-2 of the DEIS. Therefore, it follows that this area of outcrop will be "the unconfined portions of these aquifers" referred to on page 4-11 (as quoted above). However, unless the reader is able to reach such conclusions independently, the erroneous conclusion of drawdowns "as large as 90 percent of those calculated for the Madison aquifer" will result.

This is of utmost importance with respect to the clarity of the impact assessment for a serious lay reader of the DEIS. It would appear that one might finally conclude that virtually every well would have drawdowns "as large as 90 percent of those calculated" in an area "of about 5,300 square miles" for the Niobrara County well field (page 4-4 of the DEIS) and "of about 16,700 square miles" for the Crook County well field (page 4-94 of the DEIS).

PROPOSED ACTION - WATER RESOURCES

Page 4-14, Third Para., Left Column. "Spring Flow and Stream Flow. Groundwater discharge to the streams and springs in the vicinity of the Niobrara County well field would decrease as a result of pumping from the Madison aquifer (Table 4-3). The base flow of the Cheyenne River upstream of Angostura Reservoir in Fall River County, South Dakota, would decrease by approximately one cubic foot per second (cfs) after 50 years of pumping. The average flow of Cascade Springs and of the springs in the Hot Springs area, in Fall River County, South Dakota, would decrease by four cfs, and two cfs, respectively, from their present levels of 22 cfs and 25 cfs."

Comment: As pointed out previously in the dEIS, these estimates of decreased stream flows are subject to considerable question. There should be a careful monitoring and measuring program put into effect to determine the actual depletion effects as accurately as possible. Once these effects have been accurately defined, mitigation programs can be implemented to neutralize any adverse effects. Such mitigation programs could involve adding water to the streams in question either by pumping from the Madison aquifer and discharging into the streams, by retiring existing water rights and leaving sufficient water in the streams to make up for the depletions, or other mitigation measures.

This comment applies to all of the various references in the dEIS to depleted surface water stream flows.

WATER -- DEIS

Page 4-14, Col. 2, and Page 4-17, Col. 1 refer to changes in groundwater discharge rates to streams and springs in the immediate area of ETSI well fields.

Comment: These changes would not significantly affect fisheries productivity of any of the streams described. In the worst case, Niobrara well field would have a four second-foot reduction of Cascade Springs, down 18% from an annual flow of 22 second-feet. This reduction falls well below the 45% critical figure for significant effects on the aquatic biota.[1] For example, in the blue-ribbon trout stream Sand Creek in Wyoming, 50 years of using the Crook County well field would reduce the flow only by 20 to 25% during a dry year. ETSI's drawdown, even in the worst case possible, would not jeopardize the Black Hills region fishing. On pages 4-50 to 4-52, the DEIS agrees that no significant biological impacts would be expected.

Suggest that discharge numbers include percentages to allow for an easier interpretation of Sec. 4-A-6. Converting to percentage figures allows the reader to understand the "not significant in effecting the biology of Cascade Creek".

1 Binns, N. A. and F. M. Eiserman. 1979. Quantification of fluvial trout habitat in Wyoming. Transactions of the American Fisheries Society 108:215-228.

Page 4-14, Para. 6 of the DEIS. "Many existing Madison and Minnelusa water users would have increased pumping lifts as a result of the declines in the potentiometric surface around the Gillette well field (Table 4-4)."

Comment: Table 4-4 assumes that all the water extracted at the Gillette well field is for ETSI's benefit. This is not true. The drawdown effect of only ETSI's allotment should be reflected in the column marked, "ETSI only" of Plan 2 in the table - not the combined total of Gillette's allotment and ETSI's allotment.

This correction will greatly reduce the number of water users that are calculated to be affected.

WATER RESOURCES -- DEIS

Page 4-14, Para. 2
Page 4-17, Para. 3
Page 4-97, Para. 4

Reference a time frame figure to this paragraph.

Comment: Important for reader clarification changes in base flows of the Cheyenne River, Cascade Springs, and of springs in the Hot Springs area, as well as flows of Sand Creek, Spearfish Creek, Belle Fourche River, and Crow Creek Springs, could be depicted in the same way as was done in Fig. 4-1 on page 4-9 of the DEIS for the Edgemont and Provo wells.

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 4-15, Para. 3, Line 7 --- "a leakage coefficient of approximately 5×10^{-4}".

Comment: It is probable this value should be changed to "5×10^{-9}".

WELL-FIELD HYDROLOGY-TECHICAL REPORT

Page 4-16, Second Paragraph "These observations led to the development of the following conceptual model that explains the hydraulic behavior of the Madison aquifer and, on a regional scale, the effective capacity of the two zones in the Madison to transmit water (see Appendix H, page H-32)".

Page H-32, No. 1 "The hydraulic behavior of the Madison aquifer can be best described with a conceptual model similar to that proposed. However, because the exact areal distribution of the high-transmissivity zones is not known, regional assessments of the aquifer have to be based on models that use an effective average of the properties of the high- and low-transmissivity zones".

Comment: Although the conceptual model is probably the best and most reasonable proposed to date, the fact remains that use of the "effective average of the properties" cannot reproduce field results on a local scale.

The attached example, plotted on Figure H-3, shows this and, further, that use of the parameters specified for the model would predict increasingly larger drawdowns as time progresses.

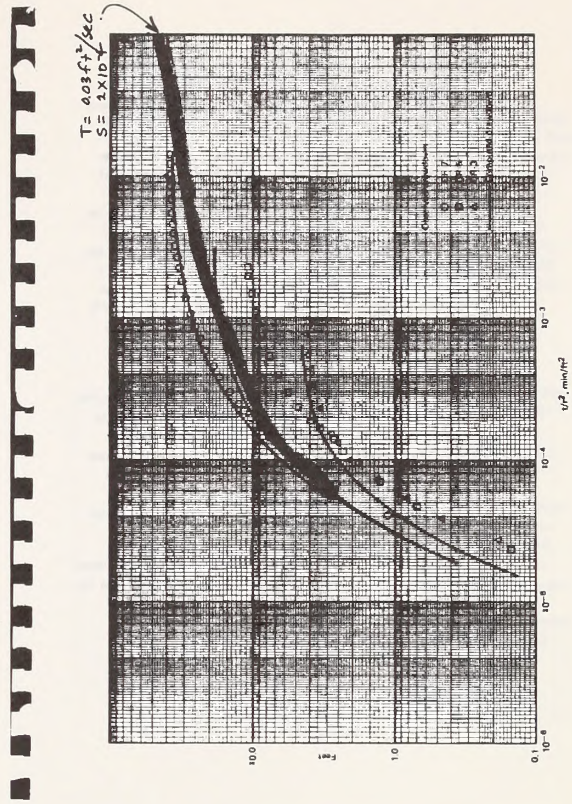


Figure H-3. COMPARISON OF COMPUTED AND OBSERVED DRAWDOWNS FOR THE GILLETTE WELL-FIELD PUMPING TEST

Page 4-17, Para. 5 of the OEIS. "Surface Water," refers to effects of hydrostatic testing indicating possible adverse effects.

Comment: Change this section to reflect impact of mitigating measures. In the ETSI project, only a small amount of water will be discharged at locations approved by EPA and/or State authorities, and using approved methods to prevent any adverse pollution.

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 4-21, Para. 1 "The aquifer matrix compressibility is unknown, but the average compressibility of solid rock is 1.1×10^{-11} pascals (Pa) (Freeze and Cherry, 1979). The storage coefficient per foot of aquifer thickness computed with a porosity of 10 percent and a matrix compressibility of 1.1×10^{-11} Pa is 3.3×10^{-7}. A storage coefficient of 3.3×10^{-7} per foot is lower than the typical storage coefficient of a confined aquifer, which is approximately 1×10^{-6} per foot of aquifer thickness (Lohman, 1972)."

Comment: This is an extremely important aspect of the entire analysis of the Madison aquifer and directly affects the predicted impacts (drawdowns). References are made and coefficients are presented without supporting calculations in order to demonstrate the dramatic differences that would accrue using these coefficients. However, the authors can easily verify them, if they so desire.

The average compressibility of 1.1×10^{-11} Pa could not readily be found in Freeze and Cherry. However, Table 2.5 on page 55 of that reference presents a range of compressibility of 10^{-8} to 10^{-10} for jointed rock and 10^{-9} to 10^{-11} for sound rock in units Pa^{-1}. It appears that the authors used the most conservative figure to derive the specific storage (storage coefficient per foot) used in the rest of the entire analysis.

On page 9 of the Lohman reference cited it is shown that the portion of specific storage attributed to the expansion of water alone for a porosity of 10 percent would be 1.43×10^{-7}. If the range of compressibility values (Pa^{-1}) are used in the equation on page 9 of Lohman, it can be shown that the specific storage values derived will vary from 3.14×10^{-6} to 1.46×10^{-7}. Therefore, it is not surprising, considering the range of values to choose from to derive specific storage, that Lohman uses 1×10^{-6}.

The importance of the specific storage can be shown on the attached modifications of Figure 5-7 of the Technical Report. The following explanation will be as brief as possible because the authors are familiar with the criteria used.

The first example uses the specific storage used in the computer simulation for Crook County (3.3×10^{-7}) for the total thickness of all units (2500 feet) for a derived storage coefficient of 8.25×10^{-4}. This shows that a non-equilibrium solution differs only slightly from the computer simulation. This is principally because the various boundaries used in the model cannot be considered in the simplistic approach. This example is presented only for the purpose of comparison with the next example. It uses Lohmans average figure of 1×10^{-6}, which also falls within the range calculated above, for the entire thickness that results in a storage coefficient of 2.5×10^{-3}.

Comparison of the two examples shows that the change in specific storage greatly affects the magnitude and extent of predicted drawdowns. It would appear reasonable to assume comparable changes would result if the higher specific storage value were used in the model simulation. In fact, it appears that the data points used in South Dakota (Figure 5-2 and Table 5-1) might show predicted drawdowns of less than 25 feet in another model simulation.

If that were the case, the impacts there would not be considered significant. Page 4-1 para 3 of the OEIS states, "Impact on the hydrology of the Madison aquifer system would be considered potentially significant if drawdowns in the potentiometric surface exceeded 25 feet----".

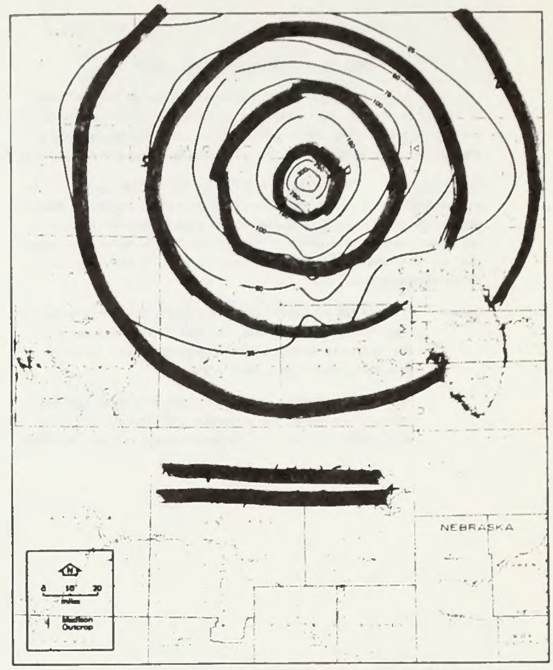


Figure 5-7. DRAWDOWNS (in feet) IN THE MADISON AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM CROOK COUNTY WELL FIELD ONLY (PLAN 3)

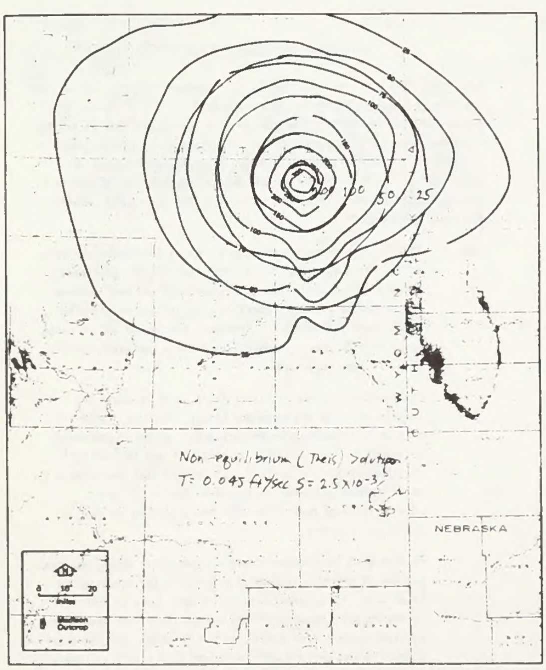


Figure 5-7. DRAWDOWNS (in feet) IN THE MADISON AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM CROOK COUNTY WELL FIELD ONLY (PLAN 3)

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 4-25, Table 4-2 "Calculated Potentiometric Heads in The Madison Aquifer using the Steady State Model".

Comment: This tabulation shows that Niobrara and Weston Counties locations are extremely sensitive to both leakage and the simulated effect of geologic structural features. However, Crook County locations are relatively insensitive to both parameters. Consequently, if leakage values increased on the basin side of the Black Hills Monocline due to the depth of burial, the calculated effects of the Crook County well field could be different than predicted because of possible contributions from that area.

WELL-FIELD HYDROLOGY TECHNICAL REPORT

Page 4-41, Figure 4-6 Finite Difference Grid Used in Simulating Pumping from the Crook County and Gillette Well Fields.

Comment: The location of the Crook County Well Field is shown Row 9, Columns 9 and 10. This appears to be the location of the Devils Tower and Hulet data points, as shown on Figure 5-2. The actual location of the Crook County well field should be in Row 10, Columns 9 and 10, according to the second paragraph on page 4-39. The location of the Gillette Well Field is shown in Row 8, Column 8. The actual location should be in Row 7, Column 8.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page 4-94 and 4-97 Near the bottom of page 4-94 of the EIS, a discussion of the predicted effects on existing users begins. Increased pumping lifts and declines in pressures of both the Madison and Minnelusa formations are postulated and it is stated that, "This would result in a substantial flow reduction in many of the irrigation wells".

Comment: This conclusion is not substantiated by explanation or data in the Technical Report in Section 5. However, data from the files of the USGS District office in Huron show water levels have fluctuated during the past 20 years more than the models prediction of 40 feet of decline in that area.

The record of these two Minnelusa wells shows that pre-irrigation season measurements from one year to the next may vary as much as about 30 feet. The difference between levels within a year (one before and one during the irrigation season) may vary by about 20 feet. The limited data on flow rates from irrigation wells in the Spearfish area indicate the expected change in flow with change in pressure. However, based on these data and other experience with flowing wells, the reduction of flow rate due to a decline of pressure of 40 feet (as predicted by the model simulation) can be expected to be only about 10 percent because of discharge vs drawdown relationships in rock aquifers (Kelly & Others, 1980). This is in sharp contrast to "a substantial flow reduction". It also should be added that some of the present irrigation users apparently are not greatly concerned about conservation of water (and/or the pressure levels) as evidenced by the practice of flowing to waste at some wells during the non-irrigation season.

**********PROVISIONAL DATA * SUBJECT TO REVISION **********   117

LAWRENCE COUNTY

WELL   6N 2E23BBBA   SITE NUMBER 442820[illegible]

TOM KAYOR. DRILLED UNUSED ARTESIAN WELL IN THE MINNELUSA FORMATION. DIAM 8 IN, DEPTH 415 FT, (MEASURED 264 FT 9-25-56), MP HOLE IN TOP OF CAP 1.50 FT ABOVE LSD.
LSD ABOUT 3770 FT.

HIGHEST WATER LEVEL 36.07 FEET BELOW LAND SURFACE DATUM MAY 16, 1971.

LOWEST WATER LEVEL 80.05 FEET BELOW LAND SURFACE DATUM MAY 03, 1962.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 25, 1956	74.15	AUG 1961	81.80	JUL 21, 1967	62.80	APR 05, 1973	61.35
MAR 04, 1957	75.65	MAY 03, 1962	80.05	MAY 10, 1968	71.90	MAY 13, 1974	53.33
MAY 30, 1957	75.00	AUG 28	77.06	JUN 16, 1969	69.00	JUN 30, 1975	58.30
AUG 17, 1957	75.92	JUN 05, 1963	71.89	MAY 12, 1970	51.80	MAY 10, 1976	66.20
JUN 19, 1959	76.73	JUN 02, 1964	75.72	MAY 16, 1971	36.07	JUL 28, 1977	58.75
AUG 14, 1960	79.89	JUN 15, 1965	55.84	AUG 09, 1971	56.9	MAY 24, 1978	37.83
MAY 24, 1961	80.94	MAY 17, 1966	66.60	MAY 24, 1972	39.1	MAY 09, 1979	66.22

34   **********PROVISIONAL DATA * SUBJECT TO REVISION **********

BUTTE COUNTY -- CONTINUED

WELL   8N 3E33CCB   SITE NUMBER 443627103460301

AL & RODNEY MCELMOT. DRILLED STOCK ARTESIAN WELL IN THE MINNELUSA FORMATION. DIAM 5 IN. DEPTH 2340 FT, SLOTTED 2265-2380 FT, MP BASE OF GAGE 2.4 FT ABOVE LSD
LSD ABOUT 3275 FT.

HIGHEST WATER LEVEL 205.3 FEET ABOVE LAND SURFACE DATUM MAY 09, 1979.

LOWEST WATER LEVEL 205.3 FEET ABOVE LAND SURFACE DATUM MAY 09, 1979.

WATER LEVELS IN FEET ABOVE LAND SURFACE DATUM.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 23, 1961	147.8	MAY 18, 1966	126.9	MAY 27, 1970	145.3	MAY 11, 1976	205.3
MAY 01, 1962	140.9	AUG 24, 1967	126.9	JUN 28, 1973	219.2	JUL 29, 1977	200.7
AUG 27, 1962	136.6	MAY 21, 1968	120.6	MAY 09, 1974	218.5	MAY 24, 1978	214.5
AUG 23, 1965	136.3	OCT 15, 1969	124.6	JUL 01, 1975	209.9	MAY 09, 1979	205.3

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 5-1, Chapter 5 This chapter discusses the "Impacts caused by Pumping From the Madison Aquifer System".

Comment: Numerous other comments have been made about criteria and/or parameters. This comment is directed specifically to the computer model (Chapter 4. Numerical Model of the Madison Aquifer) results discussed in Chapter 5 that appear to be contradictory. It will be helpful to state some of the salient criteria and/or conclusions upon which the following discussion is based.

1. "The starting point for defining the units overlying the Madison unit was to exclude from the conceptual model all strata above the Inyan Kara Group. The several-thousand-foot sequence of Cretaceous shales overlying the Inyan Kara Group----. These shales are assumed to act as a barrier that hydrogeologically separates the strata below from those above". (p. 4-9).

2. "The leakage coefficient for the Upper Confining Unit was specified as 4×10^{-12} sec^{-1} everywhere the Upper Confining Unit exists". (p. 4-23).

From these two statements, it appears reasonable to assume that in areas where the thick Cretaceous shales exist an impermeable no-flow layer is present (both in the model and in the field). Furthermore, that this layer would preclude the transmitting of any effects through it to the surface. However, in areas where the shales do not occur, it seems reasonable to assume that the leakage coefficient of the Upper Confining Layer would determine if effects can reach the surface. Furthermore, it follows that, if effects reach the surface, such effects also would reach the unconfined, near surface zones of saturation (water table).

The actual delineation of this area can be seen on Figure 3-1, "Generalized Surficial Geology----". The thick Cretaceous shales are designated Kp and Kc, while the Upper Confining Unit is shown as KJ. Referring to that map, the Cheyenne River south of the Black Hills flows on or near the outcrop of the Upper Confining Unit. In the north, a considerable reach of the Belle Fourche River flows on Upper Confining Unit while the Little Missouri River appears to flow only on the Cretaceous shale unit.

Referring to Table 5-2, page 5-7, a calculated change in flow, due to simulated ETSI pumping at the various locations, is shown for the three rivers mentioned above. This must mean that the effect reached the surface area, and furthermore, that the effect reach the unconfined near-surface zone of saturation. It then follows that this zone should respond theoretically by a lowering of the water table by drainage (specific yield).

Perhaps the calculated decrease in the Little Missouri River, that flows on the Cretaceous shales, is due to tributary contribution (or lack thereof) from Upper Confining Unit areas. However, it is clear that the model calculated effects reaching the ground surface in the case of the other two rivers.

If effects of simulated pumping reach the (unconfined) water table, the effect of the water table and its several orders of magnitude increase in storage coefficient also should have some effect on the calculated drawdowns in the Madison aquifer. It would seem that the water table influence on the cone of depression would be to restrict its growth or magnitude to the south and southeast in the case of the Crook County alternative in particular. However, Figure 5-16 appears to show only assymetry due to the Black Hills Monocline and the outcrop cell (7, 12) on Figure 4-6.

In summary, it appears that the top of the Upper Confining Unit was not modeled to have a constant head layer (or boundary) at its upper surface in those areas where it is exposed at ground surface. Yet, because most observers would contend a general zone of saturation exists near ground surface (water table), it would appear that such a layer should exist in the conceptual model also. It is acknowledged that propogation of effects through 1,000 + feet of low vertical permeability material will be slow. However, in close proximity to the well field (say 10 miles), conventional techniques of leakance considerations indicate the effect will occur within 50 years. Obviously, the model makes the same predictions with respect to stream flow. Why did the model not predict some of this effect on drawdowns?

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 5-1, Chapter 5. Impacts Caused by Pumping from the Madison Aquifer System. Figures 5-3, 5-5, 5-7, 5-9, 5-11, 5-12, 5-14, 5-16 and 5-18 depict calculated drawdowns in the Madison aquifer system by use of contours of equal drawdown.

Comments: These maps confuse the average reader and convey the idea that the drawdowns shown will occur in all aquifer systems, even in those wells that penetrate only the uppermost aquifer such as in the Inyan Kara Group. ("Dakota", that includes the Lakota and Fall River formations) It is suggested that, for each of the scenarios portrayed, figures above be expanded to show the calculated drawdowns in the aquifer units shown on Figure 4-3 that occur above the Madison. These would include the Upper Minnelusa, the uppermost part of the Upper Confining Unit (Fall River Formation), and alluvial deposits of stream valleys. It may be necessary to include the Arikaree for the Niobrara County field because of its occurrence there. Examples of Plan 3 (Crook County Well Field) supplemented figures are attached. The contours on these examples were not calculated and the values shown were selected on the basis of judgment for illustrative purposes.

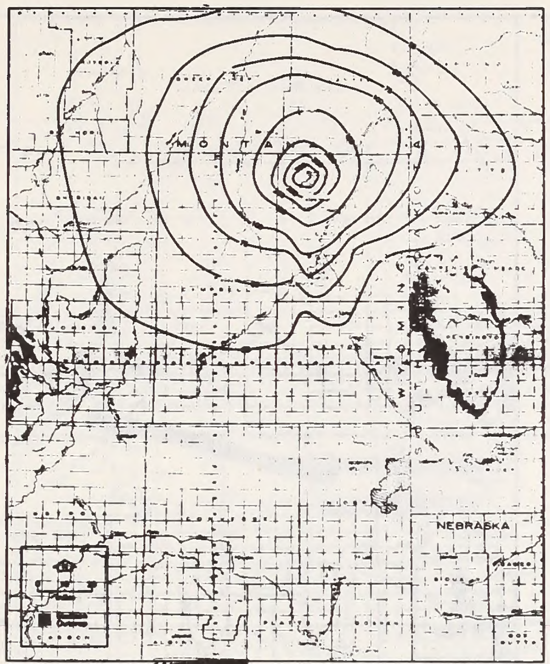


Figure 5-7: [redacted] DRAWDOWNS (in feet) IN THE MADISON AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM CROOK COUNTY WELL FIELD ONLY (PLAN 3)

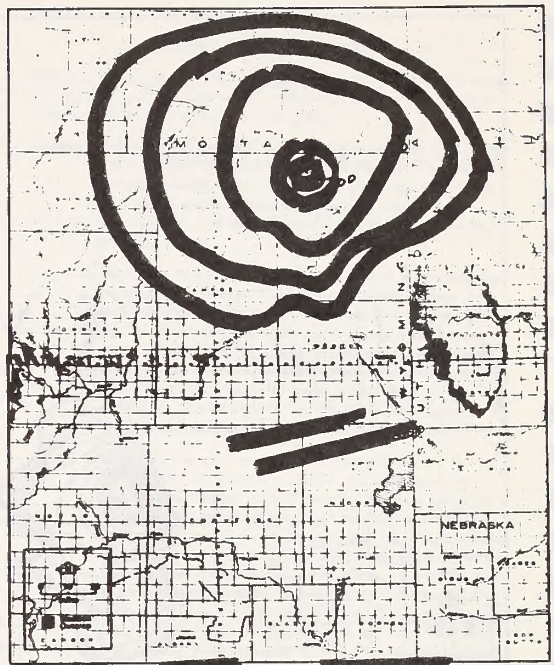


Figure 5-7A [redacted] DRAWDOWNS (in feet) IN THE [redacted] AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM CROOK COUNTY WELL FIELD ONLY (PLAN 3)

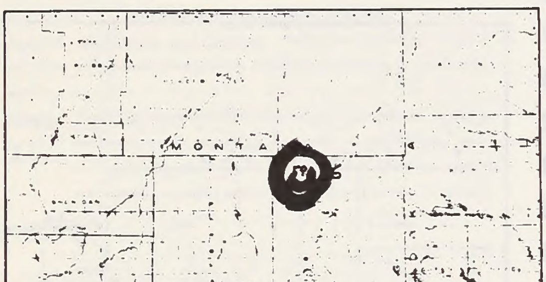


Figure 5-7B [redacted] DRAWDOWNS (in feet) IN THE [redacted] AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM CROOK COUNTY WELL FIELD ONLY (PLAN 3)

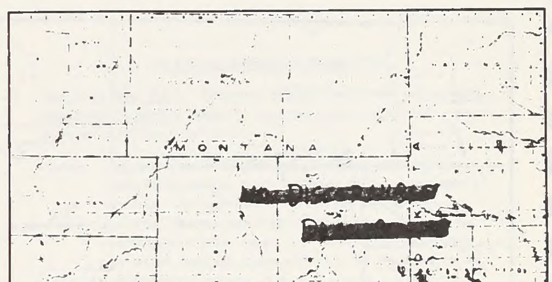


Figure 5-7C [redacted] DRAWDOWNS (in feet) IN THE [redacted] AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM CROOK COUNTY WELL FIELD ONLY (PLAN 3)

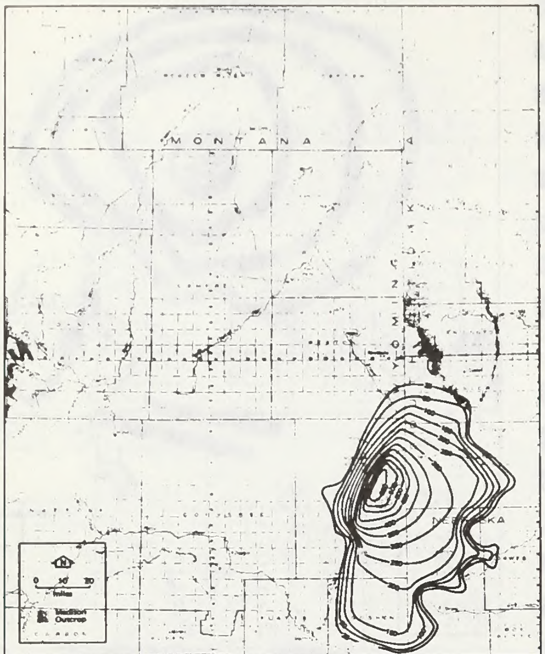


Figure 5-3 DRAWDOWNS (in feet) IN THE MADISON AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM NIOBRARA COUNTY WELL FIELD ONLY (PLAN 1)

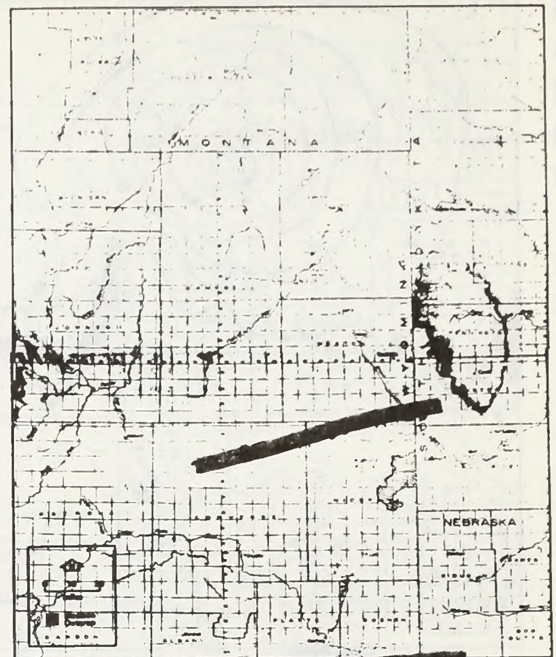


Figure 5-3A DRAWDOWNS (in feet) IN THE [redacted] AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM NIOBRARA COUNTY WELL FIELD ONLY (PLAN 1)

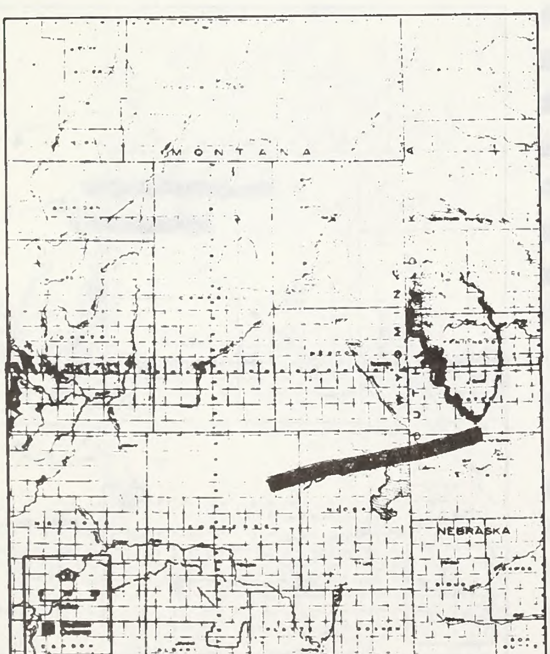


Figure 5-3B DRAWDOWNS (in feet) IN THE [redacted] AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM NIOBRARA COUNTY WELL FIELD ONLY (PLAN 1)

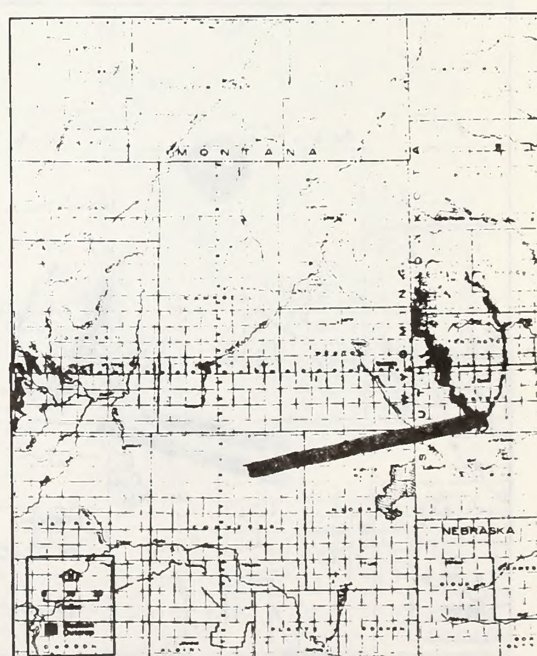


Figure 5-3C DRAWDOWNS (in feet) IN THE [redacted] AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM NIOBRARA COUNTY WELL FIELD ONLY (PLAN 1)

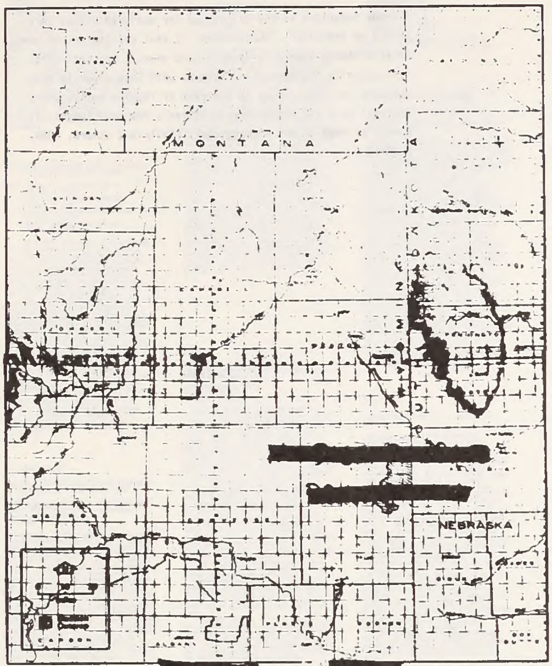


Figure 5-30, DRAWDOWNS (in feet) IN THE MADISON AQUIFER POTENTIOMETRIC SURFACE AFTER 50 YEARS (1985-2035) OF PUMPING FROM NIOBRARA COUNTY WELL FIELD ONLY (PLAN 1)

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 5-11, Para. 5.B.3 "Ground-water discharge to the streams and springs in the vicinity of the Niobrara well field would decrease as a result of pumping from the Madison aquifer (Table 5-2)".

Comment: The continuing discussion makes predictions of decreases at the end of 50 years of the base flow of the Cheyenne River and two springs in South Dakota. It should be stated how long it will take for the predicted decline to begin (in years) after pumping begins, and how long it will take to reach the maximum predicted decline.

"Base flow" is a misnomer, as used, because it is apparent that the predicted decline of 1 cfs flow rate in the Cheyenne River is due to a decrease of the upward leakage contribution to the shallow ground water body along the river over a reach of many miles. Consequently, it is doubtful that the calculated rate would actually become surface water flow. Furthermore, this predicted miniscule flow rate change (if expressed in terms of rate cfs per unit distance) is not within the accuracy of flow rate measuring techniques.

With respect to the predicted spring flow declines, it is inferred that declines accrue because of a lowering of the potentiometric surface in the Madison at the spring source but the methodology is not explained. If the decline is based on the assumption that a certain percent reduction in head produces an identical percent reduction of the calculated (or measured) flow, this should be explained. Furthermore, if that was the method used, it is probably incorrect because that assumes the spring is hydraulically 100 percent efficient, with head directly proportional to flow. This has shown to not be the case for flowing wells. (See references p. R-7, Kelly and others, 1980)

LONG- AND SHORT-TERM BENEFITS, TRADE-OFFS

Page 5-15, Second Para., 5.c.1, Benefits. "Groundwater Hydrology. Project operation would provide extensive new scientific information on the Madison aquifer."

Comment: Another significant benefit connected with this project is that it would also develop and utilize a presently unused resource. This is particularly significant in view of the fact that this is a renewable resource currently providing only limited benefit to mankind.

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 5-20, Para. 5.D.1 "Drawdowns greater than 25 feet in the Madison potentiometric surface (emphasis added) were calculated within a region of about 16,700 square miles----".

Comment: All ground-water developments, from individual wells to a well-field-complex, create drawdowns in the potentiometric surface. The magnitude and extent may have an effect on an area, as shown on a map, in the aquifer itself but not noticeable in other zones. For instance, the calculated effect of the Crook County well field is a drawdown in the potentiometric of some 25 feet at a point about 15 miles east of Sheridan (or 90 miles from the well field). However, that calculated effect is within the Madison at a depth of about 13,000 feet below ground surface.

This calculated effect clearly is not going to affect water users in the Sheridan area but the map gives this impression. Furthermore, all of the map area at this great depth goes into the lead sentence, that all readers (and press coverage) relate to, about how many thousand square miles are affected.

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page 5-25, Para. 5.0.3 "Ground-water discharge to the streams and springs in the vicinity of the Crook County well field would decrease as a result of pumping from the Madison aquifer (Table 5-2)".

Comment: The continuing discussion makes predictions of decreases at the end of 50 years of the base flow of the Belle Fourche and Little Missouri springs or spring fed streams in South Dakota. It should be stated how long it will take for the decline to begin (in years) after pumping begins, and how long it will take to reach the maximum predicted decline for each of the cited occurrences.

"Base flow" is a misnomer, as used, because it is apparent that the predicted decline of 1 and 4 cfs flow rates in the Little Missouri and Belle Fourche Rivers, respectively, is due to a decrease of the alleged upward leakage contribution to the shallow ground water body along the rivers over a reach of many miles. Consequently, it is doubtful that the calculated rate would actually become surface water flow. Furthermore, this predicted miniscule flow rate change (if expressed in terms of rate per unit distance) is not within the accuracy of flow rate measuring techniques. In addition, in the case of the Belle Fourche River, Figures I-1, I-6 and I-7 shows that a flow rate of 4 cfs does not have a high probability even with controlled releases from Keyhole Reservoir. It appears that the numbers generated by the model are over predictive when compared with actual data.

With respect to the predicted spring flow declines, it is inferred that declines accrue because of a lowering of the potentiometric surface in the Madison at the spring source but the methodology is not explained. If the decline is based on the assumption that a certain percent reduction in head produces an identical percent reduction of the calculated (or measured) flow, this should be explained. Furthermore, if that was the method used, it is probably incorrect because that assumes the spring is hydraulically 100 percent efficient, with head directly proportional to flow. Even in the case of flowing wells, where the well bore and casing have relatively low head losses, discharge vs head is not proportional. (Kelly and others, 1980, p. R-7)

GLOSSARY -- DEIS

Page GL-1 "Base flow - that part of a stream derived from groundwater."

Comment: In the DEIS, base flow figures are derived from specific modeling of the Madison Formation and pertain to groundwater originating from the Madison Formation (question to Charles Andrews, Hydrology meeting, Denver, 12/18/80, on this subject; answered in the affirmative).

Suggest expanding the definition to read: "That part of a stream flow derived from Madison Formation groundwater."

WELL-FIELD HYDROLOGY-TECHNICAL REPORT

Page H-30, Para. 1 "For a confining bed only 100 feet thick, this value would translate to a vertical hydraulic conductivity of 4.6×10^{-7} ft/sec. This latter value is large for a confining bed in general but is similar to the estimated horizontal hydraulic conductivity of 4.6×10^{-6} ft/sec of the Madison aquifer, also estimated using the Hantuss-Jacob equations".

Comment: It is recognized by virtually all investigators that the Madison aquifer porosity and hydraulic conductivity is largely due to secondary occurrences, i.e. solution activity, fracturing, dolomitization, etc. Consequently, when vertical fractures (Blankennagel and others, 1977, p. R-2) in particular are considered, it is entirely possible that vertical hydraulic conductivity could be high. Neuzil (1980, p. R-9) and Bredehoeft and Neuzil (1980, attached) consider vertical fractures in the Pierre Shale as the controlling mechanism with respect to the Dakota Aquifer, another regional aquifer system.

This again brings up the parameter estimated selections made for the simulation model and their ultimate influence on the magnitude of calculated impacts.

EOS, vol. 61, no. 46 November 11, 1980 page 952

Assessment of Regional Aquifer Systems

Garden JT
Tuesday PM
L. F. Konikow (USGS), Presiding

H 20 INVITED PAPER

H 19 INVITED PAPER

H 21

H 22

H 23

SURFACE WATER QUALITY -- TECHNICAL REPORT

Page 1, Para. 2 "Simulation studies...and sulfates (SO_4) would <significantly increase>* increase by 400 - 1000 mg/l and 300 - 600 mg/l, respectively, in the dewatering plant effluent (slurry filtrate).

Comment: Use of the actual numbers will serve to define better the expected increase. The relative significance of the increase increases as the source water quality improves.

Page 11, Para. 2 Insert "(1% solids concentration) after "10,000 mg/l" and before "at distances of 50 feet..."

Comment: The value of 10,000 mg/l may appear more significant than it actually is unless viewed relative to the fact that it only represents a 1% solids concentration.

Page 11, Para. 2 "Up to an estimated maximum of 16 million gallons could be generated per construction spread."

Comment: It is unclear what "spread" represents in this discussion.

Page 1, Para. 3 Insert "and" in the first sentence after "site to site" and before "seasonally at individual sites".

Comment: Receiving water characteristics vary not only from site to site, but also with the seasons at individual sites.

Page 1, Para. 3 Add "The maximum concentrations, shown in Table 1-3, normally occur during low stream flow periods; and minimum concentrations occur during flood flows. The maximum concentrations at minimum flows are of most significance when evaluating the potential impacts of a discharge on a stream.", as the third and fourth sentences to the paragraph (should follow "Table 1-3 presents... period 1970 - 78.)"

Comment: The minimum and maximum concentrations represent extreme conditions, as do critical and flood flows, and not typical variability within a stream. The above sentence should be added in order to clarify conditions signified by minimum and maximum concentrations.

Page 14, Para. 5 "The ETSI coal slurry...coal processing procedures (i.e., source mine, coal storage conditions and time), quantities of substances...a given well field."

Comment: The coal processing procedures listed as examples will vary and may affect final wastewater quality significantly, while the actual slurry processing procedures will remain relatively constant.

Page 15, Table 1-8 "Preliminary Projections of Chemical Characteristics of Proposed Project Coal Slurry <Simulation Filtrate> Dewatering Plant Effluent."

* Means to delete < >

Comment: Change to avoid confusion and remain consistent with later tables.

Page 15, Table 1-8 Footnote should read "[a] For the ranges shown, the maximum value reflects the sum of the highest concentrations of constituents in the carrier water and the maximum leachate concentrations."

Comment: These concentrations are not representative of any measured filtrate concentration. Values were calculated using the maximum concentrations measured or predicted in the slurry transport water and the maximum concentration increases for the parameters listed for all the simulation runs.

Page 16, Table 1-9 Switch positions of BOD_5 and Cl lines under "Typical Conditions".

Comment: This is a cosmetic change in order to remain consistent with the rest of the report and within this table. Values listed with the constituents are correct.

Page 16, Table 1-9 Footnote should read "[a] A function...coal processing procedures (e.g., source mine, coal storage conditions and time).

Comment: Refer to comment for Page 14, paragraph 5.

Page 17, Para. 1 Insert as the third and fourth (next to last) sentences in the paragraph, "The 'worst case' is determined by combining the highest concentration of coal leachate from all the simulation runs with the highest measured and projected concentrations of constituents found in the individual monitoring wells. As such, the probability of occurrence of the worst case condition should be considered small."

Comment: The 'worst case' has not been reproduced in the simulation tests. It represents a combination of two extreme conditions: the highest concentration of constituents leached in any of the simulation runs, and the highest measured and projected concentrations of constituents in any of the individual monitoring wells.

Page 17, Para. 2 "Chemical analyses...on the filtrate resulting from <two> five separate slurry simulation tests."

Comment: Additional simulation tests results are now available.

Page 19, Para. 1 As shown, these...criteria (total dissolved solids, sulfate, and chloride) on the basis of natural background conditions,... such as dissolved oxygen, pH, and turbidity.

Comment: Add the above statement to clarify the wide range of values given for the various states' mineral criteria and to indicate the rationale for these based on natural conditions rather than strenuous environmental laws.

Page 19, Para. 3 and 4 "In order to evaluate the effect of the slurry effluent discharge upon receiving water...for receiving streams <have been tabulated and appear in Table 1-12> were determined. Mass balance calculations using the design low flow conditions, maximum concentrations specified by stream standards, and expected dewatering plant discharge flows were performed to calculate the maximum concentrations for total dissolved solids, sulfates, and chlorides which could be tolerated in the discharge without violating stream standards. The calculated allowable constituent concentrations for the proposed dewatering plant discharges are shown in Table 1-12. <These flows...low flows in Louisiana. Background levels... appear in Table 1-12. The levels...for the slurry filtrate> The projected range of TDS, SO_4, and Cl concentration in the dewatering plant effluent as given in Table 1-8 have been compared...standards. Tables 1-13...TDS, SO_4, and Cl.

Comment: The discussion as presented in the Technical Report is unclear.

Page 22, Table 1-12 Footnote, "[b] Alternatives: PA = proposed action, MA = market alternative, BA = barge alternative"

Comment: Alternative notation not explained.

Pages 23, 24, and 25, Tables 1-13, 1-14, and 1-15 Add arrows to ends of carrier water bars.

Comment: It is unclear exactly what these bars represent. To make the table more clear, an example might be given in the footnote.

Using Table 1-13. Example: Given the Oahe Reservoir as the transport water source, the concentrations of TDS in the dewatering plant effluent could be expected to fall within 800 - 1200 mg/l. The actual concentration will be a function of the source water and leaching from the coal.

Pages 23 and 24, Tables 1-13 and 1-14 Concentration in <Transport Water> Dewatering Plant Effluent (mg/l).

Comment: Concentrations actually represent projected dewatering plant effluent ranges rather than transport water quality.

Page 24, Table 1-14 Line for Preliminary Assessment of Treatment Requirements for Boyce should read: 72%, 78%, 89%, and 91% for 400, 500, 1000, and 1200 mg/l $SO_4^=$ in dewatering plant effluent.

Comment: Correct typographical mistake.

Page 32, Para. 1 "(e.g., burial 4 feet or 20 percent of scour depth, beneath the maximum scour depth elevation, or whichever is greater.)

Comment: As stated, it is not clear whether 20% indicates only 20% of the scour depth or the scour depth plus 20%.

Technical Report
Surface Water Quality
Page 4

<u>Page 63, Para. 2</u> "In Oklahoma,...Region 6 (Dean 1980) <u>in addition to state discharge permits</u>."

Comment: In Oklahoma, Arkansas, and Louisiana, state discharge permits are required for the discharge of hydrostatic test water.

<u>Page 64, Para. 2</u> "Water would be obtained...of water required per spread... Colorado alternative."

Comment: Refer to comment for page 11, paragraph 2.

<u>Page 18, Table 1-10</u> "Molybdenum (Sb)" should read "Molybdenum (Mo)".

Page 1, Para. 7 cites Spills and Ruptures as an Area of Controversy. Page 4, Para. 6 of the DEIS summarizes impacts associated with Spills and Ruptures.

The Technical Report on this controversial topic is not properly reflected in the DEIS which omits this significant statement now in the Technical Report:

"...it cannot be emphasized too strongly that the likelihood of any of the line breaks evaluated ever occurring, let alone the volumes projected ever actually being discharged from the break, is extremely remote."

Moreover, a balanced prespective could be better achieved if the validity of the simplifying assumptions were explained in Volume 1.

- "Slurry behaves like petroleum." This is not valid because if a slurry spills, it would thicken and form a soft plug which reduces both the flow rate and amount of coal discharge compared to oil.
- The Technical Report cites the average oil spill between 1968 and 1974 as 1058 barrels. But the average slurry spill used in the Technical Report is two orders of magnitude (100 times) greater.
- Page 143 of the Technical Report shows that profile points used 200-foot contour lines. Hence, a ruptured section could in actuality be isolated from downstream or upstream pipe sections by a hill or valley not identified on the contour maps. This isolation alone is sufficient to radically reduce

the quantities of coal slurry spill.
- Page 141 of the Technical Report assumes the type of spill was either a complete break or a puncture but does not specify the ratio of the two spills. This ratio is important because in the few minutes required for an automatic shutdown, the loss of slurry in a rupture is much smaller than for a complete break.

These points validate the almost hidden statement in the Technical Reports regarding the extreme remoteness of the quantities of spill projected. However, since this document will no doubt be referenced as other slurry pipelines are evaluated, it would have been more objective to project more typical spill rates rather than the improbable rates (4000 - 540,000 barrels of P4 in the DEIS Summary) - even though they are insignificant. Considering the above points would lead to a more realistic range of 500 to 150,000 barrels.

<u>SLURRY PIPELINE RUPTURES & SPILLS & WILDLIFE -- DEIS</u>

<u>Page 3-105, Para. 5</u> "However, in Kansas the Colorado alternative would pass approximately seven miles north of Cheyenne Bottoms State Waterfowl Refuge, which is critical habitat for the whooping crane."

<u>Page 4-89, Para. 4</u> "In addition, a spill at Deception Creek...stream crossing."

<u>Page 4-92, Para. 3</u> "A major rupture in Deception Creek could cause a reduction in suitable whooping crane habitat in Cheyenne Bottoms."

Comment: Suggest adding a mitigating measure to section on Mitigation, page 4-120, to read: "In order to reduce possible rupture and spill problems on Deception Creek upstream from the Cheyenne Bottoms State Wildlife Refuge, install valves on either side of creek crossing. Effectiveness: This action would reduce potential effects on whooping crane habitat.

AQUATIC BIOLOGY (WATER SUPPLY SYSTEM) -- DEIS

Page 4-51, Para. 3 "If a pipeline rupture were to occur in a stream...it could reasonably be expected that a localized fish and invertebrate kill might occur as a result of a 'cold shock'."

Comment: Disagree that cold-shock problems would result. Most streams in the area of the water pipeline have only intermittent flows and those that are perennial are relatively shallow. Consequently, the aquatic biota experiences a rapid temperature changes associated with the harsh conditions of the normal climate.

RUPTURES AND SPILLS -- DEIS

Page 5 and Page 4-119 omit mention of coal car derailments as one impact of the No-Action Alternative.

Comment: The impact of coal car derailments should be noted to correct this inadequacy. Such derailments are common in both terrestrial and wetland conditions. P 4-119, Sec. 4-I-2 notes that the potential for hopper-car spills into water bodies exists. However, it fails to note that in addition to stream damage by spills smothering stream-bottom invertebrates that retrieving cars from the stream cause a great deal of stream-bank damage and erosion and siltation. Stream-bank restoration after three trains spilled hopper-cars (two coal and one grain train) into the North Platte River was poor (personal communication Mr. Larry Peterson, District Fisheries Manager, Wyoming Game and Fish Department, Casper, Wyoming, December 16, 1980).

NO-ACTION ALTERNATIVE -- Technical Document

The reader should be referred to the report done by the Office of Technology Assessment in January 1975, which report is much more concise and covered a broader spectrum of impacts, such as train noise, right-of-way fires, locomotive diesel emissions, fugitive coal dust, impact on wildlife, and energy/materials use.

Page 146 of the OTA Report shows for the nearest example, Wyoming to Texas, to the Proposed Action of the DEIS that the total energy required for rail is 25% greater than by pipeline.

Page 2-1, Section 2.A.1 of the DEIS compares energy at the "raw" level, i.e., electricity from coal for pipelines and oil for locomotives. A more appropriate comparison would be based on coal for electricity for pipelines compared to coal for electricity for electrified locomotives or coal for electricity for pipelines compared to coal for diesel for locomotives. Indeed, data for the latter comparison can be found in Table 2-1, Page 2-2. This more clearly reveals that on a comparable basis the energy for locomotives (1,064,000 Btu/ton) is 40% more than for pipelines (664,000 Btu/ton to do the same job.

Windage loss is another component of energy for the No-Action Alternative. Calculations of windage loss on the basis of differential weight of rail cars for a given haul fail to account for the influence of moisture oickup from rain or from the increase in equilibrium moisture content as the coal picks up moisture when the coal cars move from the high dry areas to the moister destinations. Some sources show this on the order of 1% rather than the 0.1% used in Appendix E of the DEIS.

ENERGY EFFICIENCY -- OEIS

Page 2-5, Points 1-7 list energy components excluded from the energy consumption analysis and not included in Table 2-1.

Comment: Add "8. Energy benefits resulting from solar and wind energy facilities that may be built."

Stationary facilities such as pipeline support facilities--preparation plants, pump stations and dewatering facilities--can be adapted to use renewable energy resources, including wind and solar power. By way of contrast, mobile energy users such as railroads cannot be adapted to these particular renewable resources.

Although ETSI's studies do not reveal any economic incentive for these conservation techniques, the company offers help to interested builders of such facilities. Specifically, if someone would like to install, at his total expense, a wind or solar device at an ETSI facility, ETSI would pay the installer the prevailing price for the quality of energy. If enough space exists within the plot plan, ETSI would also be willing to provide the land to the installer, free.

Page 2-5, Para. 4 Add to listing:

8. Fuel wasted by vehicles at crossings
9. Fuel required for derailment cleanup

Fossil Fuel Steam Plant Efficiency

Table E-3 (Volume 1, P E-6) lists the energy conversion factor (heat rate) for the input electrical energy in a fossil fuel steam plant as 10,400 Btu/kWh. The factors may vary from this to about 9,700 Btu/kWh. Modern plants such as are becoming more common along the pipeline route tend toward the lower figure which affects the energy requirement by about 7% and would therefore reduce the energy consumption on the pipeline alternatives.

Page 5, Para. 2 of the OEIS summarizes the full efficiency of different alternatives on the basis of Btu/ton of delivered coal. For the No-Action Alternative, it is 570,000 Btu/ton, and for the proposed action, it is 664,000 Btu/ton - a difference of 94,000 Btu/ton or 0.5% based on the energy in one ton of coal.

Comment: EIS calculation of fuel efficiency should include loss of fuel due to ruptures of pipelines and derailments of coal cars. This has been omitted from the back-up calculations of Appendix E.

Using historical data for oil pipelines and the method of Beyer and Painter, 1977 one can estimate that 328.5×10^6 Bbls/yr might spill in oil pipelines. This is equivalent in energy to 0.26 million tons/yr of as-mined coal or 122,000 Btu/ton of delivered coal.

Similarly, using historical data for railroads and assuming a 1400-mile trip to the centroid of the ETSI marketing area, the loss of fuel would be 0.125 MM ton/yr. Windage losses at 0.5% would be 0.2 MM tons/yr for a total coal fuel loss of 0.33 MM ton/yr. This is equal to 142,000 Btu/ton of delivered coal.

The difference of 20,000 Btu/ton closes the already insignificant Btu difference on Page 5, Para. 2 of the OEIS. However, it is significant that diesel fuel for locomotives is an increasingly scarce item today and will continue to be more so - and more expensive - over the 50-year life of the proposed project. On the other hand, electricity is projected to be available and at relatively stable cost over the same time frame.

2.

Furthermore, the use of indigenous fuel like coal offers protection against inflationary pressures associated with foreign oil and has the additional advantage of enhancing national security.

Page 5, Para. 2 of the OEIS summarizes the full efficiency of different alternatives on the basis of Btu/ton of delivered coal. For the No-Action Alternative, it is 570,000 Btu/ton, and for the proposed action, it is 664,000 Btu/ton - a difference of 94,000 Btu/ton or 0.5% based on the energy in one ton of coal.

Comment: An overlooked factor is the amount of diesel and gasoline consumed by vehicles waiting to cross railroad tracks as unit-trains block traffic.

Using data from the No-Action Technical Report and the attached calculations, we find another 23,000 Btu/ton should be assigned to the No-Action Alternative calculations in Appendix E.

CALCULATION SHEET

DATE ______

DESIGN BY L. J. PETERSON DATE 12/16/80 CHECKED BY ______ SHEET NO. 3

PROJECT ETSI JOB NO. 10680

SUBJECT PETROL CONSUMPTION @ R/R X'INGS CALCULATION NO ______ FILE NO ______

FROM TABLES III-17, III-18 + III 19 IT IS EVIDENT THAT THERE IS NO RELATIONSHIP BETWEEN POPULATION AND # OF GRADE CROSSINGS FOR A PARTICULAR TOWN.

∴ USING TABLES A-1 THRU A-10 (PPGS. 112-126 IN NO-ACTION ALTERNATIVE TECHNICAL DOCUMENT), AND ASSUMING THAT THE AVERAGE DAILY TRAFFIC (ADT) THROUGH ALL GRADE CROSSINGS IN ANY PARTICULAR TOWN ≅ 0.50 (POPULATION) CALCULATE TOTAL HOURS SPENT IDLING @ GRADE CROSSINGS.

FROM TECHNICAL REPORT, AVG. SPEED OF LOADED TRAIN = 40 MPH
" " " EMPTY " = 60 MPH

FROM PG. 90, @ 40 MPH, TRAIN PASSES CROSSING IN APPROX. 2 MINUTES
" 60 " , " " " " 1.5 "

ADD TO THESE FIGURES 25% TO ACCOUNT FOR ADDITIONAL DELAY PRIOR TO AND AFTER TRAIN PASSAGE, AND 25% TO ACCOUNT FOR DELAYS AS A RESULT OF MAINTENANCE, CREW CHANGE STOP, OR SWITCHING.

$\therefore$ AVERAGE DELAY/XING $\approx \left(\frac{2+1.5}{2}\right)1.5 \approx$ 3 MINUTES / XING

AFFECTED POPULATION WYOMING MINES – KANSAS CITY = 0.8×10^6
" " KANSAS CITY – TERMINALS 2.1×10^6
2.9×10^6

FROM TABLE III-1, ASSUME 20 TRAINS/DAY WYO-K.C.
4 TRAINS/DAY K.C.-TERM.

FROM WYOMING MINES-K.C. $\Rightarrow \left(\frac{20 \text{ TRAINS}}{\text{DAY}}\right)\left(\frac{3 \text{ MIN.}}{\text{XING}}\right) =$ 60 MIN TOTAL DELAY @ ANY ONE XING

FROM K.C. – TERMINALS $\Rightarrow \left(\frac{4 \text{ TRAINS}}{\text{DAY}}\right)\left(\frac{3 \text{ MIN}}{\text{XING}}\right) =$ 12 MIN TOTAL DELAY @ ANY ONE XING

~~DELAY FREQUENCY ⇒ 60 / 1440 MIN/DAY = .0417 ⇒ traffic held up 4.17% of time~~
~~12 / 1440 = .0083 ⇒ " " " 0.83% " "~~

R H D
12/23/80
SHEET 4

ADT ≅ 50% OF AFFECTED POPULATION

AFFECTED POPULATION PART I (WYO.-K.C.) = 0.8×10^6

ADT = $0.5 \times 0.8 \times 10^6 = 0.4 \times 10^6$ CARS

ASSUME CONSTANT RATE OVER GRADE CROSSING

$\Rightarrow \frac{0.4 \times 10^6}{24} = 16{,}670$ CARS/HR

ASSUME 16,670 CARS DELAYED FOR 1 HR ⇒ 16,670 CAR-HR/DAY

(16,670 CAR-HR/DAY)(0.625 GAL/HR) = 10,419 GAL/DAY

OR 3.8×10^6 GAL/YR

WYO.-K.C. $\Rightarrow \left(\frac{3.8 \times 10^6 \text{ GAL}}{\text{YR}}\right)\left(\frac{1.5 \times 10^5 \text{ BTU}}{\text{GAL}}\right) = 5.7 \times 10^{11}$ BTU/YR

PART II

K.C. – TERMINALS $(0.50)(2.1 \times 10^6) = 1.05 \times 10^6$ CARS

12 MINUT.

$\left(\frac{1.05 \times 10^6}{24}\right) = 43{,}750$ CARS/HR = 43,750 CARS/HR $\times \frac{1}{5}$ HR

= 8750 CAR-HRS/DAY

(8750)(.625 GAL/HR) = 5470 GAL/DAY OR 2.0×10^6 GAL/YR

$\left(\frac{2.0 \times 10^6 \text{ GAL/YR}}{}\right)\left(\frac{1.5 \times 10^5 \text{ BTU}}{\text{GAL}}\right) = 3.0 \times 10^{11}$ BTU/YR

$\therefore 3.0 \times 10^{11} + 5.7 \times 10^{11} = 8.7 \times 10^{11}$ BTU/YR OR

$(8.7 \times 10^{11}$ BTU/YR$) / 37.4 \times 10^6$ MMTA = 23,265 BTU/TON DEBITED FROM R/R ALTERNATIVE

Table E-7, Page E-20 of the OEIS gives incorrect mileages. They are at variance with the data supplied in the technical report for the no-action alternative. For example, in the case of Jacobs Ranch to White Bluff, the round-trip distance by rail is declared at 2,730 miles through Orin in ICC Docket No. 36719, dated October 23, 1978 (Page 4). This gives a one-way mileage of 1,365 miles and agrees with Page 25 of the no-action alternative Technical Report, rather than the 1,137 miles used in Table E-7. If other mileages are corrected according to Table II-5 of the technical report on the no-action alternative, the net ton-miles would increase to 49,814 ton-miles. The energy consumption in the no-action (all-rail) alternative would therefore rise to 615,533 Btu/ton instead of 534,000 Btu/ton in Table E-7 or 570,000 on Page 2-2 in Table 2-1 and Page 5.

Page E-8, last line of the DEIS states, "The total Btu loss in cleaning one ton of coal is ----------416362 Btu/ton."

Comment: The cleaning plant "loses" coal in the cleaning process back to the mine (Volume 1, Page E8). This report assumes that the returned coal is "irretrievably lost". This assumption is not correct, because while the heat content of the returned coal is low, it is in no sense used up in the process. It is also returned to its point of origin and is still theoretically available at some later date.

Page E-23, Para. 2, "Excluding delays incurred at river locks, tow speed-----------."

Comment: There are no locks on the lower Mississippi.

RECREATION RESOURCE -- DEIS

Page 7, Para. 3 and Page 4-63, Para. 8 "Of particular concern for the proposed action would be temporary construction-related impacts due to crossing the proposed Walnut Creek Recreation Area in Kansas." And Page 4-63, Para. 8, "The slurry pipeline would traverse the proposed Walnut Creek Recreation Area...resulting in disruption to recreation use and the quality of user experience."

Comment: The ETSI pipeline will avoid this relatively small area. Delete this concern.

DEIS

Page 1-2 Need For Project. "At present, railroad transportation is the only option available to utilities using or planning to use western coal."

Comment: It has been suggested (Caltech, Dec. 11-12, 1980, Conference: "Trends in Transportation Regulation") that as a result of rail deregulation, railroads must earn their revenues in such areas, rather than placing higher rates on commodities which can be transported by other means and would lose the railroads that freight, "Captive freight" rates may rise considerably.

Page 1-12, Figure 1-3, and Page 1-13, Table 1-4 of the OEIS. Figure 1-3 indicates that in the last half of 1987 and the first quarter of 1988 there would be no ETSI construction work. In contradiction, Table 1-4 indicates that during the same time period, there would be 76, 33 and 40 workers respectively, required for preparation plant and dewatering plant work.

Comment: Figure 1-3 has an error. Extend the lines in Figure 1-3 for the preparation plants where construction is to take place at this time.

Page 3, Para. 5 of the OEIS shows that "no significant impacts are anticipated from the addition of about 243 permanent workers and their families to the affected Wyoming counties during operation phase of the project." However, in a different part of the book, the number 534 permanent construction operating jobs is given. There should be an explanation of this apparent conflict of over 100%: The figure of 243 is shown on Page 1-14, Table 1-5. It should be pointed out that three of those people involved in administration are already permanent employees and are permanently located in Wyoming. They are not new personnel. Table 1-32 confirms the number of 243 workers in the Western District. Page 2-10 shows the 534 permanent jobs for operation, including both construction and service. This seems to indicate that the 534 jobs are not just those jobs associated with the operation, but has a rather large factor applied to it to get to the total number of permanent jobs that might be caused directly and indirectly by the operation. Gillette, Newcastle, and Upton are well enough developed that there needn't be such a high increase in the infrastructure associated with the jobs.

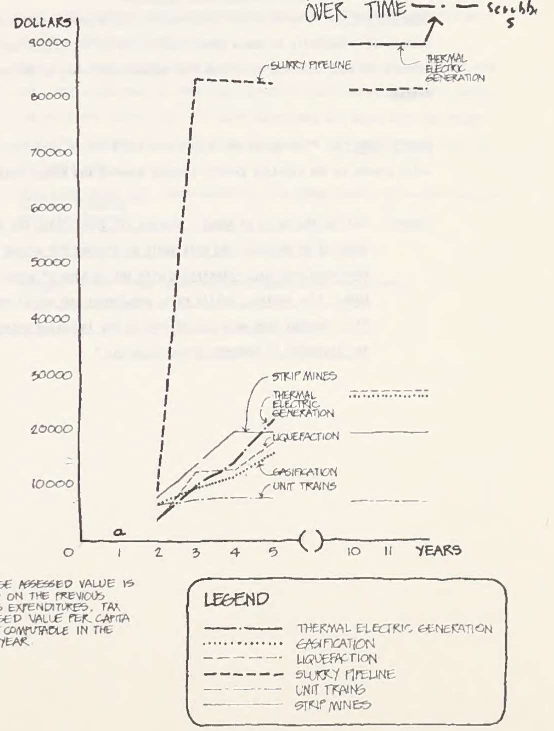
SOCIOECONOMIC IMPACTS -- OEIS

Page 3, Para. 7. "Pipeline systems contribute relatively less to the tax base than do other types of projects under the present Wyoming tax structure."

Comment: This is an erroneous statement. Change it to reflect the fact that ETSI will generate about $3.4 million of additional tax revenue per year for a pipeline 104 miles long, a tax fallout of around $35,000 per mile from the main slurry pipeline. In contrast, railroads, according to data provided by the UP representative to the Farm Bureau Transportation Committee, will produce about $1,500 per mile.

Add that "According to 'Coal Development Alternatives' prepared by OEPAO for the Wyoming State Legislature in December, 1974, other types of projects such as gasification, liquefaction and unit trains produce on the order of $10,000 to $25,000 assessed valuation per unit of population over time. By comparison, coal slurry pipelines and electrical generating plants will produce over $80,000 per unit of population. So pipelines contribute relatively more to the tax base than most other types of projects." Include attached chart showing this.

FIGURE VII - 4
ASSESSED VALUATION PER UNIT OF POPULATION OVER TIME



a. BECAUSE ASSESSED VALUE IS BASED ON THE PREVIOUS YEAR'S EXPENDITURES, TAX ASSESSED VALUE PER CAPITA IS NOT COMPUTABLE IN THE FIRST YEAR.

-83-

RECREATION RESOURCES -- DEIS

Page 7, Para. 7 "For all pipelines, the increase in project-related newcomers to the Gillette, Wyoming area...would cause an increase in local hunting activity, impairing the quality of the hunting experience."

Comment: Wyoming law requires a greatly increased hunting license fee for non-residents and a specific time period during which an application must be submitted. The attached table describes license fees and application deadlines. Residency takes one year to establish. Because non-residents are not usually hunters, because their license cost would be higher, and because few construction workers will be present during the mid-winter period when applications are due, it is projected few of them will interfere with Wyoming hunting. In addition, union leaders have provided data that leads to the expectation that the only in-migrant workers for the construction project will be 137 welders, who are expected to stay in Wyoming only briefly.

Page 4-63, Para. 3 "A major consequence of the proposed action would be an increase in hunting within Campbell County..."

Comment: Disagree with this and suggest that the word "major" be deleted with regard to consequence. ETSI feels that even if there were any increase in hunting, pressure would be minor for reasons listed in the above comments.

DEIS
Page 7, Para. 7
Page 4-63, Para. 3

TABLE 1

HUNTING AND FISHING LICENSE FEES AND DEADLINE DATA

LICENSE	FEE			DEADLINE DATA
	NON-RESIDENT		RESIDENT	
Elk	$ 250.	Plus registration fee $5	$ 25.00	Jan. 1 to Feb. 1
Deer	100	" "	15.00	Jan. 1 to Mar. 1
Antelope	100	" "	15.00	Jan. 1 to Mar. 1
Moose	300	" "	50.00	Jan. 1 to Mar. 15
Mtn. Goat	500	" "	50.00	Jan. 1 to Mar. 15
Mtn. Sheep	400	" "	50.00	Jan. 1 to Mar. 15
Turkey	30	" "	6.00	Jan. 1 to Mar. 15 Aug. 1 to Sep. 1
Bird	30	" "	6.00	
Fish	30		7.50	

SOCIOECONOMIC IMPACTS -- DEIS

Page 8, Para. 3. "The no-action alternative...could cause significant disruption, especially in towns where public service facilities such as schools and hospitals are separated from residential areas by railroad tracks."

Page 8, Para. 5. "The no-action alternative would add an estimated 20 daily trains to the existing traffic between Wyoming and Kansas City."

Comment: Add "On the basis of about 3 minutes for each train, for a total of 60 minutes, the area would be blocked for around an hour more each day, interfering with the passage of school buses, fire engines, police cars, ambulances and normal traffic. Perhaps even more significant is the increased potential for accidents at numerous grade crossings."

Page 2-11, Para. 5 of the DEIS states, "There would be no construction required for the all-rail alternatives."

This statement conflicts with the current effort of the C&NW and the UP to build a new rail connector line from Van Tassel, Wyoming to Joyce, Nebraska. The route of the line through agricultural land has generated opposition to the project even though it would help bring competition to the BNRR.

A typical news item is attached.

TORRINGTON TELEGRAM, Oct. 8, 1980

C&NW connector line approved

BY RITA PETERSON
Of the Telegram

TORRINGTON - One could almost hear the weariness and disappointment etching the minds of the landowners when they were called Tuesday night for their opinions about the Interstate Commerce Commission judge's approval of a railroad line they have vehemently opposed.

Although the weariness might have been due to the long days of farm work or cattle ranching, the source of disappointment was a long-awaited decision by ICC Administrstive Judge Richard Beddows.

Beddows opened the way for the Chicago and North Western Railroad to build a 56-mile line which would connect the coal-rich Powder River Basin with a Union Pacific line near Joyce, Neb.

The WyoBraska Landowners have been fighting the project because of the adverse environmental effects they clsim it would have on their agricultural land.

Landowners were uncertain about appealing the decision when contacted Tuesday night. Since the opinion was handed down just that sfternoon, they had not received copies and were unsure of the terms provided within the 50-page document.

WyoBraska president Carl Franklin simply said, "I wasn't surprised (about the decision)." He added that he could not comment much further because the only information he received was from a Union Pacific news release.

"It was UP that released the news release," he said. "And they haven't been terribly accurate in the past."

While their own uncertain sppeal hinges on legal counsel, the landowners expect Burlington Northern to challenge the decision. BN presently hauls the majority of coal from the Powder River Basin.

The entities have 20 days to appeal the judge's decision. Beddows also set a Nov. 13 date for a prehearing conference in Washington, D.C., to clarify any outstanding issues.

Although there is nothing definite, Don Musch, BN associate news director in St. Paul, Minn., said, "I suspect we will appeal it."

About the decision, Musch commented, "Of course, we don't like it. We don't believe the line should go through. It's a waste of taxpayer's money. The new line is not necessary. We believe it would just be to the advantage of the Union Pacific Railroad - the richest railroad in the country."

Musch added that BN has the capability to handle all of the coal transportation that is necessary from the mining area. Some 31 of BN's coal trains and 102 of their service locomotives are currently in storage, ready for use.

"There will be a larger damand for coal," Musch said. "And we'll be able to handle it."

In his decision, Beddows agreed that the demand for coal from the Powder River Basin would increase, reaching 80 million tons annually by 1982. However, he disagreed that BN would be able to handle the coal trsffic.

C&NW lawyer Chris Mills reflected the railroad's satisfied attitude. "We're quite pleased with it."

C&NW company officials have said the line is needed to haul coal out of the Powder River Basin and to provide competition to BN.

Saying the line was in the "public interest," Judge Beddows added Tuesday, "the present and future public convenience and necessity require and will be enhanced by the construction and operation" of the C&NW line.

Beddow's decision added: "It is also considered to be important to the nation to have reserved some cspacity to meet expected emergency or other change requirements because of the importance of Basin coal to so many public utilities in different sections of the country."

"It also is necessary that there be some slternative means of rail transportation should some unpredictable disaster affect either Burlington Northern or Chicago and North Western."

Beddows ordered that an agreement between C&NW and BN for joint ownership and operation of the line be modified.

"The agreement, if not modified, could have prohibited Chicago and North Western from participating in some of the traffic," Beddows said. He said the modifications he suggested will give both railroads "equal opportunity to compete for the traffic along the joint line."

Beddows did not specify what those modifications were.

The controversial line has brought comments from Sen. George McGovern, D-S.D., who indicated that he has no quarrel with the presence of a C&NW connector, but he opposed the loan arrangement which included $60 million already loaned to the C&NW by UP.

BN is concerned that the UP loan represents an attempt by UP to monopolize coal traffic.

C&NW must still receive approval of $300 million in loan guarantees from the Federal Railroad Administrstion before the line can be constructed.

The FRA must complete its version of an environmental impact statement before the loans can be approved.

Meanwhile, the appeals and the seeming defeat are stirring in the minds of landowners. Ed Middleswarth, Henry, Neb., WyoBraska Landowner said, "Everybody's saying we knew it would happen, but then we gave them a good fight anyway."

Page 3-25, Table 3-4 of the OEIS. This table lists Edgemont as using 2.5 cubic feet per second (cfs), with a projected production at the same rate.

Comment: The customary factor of 150 gallons per day per person is only one-sixth of the amount Edgemont is using now and projected to continue to use in the future. There is a possibility that because the 1,610 population of Edgemont and the 139 population of Provo (1980 Census data) have artesian wells, they are allowing water to be discharged in an uncontrolled and wasteful way. Any monitoring program should be assigned to consider conservation aspects of Edgemont water usage.

SOCIOECONOMIC IMPACTS -- OEIS

Page 4-19, Para. 13. "Secondary employment generated by the construction project would be about 600 workers at maximum."

Comment: Although the OEIS states that this is a "worst case condition", this section exaggerates the impacts on Gillette and Campbell Counties. Table 4-5 on Page 4-21 illustrates why the quoted sentence is misleading. In the fourth quarter of 1984, the table shows a peak employment of 1,015 workers for just that quarter. The previous quarter has only 732 workers, or 30% fewer, and the next quarter has only 91. It is difficult to conceive that an influx of workers over a three-month period will result in great numbers bringing in their children to impact the school system. In addition, the assessment of impact is also made on the assumption that all the workers will be newcomers, which ETSI feels is unlikely and is addressed in our comment in re Page 4-31.

Page 4-20, Table 4-5 Column 9, 4th Quarter of the OEIS, indicates 670 main pipeline construction workers.

Page 4-23, Para. 6, Housing, Line 7. Indicates 840 units for these 670 workers. But under Para. 4, "Non-local pipeline construction workers", line 2, the 1.3 x 670 factor gives 871 units which does not agree with the figure 840 units referred to on Page 4-23; and this is also inconsistent with the following item.

Page 4-25, Table 4-8. Under Main Pipeline (100%) Total, 921 units required.
Gillette Planning Area, 4th Quarter

Comment: These three items should be checked for consistency.

Page 4-24, Table 4-7
Gillette Planning
Area, 4th Quarter

This table in the OEIS shows a projected number of workers to be 1500. This does not agree with any of the previous numbers. 1500 is too high for main pipeline workers. 400 is a more realistic number for main line pipeline construction.

SOCIOECONOMIC IMPACTS -- OEIS

Pages 4-30, 4-31; Tables 4-10, 4-11. These tables on "Net Fiscal Impact of ETSI Project" and "Summary of Social and Economic Effects of Operation in Wyoming: Proposed Action" show figures based on an assumption all pipeline workers will be newcomers.

Comment: This is a worst case assumption. ETSI feels that it is imperative to assess in advance any impacts that might strain city, county or school district services, so mitigating measures can be taken. However, it should be pointed out that these are worst case figures, so as not to mislead. ETSI recommends that the Bureau in fact review its prime data source and recalculate the tables to show either a medium figure in place of the worst case or a minimum impact figure in addition to the worst case figures.

SOCIOECONOMIC IMPACTS -- OEIS

Page 4-31, Table 4-11 summarizes the social and economic impacts of operation in Wyoming. It indicates the amount of estimated ad valorem tax for the transversed counties.

Comment: Add Goshen County to the table. Map No. A-4 shows that ETSI's route cuts across the northeast corner of Goshen County for several miles. On the basis that the ad valorem tax in counties is calculated on the proportional distance of the main line in that county, Goshen County will receive a prorated share of the property taxes and should not be overlooked. This share will fall between $100,000 and $200,000 a year. Adjust Table 4-11 and the corresponding elements of the text to reflect this share.

Page 4-111, Para. 4.1.1 of the OEIS states that "train derailments.... are not considered (Boyce 1980)."

Does this mean that all impacts of derailments:

. Injuries
. Destroyed equipment
. Fuel to fix the derailment
. Replacement steel and fuel to make steel
. Evacuation of people

should not be considered because a railroad proponent said so? This is biased in favor of the No-Action Alternative.

ENVIRONMENTAL IMPACTS -- DEIS

Page 4-117, Para. 2. "Rail Accidents." This notes approximately 17 rail accidents attributable to the all-rail alternative would occur a year, and says "Overall, this increase is small and insignificant."

Comment: Change the word "accidents" to "fatalities." This is a significant loss of life, a nonrenewable resource. Change the last sentence to reflect this, so it reads, "Overall, this increase is a significant loss of life."

Appendix C, pp C-15 & 16 of DEIS

Part of the 3rd party beneficiary agreement is missing.

Comment: The missing part is attached.

4. Covenant of ETSI to Protect Beneficial Uses.

In the event ETSI's pumping from the Madison Formation causes interference with the pumping of any existing or preferred user, the State Engineer may on the basis of a valid complaint by any such user, hold a public hearing and investigate and determine whether and to what extent ETSI has caused interference with such user's pumping. If the State Engineer shall determine that any such complaint should be investigated, he shall first undertake any such investigation with his own staff. Should the State Engineer determine that such investigation requires independent consultants to assist in the investigation, the State Engineer shall notify ETSI in writing, and together the State Engineer and ETSI shall select consultants qualified to investigate the complaint. In the event the parties cannot agree on the consultants so to be engaged, the extent of the investigation or the reasonableness of the cost of said investigation, the issue shall be submitted to arbitration. In such event, the State Engineer and ETSI shall each appoint an arbitrator, and the two appointees shall select a third arbitrator. The three arbitrators shall decide whatever issues cannot be agreed to between the parties, and a decision by a majority of the arbitrators shall be conclusive and binding upon the parties. If either the State Engineer or ETSI refuses to appoint an arbitrator, or the two so appointed cannot agree on a third arbitrator,

SOCIOECONOMICS -- Technical Report

Page 4-9, Table 4-2 shows estimated population for various counties.

Comment: Adjust these figures to reflect data now available from the 1980 census.

SOCIOECONOMICS -- Technical Report

Page 4-11, Para. 6 states very few temporary measures are available to meet the minimum health standards.

Comment: This is not true in Wyoming. Without considering the temporary measures customary in Wyoming, any calculations of socioeconomic impacts will over-inflate the cost of municipal water and wastewater services. It is common for a mobile or other temporary unit to develop wells for drinking water and septic tanks for wastewater. These temporary measures do not impact on municipal utility systems.

SOCIOECONOMICS -- Technical Report

Page 4-12, Table 4-4 has a footnote indicating the source of information on Gillette housing is dated 1978.

Comment: The work may have been done in 1977, making it at least two and possibly three years old. During the past three years, dynamic changes have occurred in Gillette. Housing is considerably more abundant today, and this information should be updated to avoid exaggerating the impact of ETSI personnel. This change affects tables in the Appendix dealing with the net fiscal surplus/deficit.

SOCIOECONOMICS -- Technical Report

Page 4-14, Para. 2 states water quality from all three aquifers is hard, then gives the hardness of water from Fox Hills at 40 milligrams per liter.

Comment: The Fox Hills water, at 40 milligrams per liter, is soft, not hard. Change the text to reflect this.

Page 4-20, Table 4-5 Column 9, 4th Quarter of the DEIS, indicates 670 main pipeline construction workers.

Page 4-23, Para. 6, Housing, Line 7 indicates 840 units for these 670 workers. But under paragraph 4, "Non-local pipeline construction workers", line 2, the 1.3 x 670 factor gives 871 units which does not agree with the figure 840 units referred to on page 4-23; and this is inconsistent with the following item.

Page 4-25, Table 4-8 Gillette Planning Area, 4th Quarter Under Main Pipeline (100%) Total, 921 units required.

Comment: These three items should be checked for consistency.

SOCIOECONOMICS -- DEIS

Page 4-24, Table 4-7 Gillette Planning Area, 4th Quarter: This table shows a projected number of workers to be 1500. This does not agree with any of the previous numbers. 1500 is too high for main pipeline workers only. 400 would be a more realistic number for main line pipeline construction.

SOCIOECONOMICS -- Technical Report

Page 4-59, Para. 1. The DEIS observes that the water accounts of Gillette will face a considerable deficit. For example, by 1984 it will be $1.8 million and by 1990 it will reach $12.4 million. To help counter this deficit, the city will need to charge $15 per thousand gallons in the initial years, tapering off to $1.30 per thousand gallons later.

Comment: The reason for the deficit is the large capacity of the Gillette water system in relation to a few customers who will have to bear the cost among them in the early days of system operation. It should be noted that ETSI can help mitigate this economic impact on Gillette citizens by purchasing Gillette's surplus water. This would allow Gillette to sell considerable water to ETSI at a substantial price, reduce the rates to its residents, and more than overcome the deficit shown on Table A2-6 on Page A-15. In fact, if ETSI purchases only 4,000 acre feet a year from Gillette in 1990, the deficit could be completely eradicated at a cost to ETSI of about $28 per acre foot above the incremental operating costs. Adjust the text and table to show impact before and after ETSI's water purchase from Gillette.

Page 4-52, Para. 1 of the Socioeconomics Technical Report states another nine workers would be required at the Niobrara well field.

Comment: This contradicts Table 2-7, which shows eleven which consists of 9 technicians and operators and 2 supervisory personnel.

SOCIOECONOMICS -- Technical Report

Page 4-48, Para. 1. This indicates that the subsequent analysis is based on a "worst case condition."

Comment: This conflicts with information provided to ETSI by each union leader as shown in the attached table. The union figures also conflict with the statements on Page 4-15 that 100% of the construction workers would be non-local and even 100% of the operation workers would be non-local. The net consequence of this worst-case analysis is to grossly exaggerate the deficits shown in the Appendix. However, the total impact is still small. Also, once it is determined how much housing should be provided, ETSI will help with pre-impact community planning to take care of employees. ETSI recently became a member of the Gillette Chamber of Commerce to facilitate such consideration.

ESTIMATED NUMBER OF EMPLOYEES
AVAILABLE DURING CONSTRUCTION
BY JOB CLASSIFICATION

Classification	Est. No. Avail. (1984)[1]	Est. Peak Requirement	Est. Peak Quarter-Yr.	% From Local Work Force[1]
Preparation Plants and Pump Stations				
Electrician	260	131	2-'84	100
Pipefitter	350	102	2-'84	100
Ironworker	550	102	2-'84	100
Teamster	300	26	4-'83	100
Laborer	180+	59	2-'84	100
Sheet Metal Worker	30	10	4-'84	100
Millwright	81-77	38	2-'84	100
Boilermaker/Welders	121	20	2-'84	100
Cement Mason	6+	6	2-'83	100
Brick Mason	5+	5	2-'83	100
Operating Engineer	300	43	2-'84	100
Carpenter	117	59	3-'84	100
Painter	30	7	2-'83	100
Supervision and Administration	18	35	2-'83	50
Slurry and Water Pipelines				
Teamster	300	135	3-'83	100
Laborer	412+	412	3-'84	100
Operating Engineer	300	259	4-'83	100
Welder	45	182	4-'83	25
Supervision and Administration	36	72	2-'83	50
Well Field				
Superintendents		1	3-'82	100
Drillers		8	3-'82	100
Floormen		16	3-'82	100
Servicemen		8	3-'82	100
Roustabouts		8	3-'83	100

1 From Wyoming counties within local union jurisdiction

TABLE III

SUMMARY OF CRAFTSMEN AVAILABLE
FOR CONSTRUCTION IN 1981

CRAFT	WYO. LOCAL NO.	UNION REPRESENTATIVE	UNION JURISDICTION BY COUNTY	LOCAL MBRSHP. 1979	EST. MBRS. AVAIL. FOR ETSI IN 1981	ESTIMATED LOCAL MEMBERS RESIDENCE IN 1981
ELECTRICIAN	415	Harlin Watts 810 Fremont Cheyenne 82001 Ph 632-5944	Campbell, Crook, Goshen, Laramie, Niobrara, Weston	140	110	N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
	322	Ed Appleby #3 English Dr. Casper 82601 Ph 237-7824	Teton-Yellowstone, Big Horn, Johnson, Carbon, Converse, Fremont, Hot Springs, Lincoln, Natrona, Park, Sheridan, Sublette, Sweetwater	300	150	
PIPEFITTER	192	Dennis Goodwine 411 W. 5th Cheyenne 82001 Ph 634-5837	Albany, Carbon, Goshen, Platte, Laramie	350		N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
	193	Ed Schuman 642 East A Casper 82601 Ph 235-5252	Niobrara, Goshen, Campbell, Weston, Converse	278	350	
IRONWORKER	454	William Freese 344 N. Walsh Dr. Casper 82601 Ph 237-9556	All Wyoming, except Uinta, Lincoln, & part of Sweetwater	514 N. Wyo. 187	550	N. Wyoming ___ Gillette 50-70 Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___ Buffalo 35-40
TEAMSTERS	307	Johnny Spears & Lloyd Long Cheyenne 82001 Ph 634-4160	All Wyoming	836	300	N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___

Table III
Page 2

CRAFT	WYO. LOCAL NO.	UNION REPRESENTATIVE	UNION JURISDICTION BY COUNTY	LOCAL MBRSHP. 1979	EST. MBRS. AVAIL. FOR ETSI IN 1981	ESTIMATED LOCAL MEMBERS RESIDENCE IN 1981
TEAMSTERS (Cont.)		Jesse James Midwest Building Casper 82601 Ph 235-2141				
LABORER	1271	Leo Garcia 309 W. 18th St. Cheyenne 82001 Ph 632-1510	All Wyoming	1000	Total Required Plus	N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
SHEET METAL WORKER	207	Richard Peterson 413 W. 25th St. Cheyenne 82001 Ph 635-4547	Albany, Carbon, Platte, Goshen, Laramie	60	30	N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
	506	B. K. Clausen P.O. Box 2814 Casper 82602 Ph 237-9901	Big Horn, Campbell, Crook, Converse, Fremont, Hot Springs, Johnson, Lincoln, Sheridan, Natrona, Niobrara, Sweetwater, Park, Sublette, Washakie, Teton, Uinta, Weston			
MILLWRIGHT	2834	Ted C. Sanford P.O. Box 1000 Westminster, Colo. 80030 Ph (303) 417-3824	All Wyoming	480	81-77	N. Wyoming ___ Gillette 10-12 Newcastle 6 Midwest ___ Torrington ___ Wheatland 30 Wright ___ Lusk 2- Douglas 4- Glenrock & Casper 2
BOILERMAKER	101	Jack Harkness 1540 Emerson St. Denver, Colo. Ph (303) 832-1651	Albany, Big Horn, Campbell, Converse, Crook, Goshen, Hot Springs, Johnson, Laramie, Natrona, Niobrara, Park, Platte, Sheridan, Weston, Washakie	400, Field Const.; 90, Apprent.	120	N. Wyoming ___ Gillette 100 Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___

Table III
Page 3

CRAFT	WYO. LOCAL NO.	UNION REPRESENTATIVE	UNION JURISDICTION BY COUNTY	LOCAL MBRSHP. 1979	EST. MBRS. AVAIL. FOR ETSI IN 1981	ESTIMATED LOCAL MEMBERS RESIDENCE IN 1981
MASON	2999	Richard Gonzales 309½ W. 18th St. Cheyenne 82001 Ph 634-5401	All Wyoming	120	Total Required Plus	N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
OPERATING ENGINEER	400	Joe Ramirez, Jr. 218 W. 9th St. Casper 82601 Ph 265-1397	Wyoming and Montana	5000	300	N. Wyoming ___ Gillette ___ Newcastle ___ Midwest ___ Torrington ___ Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
CARPENTER	1564	Ken Brown & John Fiedor 642 East A Casper 82601 Ph 237-3039	North half of Wyoming	500	105	N. Wyoming ___ Gillette 100 Newcastle 4-5 Midwest ___ Torrington 10-12 Wheatland ___ Wright ___ Lusk ___ Douglas ___ Glenrock ___ Casper ___
	469	Gaylord Allen 413 W. 20th Cheyenne 82001 Ph 632-3250	Albany, Carbon, Goshen, Laramie, Platte	420	10-12	

SOCIOECONOMICS -- Technical Report

Page 4-62, Table 4-22, "Net Fiscal Impact of ETSI Project."

Comment: Indicate that the numbers given refer to thousands of dollars. Also change the number $495,000 shown for 1984 in the Gillette General Fund Account to $498,000, as indicated in Table A2-11.

The final number $6.5 million, given as the magnitude of the fiscal impact for the period 1984 to 1990, is extremely high. This total is based on several worst-case assumptions of the numbers of incoming construction workers, incoming service workers, sizes of their families and lengths of stays. However, even taking this worst-case possibility, the total negative impact of $6.5 million loses importance against such figures as the $57 million annual surplus expected for the Campbell County School District by 1990.

SOCIOECONOMICS -- Technical Report

Page 4-111, 4.1 "No-Action Alternative." "The no-action alternative... would have impacts only on socioeconomic conditions and air quality (noise)...No major impacts on other resources...have been identified, primarily because no new rights-of-way would be required for the no-action alternative."

Comment: This is only partly true at best. Testimony given by railroad representatives at the Hays, Kansas hearing indicates that rails have a surplus capacity of one million tons/mo -- far short of the 37.4 million tons per year for the project. Currently, in the areas of Lusk and Torrington, Wyoming, a railroad line from the area of Van Tassel, Wyoming, running to Joyce, Nebraska, is proposed by the C & NW. This line would cut across prime agricultural land; interfere with farmer and rancher operations; affect migration routes for antelope and stock; and, in some cases, cut stock off from its water supply. Background to this is recorded in the DEIS on the Eastern Powder River Coal Basin of Wyoming. Adjust the quoted section to reflect possible effects of this new right-of-way which will use eminent domain.

In addition, change the statement about no impacts on other resources. Impacts will be experienced on wildlife, agriculture, visual resources, recreation and air quality for the new line above. Dust churned up by trains affects air quality. It contributes to dust pneumonia as it falls on foliage eaten by livestock and wildlife.* Some disturbance of the immediate ecology, as well as some loss of production, may result from the periodic application of herbicides necessary for railroads to maintain their rights-of-way.

* See Page 3, Item 7, Attached

EXPORT OPTIONS FOR WYOMING COAL

Basis

The following comparisons are between the two major methods of exporting coal—railroads and coal slurry pipelines. Railroads will probably carry the bulk of the coal, but certain railroad-induced problems can be relieved to the extent that slurry pipelines are also used. The references in parenthesis below refer to the volume and page of the Final Environmental Impact Statement for the Eastern Powder River Coal Basin of October, 1974.

Resources

1. Slurry lines require less steel than railroads. Over the 30-year life of comparable projects, this slurry line would require 453,000 tons compared to the railroad requirement of 795,000 tons—a 75% savings for slurry pipelines. ***Senate Hearing, 1974***

2. Pipeline energy will use electricity derived from American coal; railroad energy consumes diesel fuel derived from declining petroleum reserves or imported petroleum. By 1990, 41,200,000 gallons of diesel will be consumed annually for the Gillette to Douglas rail system. (II-181)

3. A 25-million ton/year slurry line will require an average of 15,000 acre-feet of water a year; railroad requirements are normally minor even if water consumption for range fires, pesticides, and weed control is ignored. The Wyoming Legislature and State Engineer have jurisdiction over the use of water for slurry pipelines and have approved an average of 15,000 acre-feet/year for one pipeline. Extensive well drilling and testing, legal protections to Wyoming, and economic impact on Wyoming were carefully considered before this permission was granted. **Enrolled Act No. 10, Senate, 1974 Legislature and State Engineer Permits of September, 1974**

4. The slurry preparation plant in Wyoming will require 100 acres. Each of the two pump stations will require 50 acres—a total of 200 acres. Railroads cause a permanent loss of 2,950 acres (454 animal unit months-AUMs) for the Gillette to Douglas line. (II-159)

5. There are no emissions from pipelines. Emissions from round-trip operation of unit trains, excluding coal dust, are compared with emissions from a hypothetical single power plant supplying all power requirements for the slurry line, including grinding and cleaning to remove pyrites and 15%-20% of the ash.

	TONS/YEAR		
	Rail		Pipeline
Emission (II-40)	Gillette to Wyoming	Wyoming to Arkansas	Wyoming to Arkansas
Sulfur dioxide	1,153	10,385	3,300
Carbon monoxide	2,557	23,727	Nil
Hydrocarbons	1,918	17,128	0
Nitrogen oxides	7,550	57,510	3,200
Aldehydes	113	1,009	0
Organic acids	143	1,277	0
Particulates	508	4,536	4,700

6. Coal slurry lines require only an easement. The surface is reclaimed and returned to the owner for its original use. There are no fences or roads along the right-of-way. Railroads must maintain the surface using weed poisons for fire control. (II-44)

7. Slurry lines will follow the natural contours of the terrain and are buried. Railroads must alter the grades and, hence, interrupt natural irrigation of small drainages resulting in loss of productive land surface in addition to the land requirement. (II-115)

8. The buried pipeline is immune to weather variations. The tracks east of Lusk, Wyoming were snowed in for several days last winter. If unit trains had been operating at the 1990 projection on this line, the power plants using the coal would have been short over one million tons of coal. ***Lusk Herald, 4/3/75***

9. There is no noise from slurry pipelines. Noise at pump stations and preparation plants is controlled and/or contained. Noise from railroads will range from 80 decibels for freight cars to 98 for locomotives—both measured at 50 feet from the vehicle. (II-41)

10. Right-of-way over slurry pipelines is returned to its original condition. Right-of-way along the railroads is usually controlled by chemicals for noxious weed control. The Burlington Northern procedure is to use two to four pounds/acre of the amine form of 2, 4 dichlorophenoxyacetic acid for broadleaf weeds and six to nine pounds of the acid in di-or tri- form for woody plants or brush species. (II-44)

11. Pipelines produce no dust. Train emissions and coal dust created by loading facilities will cause long-term impact on air quality. (II-87)

12. The buried pipeline will have no significant effect on game; the railroad is estimated to cause a reduction of 75 antelope from the base population and 10 to 20 deer due to lost habitat. Other losses are expected annually due to impact accidents. (II-155)

—3—

Safety

1. Slurry pipelines are buried. They do not cause impact accidents. The National Transportation Safety Board (NTSB) summarized human fatalities for petroleum pipelines and railroads for the years 1963-1968 as:

Pipeline	42
Railroad	14,489 (10,696 due to freight operation)

Furthermore, slurry is neither explosive nor combustible. Hence, fatalities will be even less for coal slurry pipelines. **NTSB-STS-71-4**

2. No estimate has been made of the potential sheep, cattle, or game fatalities. (II-161) But in Idaho, one-half of a 300-herd of antelope was wiped out by one train. **Wyoming State Tribune, 2/20/76**

3. The slurry pipeline is buried. There is no impediment to normal movement of stock and game; but railroads will transect the prairie land. (I-8)

4. Buried coal pipelines cause no fires; railroad operation is expected to couse 10 to 50 fires per year and burn up 200 to 3,000 acres per year. (II-69)

5. Slurry pipelines are buried; railroad traffic is on the surface. The Gillette to Douglas rail line will have approximately 19 grade crossings plus five grade separations. The capacity coal traffic of 46 trains per day over 19 grade crossings offers a potential of 874 crossing hazards per day or 319,010 per year. (II-25)

6. Slurry lines are immune to derailments. But derailments are common on western railroads as shown by many pictures from area newspapers. ***Rocket Miner, 3/11/76; Casper Star Tribune, 3/29/76, 3/2/76; Lusk Herald, 4/24/76; Edgemont Herald Tribune, 6/2/74; etc.***

7. Dust from railroad operations settles on the grass and is consumed by cottle causing them to contract a respiratory disease known as dust pneumonia. The buried pipeline does not have this problem. ***Dean Prosser, WSGA, 7/27/76, Cheyenne Tribune-Eagle.***

Socio-economic

1. The slurry pipeline will require about 76 employees to move 25 million tons of coal per year. Railroads will require 396 to move 96 million tons per year by 1990. (II-123)

2. By 1990, an estimated total population increase of 2,700 people is expected as a direct result of the railroad construction and operation in the Eastern Powder River Coal Basin. (II-85) The pipeline will require about 470.

—4—

3. Annual income for the 268 railroad employees in 1980 is nearly $3,900,000 a year. (II-124) The slurry pipeline payroll is estimated to be $1,400,000 for 76 employees. On this basis, the latter will have 23% more income per capita to vitalize the local economy.

4. A buried pipeline does not interfere with a community's surface activities. Increasing railroad traffic will cut communities in two. This causes an additional economic burden in communities for duplicate health and safety facilities, like ambulance service and fire stations. Alternatively, the communities might have to install overpasses or underpasses at their own expense. **Lusk Herald, 3/18/76**

5. Emergency access is needed by railroad crews across ranchers' land in the case of derailments or snow-blocked trains. This can cause problems to the ranchers' fences and land. These problems are avoided by the underground pipeline. **Dean Prosser, WSGA, 7/27/76 Cheyenne Tribune-Eagle.**

Economic

1. The slurry pipeline will generate an ad valorem tax of $2,300,000 to $2,400,000 per year, spread over five counties; the railroad will generate $60,000 per year in Campbell County and $98,000 in Converse County. (II-128)

2. Slurry pipeline investment in Wyoming is estimated as $204,000,000; the investment for the proj Gillette to Douglas railroad line is estimated at $36,000,000. (II-26)

For further information contact:

Energy Transportation Systems, Inc.
212 Petroleum Bldg., 111 W. 2d St.
Casper, Wyoming 82601
(307) 265-1800

May 29, ' 76

SOCIOECONOMICS -- Technical Report

Page 5-28, Para. 1 The Pryor dewatering plant is scheduled ... starting in the fourth quarter of 1986 (not 1984).

Line 5. Plant capacity would be increased to 3.0 MMTA ... Third quarter of 1987 (not 1986).

Page 5-30, Line 1-3 ..."and spread II would construct the pipeline segments west of the Pryor site during the fourth quarter of 1984." Should read 1983.

SOCIOECONOMICS -- Technical Report

Page 5-30, Para. 2 What does "Tulsa SMSA" stand for?

SOCIOECONOMICS TECHNICAL REPORT

Page 5-32, Para. 1 States 335 of the 670 workers would be non-local. States 435 is total transient, non-local. Where did the extra 100 workers come from?

SOCIOECONOMICS TECHNICAL REPORT

Page 5-34, Housing & Public Services First two paragraphs are repeats from Page 5-32.

SOCIOECONOMICS TECHNICAL REPORT

Page 5-46, Para. 4 and 5 States "Pipeline spreads II and III..." Says that half the workers would be from local and half would be non-local.

Housing - States that "Most of the construction workers would be hired out of union halls in Tulsa..." Contradicts previous statement that says half would be local.

SOCIOECONOMICS TECHNICAL REPORT

Page 5-84, Para. 4, Lines 3-5 Statement refers to "(Figure SE-1)". Should this read "Table"? Table SE-1 does not relate to the subject being addressed, such as construction manpower. This should read Table SE-3.

SOCIOECONOMICS -- Technical Report

Page A-11, Para. 2. "However, if the preparation plants are valued separately, then the assessed value accruing to Campbell County would be substantially higher (procedure B, Table A2-3). This procedure would be more equitable, given the concentration of facilities and impacts in Campbell County."

Comment: Delete the above. The comment is totally speculative and has no relevance to the EIS. There is no evidence to indicate that the Wyoming Department of Taxation and Revenue would make such a fundamental change in its policy.

SOCIOECONOMICS -- Technical Report

Page A-17, Last Para. "ETSI also could work with housing developers in the area, and use its financial resources to guarantee the timely production of quality, affordable housing, consistent with the planning efforts of the city."

Comment: Adjust this statement to reflect ETSI's expressed willingness to work with housing developers to develop proper housing or other appropriate mitigating measures. ETSI would further prefer to see quality housing developed within city limits so that the City of Gillette would maximize tax benefits from the total construction program.

Add to P 4-121 of DEIS:

Measure: In order to provide timely housing consistent with Gillette City planning efforts, ETSI will work with developers within the city limits to help with the pre-impact community planning to properly house employees.

Effectiveness: Would reduce housing shortage and would maximize tax bene'its in Gillette.

SOCIOECONOMICS -- Technical Report

Page A-24, Last Para. "The net fiscal impact of the ETSI project on the school district is negative (Table A2-15). The district relies almost exclusively on property taxes, and the assessed value of the ETSI project per student associated with the project is less than most other projects (which have comparable numbers of students but much higher assessed values)."

Comment: This conflicts with the chart from the DEPAD 1974 report, "Coal Development Alternatives," attached. The chart shows that for ETSI, assessed valuation per unit of population ranks far superior to other projects that might be in the area, and approximately equal to power plants. It is also based on the obviously incorrect assumption that 100% of the workers would come from out of state.

ETSI suggests that instead of considering the coal mines from the basis of both ad valorem taxes and severance taxes, it would be more to the point to compare them with coal slurry pipelines only on the basis of ad valorem taxes. It must be remembered that the ETSI project will also help to deliver coal at a fraction of the cost of any other coal transportation method, keeping coal competitive with other fuels and helping to protect the coal industry.

Table A3-4 on Page A-33 of the Socioeconomics Technical Report has the word Newcastle inserted in four places in the left-hand column where they should have introduced the word Lusk. In addition, in the left-hand column under households, the words Niobrara and Lusk have been omitted as line labels.

NO-ACTION ALTERNATIVE -- Technical Document

Page 5, Section I.3 "Rail-Related Accidents". "Rail accidents attributable to the all-rail alternative are approximately 17 per year. At any one crossing, the rate is less than one accident every 10 years. Over all, this increase is small and insignificant."

Comment: This statement is inappropriate! No death is "small and insignificant".

Also, secondary fatalities associated with unit-train traffic, not directly caused at grade crossings or by collisions, are not assessed; that is, when a fire engine, ambulance, medical rescue unit, police car, etc., are prevented from getting from their side of the track to the emergency site due to the unit-train passing the crossing.

NO-ACTION ALTERNATIVE -- Technical Document

Page 9, Para. 2, Last Sentence "Schedules for all aspects of train operation - train loading, volume transported, time of mine departure, plant arrival time - would be predetermined."

Comment: This is incorrect. Rail schedules are, at best, approximations. Schedules from affected mines are subject to change due to weather and derailments. This can be verified by mine operators.

NO-ACTION ALTERNATIVE -- Technical Document

Pages 55-59 These pages discuss a oredictive model on rail accident rates, but fail to relate it to the routes in the OEIS. A more accurate assessment of loss of human life could be made by displaying a table of estimates calculated by the different procedures.

WATER -- DEIS

Page 4-17, Para. 3 of the DEIS, which deals with the combined pumping from Niobrara and Gillette, indicates a reduction in the base flow of Sand Creek by 2 cfs, Spearfish Creek by 1 cfs, and the Crow Creek Springs of 1 cfs.

Comment: Suggest referencing Sec. 4-A-6, at the end of the third paragraph, to read: "Impacts to the aquatic biota of these streams as a result of stream flow reduction is discussed in Section 4-A-6."

AQUATIC BIOLOGY -- DEIS

Page 4-52, Para. 4 "The most available refuge for aquatic biota would be Angostura Reservoir, which would become severely overcrowded," referring to the drying of the Cheyenne River.

Comment: Delete this concern. The biota of the stream is distinct from the biota of the reservoir. As the DEIS notes, no long-term biological damage would occur to life in the Cheyenne River system, because it has evolved to sustain aquatic life under extreme drought conditions.

DEWATERING PLANT -- DEIS

Page 4-55, Para. 2 "It is anticipated that general construction activity associated with the proposed dewatering facilities would contribute considerably to the suspended solids concentrations of the water bodies identified in Sec. 3.A.5."

Comment: Change the paragraph to reflect that no quantifiable information is available and that in all cases construction techniques will be used to contain sediment contributions during rainstorms as specified on pages C-1 and C-2, Appendix C, under "General Construction, Operation, and Reclamation Procedures".

AQUATIC BIOLOGY -- DEIS

Page 4-58, Para 2 "In wide rivers where construction would last for several weeks and would precisely coincide with initial migration periods, spawning could be limited to unaffected downstream areas."

Comment: Suggest deleting this concern. In no case would construction block the river flow, and migrating fish would not be deterred by construction activities. Paragraph starts out noting that spawning could be limited to unaffected downstream area and then proceeds to tell the reader this is an unlikely impact as migrating fish would use unaffected transect areas as migrating corridors.

AQUATIC BIOLOGY -- DEIS

Page 4-58, Para. 5 "ETSI has proposed to use biochemicals, primarily herbicides, for the maintenance of the pipeline right-of-way and pump stations."

Comment: ETSI does not plan to use herbicides on the right-of-way proper. In fact, ETSI has indicated it will monitor the success and maintain revegetation programs along the right-of-way.

RECREATION RESOURCE -- DEIS

Page 4-63, Para. 5 Referring to the last sentence in this paragraph and possible adverse effects on recreation values of the inventoried rivers segments.

Comment: ETSI would be willing to add a mitigating measure of replanting native vegetation in order to reduce bank erosion and improve asthetics (P 4-120). Reference memo to W. A. Hale from W. B. Harris, subject H.C.R.S. interagency consultation to avoid or mitigate adverse effects on rivers in nationwide inventory.

Measure: Reduce bank erosion and improve asthetics of bank zones disturbed by stream and river crossings by re-planting native vegetation.

Effectiveness: These actions would eliminate the disturbance of banks that might otherwise constitute more than temporary adverse impacts on streams and rivers.

Page 4-88, Para. 3 of the DEIS refers to Appendix G-5 as the reference for emissions from a coal-fired dewatering boiler.

Comment: Reference should be G-17.

ENVIRONMENTAL IMPACTS -- DEIS

Page 4-111, Section 4.1, "No-Action Alternative," limits effects of this alternative to socioeconomic effects and noise.

Comments: With a 29% increase in rail traffic, the movement of livestock and big game across railroads would experience significant impacts. Recommend this impact and comments on wildlife, agriculture, and aquatic life be discussed in more depth.

NO-ACTION ALTERNATIVE -- DEIS

Page 6, Para. 5 "No significant impacts on wildlife would be expected from the no-action alternative."

Page 4-111, Para. 6 "No major impacts on other resources... Thus no discussion is presented for...wildlife..for the no-action alternative."

Comment: Recommend changing these statements to show impacts on wildlife resulting from a predicted 29% increase in rail traffic in Wyoming and Nebraska. These impacts will include increased game/rail traffic collisions, negative effects on big game migrations, increased probability of range fires and higher noise levels that could limit wildlife habitat. Increased big game/rail traffic collisions will be accompanied by corresponding rises in game Mortality. According to Dr. Harry Harju, a biologist with the Wyoming Game and Fish Department, the migrations of game such as deer and antelope would be affected. Both the probable increase in range fires and in noise levels, which could rise to the equivalent of 65 decibels, would limit wildlife habitat beyond the immediate right-of-way.

Two years ago a major herd of antelope was destroyed near Medicine Bow, Wyoming by a Union Pacific train. The antelope had bedded down on the tracks. A picture is attached (credit LuRay Parker, Wyoming Game and Fish files, Cheyenne, Wyoming).

141

WYOMING CHAPTER
SIERRA CLUB

Secretary, Box 376, Kaycee, Wyoming 82639

Bureau of Land Management

My comments on the Draft Environmental Impact Statement regarding Energy Transport System, Inc.'s coal slurry pipeline proposal are submitted on January 7, 1981 rather than January 6, 1981 per the understanding of Pamela A. Matthews.

Thank you for your cooperation.

Respectfully submitted,

Mark Gordon

Mark Gordon

"Not blind opposition to progress, but opposition to blind progress."

WYOMING CHAPTER
SIERRA CLUB

Secretary, Box 376, Kaycee, Wyoming 82639

Thasa commanta on tha Enargy Transportation System, Incompany's (ETSI) proposad coal slurry pipeline ara submittad on bahalf of the Wyoming Chaptar of the Sierra Club. I have divided tha comments into two sections: tha first pointing out the deficiencies of tha Draft Environmantal Impact Statemant (DEIS), and tha sacond - and parhaps more important - section reviaws the merits of an inflexibla coal transportation system that duplicatas an existing railroad's function using more enargy than trains do.[1] Wheraver necessary, I have footnoted spacific refarences which ara cited in the back of this paper. I hava submitted thaae comments with the beat intentions of furthering our country as an economic and military power, whila still presarving our heritage of fraedom and liberty, and with a solid respect for the American free enterpriae system.

PART I The Draft EIS and its problems.

If ona looks at the DEIS and the ETSI projact, while ignoring the more problematic questions of need, one discovers that both statements leave many questions unanswered - and some possibla arrors. Thase holes need to be filled before the project can be properly evaluated.

Parhaps the most conspicuous weaknessas are found in the discussion of the Madison Formation's ability to sustain the withdrawals of water ETSI proposes without affacting the watar quality or quantity appreciably. The accuracy of the DEIS's data base is thrown into doubt with the comment: "Conclusive assessments of tha impacts to the Madison Formation can be made only when tha effects of large-scale, long-term withdrawal are carefully observed and documented."[2] This comment implies that all of the research efforts have culminated in an educatad guess without definitely knowing what will happen with ETSI, nor will the public befora it is too late.

"Not blind opposition to progress, but opposition to blind progress."

(2)

From both the DEIS and the accompanying technical report (Woodward-Clyde Consultants "Well-Field Hydrology"), one can discern that very little is known about the patterns of flow in the Madison Aquifer, or the inter-formation transmissivity - especially from sub-strata.[3] This lack of information discredits the mapped effects of the proposed drawdowns. Tha towns of Edgemont and Provo, South Dakota may axperience drawdowns even greater than those surmized by tha research team. Even more important would be the effects that greater or even different drawdowns could have on wells and streams throughout the Wyoming, South Dakota, and Montana areas underlain by the Madison formation. Wyoming law specifies that if the ETSI project dries up any wells currently in use, ETSI must compensate or desist from pumping.[4] Since the possibility exists for some wells to dry up as a result of ETSI pumping, why hasn't ETSI offered alternative ways of meetings the stipulations of the Wyoming law? Because ETSI may be required to compensate for the loss of Madison Formation water with surface water (if drilling deeper is unsuccessful), shouldn't ETSI explain where that additional water would come from, and what might be involved in developing it? How can anyone assess the possible consequences of this project if the data base is questionable and no contingency plan is visible?

Similar problems of an insufficient data base and a lack of contingency strategies found in the discussion of quantity of water, recharge and intar-formation transmissivity are problems also found in the discussion about watar quality and the effects the ETSI project might have on the concentrations of minerals in the Madison and Minnelusa formations. The discussion of the water quality in both of these formations is important because thay appear to be linked.[5] Still, the existing discussions do serve a purpose. As sufficient as they are, we do know the present concentration of minerals in the Madison water - more or less. However, the discussion of how ETSI might change the quality of the ground water is a mere 73 words on page 4-17 of the DEIS.[6] There is no detailed account of what might happen except that Total Dissolved Solids (TDS) concentrations would increase. Such a discussion is meaningless if it does not describe what water quality changes might occur. For the more detailed discussion of this problem, one would be referred to the tachnical report on Well Field Hydrology. In that document,

(3)

63 words are devoted to the Niobrara County well field, and 6D words to the Niobrara and Gillette Well Field alternative.[7] No comprehensive mention is made of the necessity of these projections or why the expacted "cones of depression" would have a negligible effect on the migration of heavy matals or radioactive substances toward those cones of depression. The reader of the DEIS can only assume that the research on water quality in this document is no better than the discussion on tha volumes of water in the Madison and Minnelusa aquifers.

On page 3-21 of the DEIS, a provocative paragraph stands out from its surroundings.

> Relatively high concentrations of uranium, radium 226, and strontium 9D are found in some Madison aquifer ground water. Ground water from an ETSI test well (38N-61W-35) in Niobrara County had a radium 226 concentration of 8 picocuries par liter (pCi/l) when sampled in September 1978. This concetration exceeds the Environmental Protection Agency (EPA) mandatory drinking water criterion for radium 226 of cpCi/l. Radium 226 levels in Madison ground water at the towns of Phillip and Midland, South Dakota, have been measured as 1DD and 15 pCi/l, respectively (Wilson 1979). The high concentrations of uranium and uranium decay products that are found in Madison ground water are probably related to the uranium mineralization that occurs in the Inyan Kara Group in the 8lack Hills region. The origin of the uranium is not known, but Gott and others (1972) suggested that the uranium reached tha Inyan Kara Group by upward migration from deeper strata. Regardless of the mechanism of origin, the data availabla imply only that locally, relatively high concentrations of radioactive elements are found in Madison ground water. 8

The statement in the technical report is identical.[9] Some interesting facts arise from this paragraph. First, radioactive elements are present in Madison aquifer water. Second, ETSI turned up uranium decay products in one of its test wells not far from the proposed Niobrara County well field, and that the concentrations exceedad EPA standards. Third, that the uranium prasent in the Inya Kara Group migrated there from deeper strata, which means possibly either the Minnalusa or the Madison could be the source or that they might be affected by the same migration. Nothing more is said in either the DEIS or the technical report about the existence of radioactive minerals. Nothing is really specifically stated why this information is not important enough to include

(4)

in any further discussion, or how its existence in Madison slurry water might affect fish and wildlife, or drinking water in the event of a spill, or methods of treatment at the dewatering plants. The statement remains unexplained. It must be resolved. Uranium and its decay products like radium and strontium 90 are potent carcinogens that concentrate in food chains, and which may, subsequently, pose a threat to human health in areas impacted by untreated effluent.[10] Furthermore, recent research at Laurence Livermore Laboratory suggests that smaller doses of radiation may be more deleterious than larger doses because a cell exposed to a smaller dose is only affected by the radiation causing it to become cancerous, where a larger dose would kill the cell, thereby, eliminating the danger of cancer.[11] The discussion of radioactivity in the aquifer formations should be more complete, and it should include a discussion of the characteristics of the strata surrounding them. Mention should be made of any tell-tale sign for radioactive elements such as the existence of carbonacious materials in the cuttings. There should be some discussion included in the Final Impact Statement about how the ETSI projects might affect the migration of those "locally high concentrations of radioactivity."

Why isn't there any discussion of the use of local water the pump stations outside of Wyoming? It appears that local water would be used for many of the attendant ponds to compensate for evaporation.[12] The use of that water may have significant impact on existing water uses; for example, if a system were shut down, and the pipe needed to be flushed to remove a blockage. Depending on the nature of the clog, it might be necessary to use large volumes of locally extracted water to backwash the pipe. The effects from such an operation should be studied. In fact, the whole discussion of water supply for the 20 or so pump stations outside of Wyoming should be cleared up.

Little is said about water discharge. Although the suggestion that water should be released into existing flows in volumes and at rates which do not disrupt the existing flows is laudable and correct, the DEIS's treatment of the subject is inadequate due to the limited discussion of the treatment of the water.[13] The culminating remark that the "discharged water would have to meet state water quality standards and National Pollutant Discharge Elimination System permit standards set by the Enviornmental Protection Agency (EPA)

(5)

is insufficient mainly because it does not apply to the proposed action.[14] The question should be the treatment of water at the power plants. If chemical precipitation is part of the process of dewatering the coal, how would those chemicals be treated, what whould they be?[15] These important questions require answers before the project can be properly evaluated from an environmental standpoint. Even though there are remarks about coal characteristics, slurry water characteristics, and coal slurry interaction as simulated in lab experiments, there is a need to look at how the effluent would be treated. Little is said about the corrosive effects of coal slurry water on the pipeline, or on the cooling water system of the receiving power plants, or of how coal slurry water can scale cooling systems.[16] Effluent water in some forms can cause serious environmental problems of their own, e.g., chlorination of slurry water might react with Humic of Fulvic acids present in the discharger water creating haloforms which are known to be powerful carcinogens.[17] Furthermore, there should be a discussion of how radioactivity would be handled in the event that it became present in the slurry water. Although ETSI perhaps didn't need to acquire its state and federal permits before the BLM prepared its EIS, a discussion of the possible treatments and their effect on the discharge water would be meaningful. Without having these relevant permits, or at least the information, in hand before the DEIS was prepared, ETSI has obfuscated the efficient expedition of the public aspects of the project by not allowing the process to be reviewed at a federal level in one step.

In light of the mention of "Prime Agricultural Farmland if irrigated," there is a need for discussion of the most beneficial use of Madison and Minnalusa aquifer water so the public may accurately judge the merits of comparative uses of the water. This matter could be important if, as seems likely in Wyoming and Kansas, ETSI will have to appear before the Public Service Commissions (PSCs) of some states for permission to operate based on beneficial use to the public criterion. If this is the case, the EIS should outline the additional permits required.

I am confused from where ETSI hopes to obtain additional water if Wyoming

(6)

has given them access to only 20,000 acre feet a year (and in the case of the State Engineer's agreement, only 15,000 acre feet per year averaged over a thirty year period).[18] ETSI seems to require between 300 and 1,300 acre feet more than Wyoming has offered, because DEIS was prepared assuming between 20,000 and 20,800 feet per year over a 50 year project life.[19] This discrepancy needs to be rectified or at least clarified before the project goes into operation.

In the final discussion of water, what kind of a statement is "A detailed spill contingency plan for the pipeline would be prepared prior to initiating pipeline operations?"[20] Moreover, the mention of how the most major Black Mesa Pipeline spill cleaned itself up is ludicrous![21] Very few ETSI spill scenarios compare with that spill. It is absolutely imperative that a contingency plan be formulated and subjected to public scrutiny prior to the issuance of the Final Statement. Then, the public can judge how effectively ETSI would handle a spill situation. Furthermore, I am absolutely amazed that I could find no discussion of wetland spills in either the DEIS or the accompanying technical report on "Ruptures and Spills." (WWC) The fact that no scenario explored that possible event became egregious with respect to the comment that:

> A coal slurry spill in a wetland area could result in the destruction or permanent alteration of the wetland. Because of the scarcity of the wetland habitat in some regions such a loss would be considered long-term and significant. 22

Considering the fact that some of the wetlands which might be traversed are Whooping Crane habitat, and considering the abundance of wetlands traversed in Arkansas and Louisiana which could be habitat for the American Alligator and the Florida Panther, the lack of a plan to deal with spills is a major shortcoming.[23] Failure to formulate a contingency plan that can be reviewed by the public would be irresponsible.

Very little discussion is given to the construction of the pipeline on steep slopes, and the environmental impacts of terracing, such as erosion.[24] Terracing might also affect drainages. The DEIS should address this problem.

The comment on page 1-2 of the DEIS suggesting that a pipeline

(7)

would be desirable from the point of view of national security because it offers a number of transportation alternatives is nonsense.[25] Coal slurry pipelines are inherently inflexible and vulnerable systems. The ETSI pipeline will originate in the Powder River Basin and flow to nine power plants in Oklahoma, Arkansas and Louisiana. The pipeline does not serve any other markets and, therefore, is as vulnerable as those nine powerplants are. On the other hand, railroads can service any number of markets ipso facto of its routing diversity. Furthermore, the pipeline is limited to its point of origin. In a nuclear age where potential adversaries have weapons we are told, with "yields" up to 350 times the power of the Hiroshima or Nagasaki bombs, the Powder River Basin could be easily rendered uninhabitable. Continuing, the Powder River Basin is slated for development of synthetic fuels and other energy enterprises, tripling its desirability as a target for enemy nuclear warheads. Consequently, the ETSI pipeline could be rendered useless. The railroads, however, would be more able to deliver coal from other regions to those same power plants. Without even analyzing the integral weaknesses of the slurry line itself, railroads contribute more to the overall resiliency of the power generating grid than do slurry pipelines. A railroad is more difficult to disrupt for a significant period of time because the network offers more routing flexibility. Slurry pipelines, in contrast, are dependent on 20 or so pumping stations any two of which, if knocked out, would result in a system shutdown that could last for an indefinite period of time.[26] Since slurry pipelines offer only an alternative method of transporting coal from one region of closely located mines to another region of closely located power plants and are vulnerable, they offer no advantages to national security.[27] The comment found on page 1-2 should be altered to conclude that railroads are better for national security because of their versatility than are slurry pipelines.

PART II The Need for the Project

In this section, I address the issue set forth on page 8 of the DEIS: "Is an additional mode of transportation for coal desirable?"[28] I will look at this question by first examining the demand trends for electricity and how they respond to price: the economic theory of price "elasticity" of demand. I will look at why low electric rates may not be a good idea. Next, I will look at demand trends nationally, and in Arkansas (which can be taken as a model for the Middle South Utilities System, of which it is part). Then, I will look at the flexibility of the railroads and how they are better suited to meeting fluctuations in demand. I will examine some new technologies and how they may affect the energy picture in terms of alternative supplies to consumers, power plant burner efficiency improvements, and railroad transportation changes. The comparisons of energy efficiency, employment effects and resource commitments between railroad and slurry pipeline use will be reviewed. Finally, I will try to debunk some slurry pipeline myths. Some of this last discussion may not be entirely germane to the DEIS, but it is important to the overall picture and the discussion will be useful in explaining why the ETSI project has come far enough.

Since 1973, strange things have happened to energy demand in the United State. What seemed, up until that time, to be a forgotten rule of economics reemerged forcefully and quickly, too quickly for some major utility companies to grasp. The rule is a simple one, stating that as the price of a good or a service increases, the demand for it decreases. Thus, when the price of beef went up, fewer people could afford it, so they bought other food items which were less expensive. Still, the energy business seemed different.

For many years energy was extremely inexpensive. The public took advantage of cheap energy. They started driving their own cars rather than taking public transportation. Others installed electric stoves and furnaces in their houses. Unfortunately, in retrospect, the low price of energy encouraged consumption for convenience sake, increasing the demand for greater generating capacity. Eventually, the demand exceeded our own domestic resources of oil, and we became dependent on the Oil Producing Export Countries (OPEC). OPEC raised

the price of energy and created artificial shortages of oil which drove prices up rapidly. Simultaneously, inflation affected the cost of constructing new power plants. Our rapid and excessive use of oil drained out less expensive retrievable sources of oil. The result was energy became an expensive good mainly because it was so expensive to produce. But, then, what the utility companies had not expected , happened: as the price of energy went up, consumers searched for more economical ways of using energy and other less expensive sources of energy. As a result, energy demand has dropped off dramatically during the past few years. Nowhere is this more evident than in the electric utility sector, where it appears that many executives still do not grasp the meaning of economics, or the ability of the consumer to alter his habits energy consumption habits. Consequently, many utilities are in embarrassing financial situations due to over capacity. Some have had to cancel new power plants they had foreseen as necessary. Virginia Electrical Power Company (VEPCO) has just cancelled its North Ana III nuclear facility for this very reason.[29] And why not?: 72% of our incremental energy supply was derived from more efficient use of energy.[30] And last year, 1979, 97% of our country's economic growth was fueled by energy savings![31] The countries in the European Comman Market have done better than that, outpacing us in energy efficiency since 1972.[32] Conservation is our fastest growing energy component.[33] The American consumer has chosen weatherstripping, more insulation, and sometimes a renewable energy, or some other less expensive energy supply such as natural gas over a higher electrical bill. He has chosen a more efficient Japanese economy car over an American Petro-Pig as Amory Lovins calls them. The principles of economics apply to energy as much as they do to meat and cars.

As energy, especially energy from oil, became more expensive, many electric utility companies began to look at coal as a domestic resource for fuel. Because utility companies in the Middle South System such as Arkansas Power and Light had only considered the supply angle of energy, they thought first of increasing the capacity of their grid (in this case, the grid is the Middle South Utility Grid).[34] Arkansas Power & Light planned two powerplants serviced by the ETSI project proposal: White Plains and Independence.[35] In this effort, however, they underestimated the intelligence of the consumer who had already begun to take steps for himself. He had begun to conserve, which

did not mean freezing in the dark, it meant weather stripping, and more insulation, maybe less powerful but still adequate and comfortable lighting. Startling things happened for the first time in recent history; the demand for electricity fell off. In 1979, growth in Arkansas dropped 4.5%.[35½]

There are those who firmly believe that productivity as measured by the Gross National Product (GNP) and energy are inseparable and mutually dependent. One such individual is Mr. Floyd Lewis, Chairman of the Board of Middle South Utilities, who sees a "remarkable correlation" between GNP and energy consumption.[36] Moreover, he warns that if "advocates" of slow or no economic growth" are allowed to disrupt the development of energy then the whole American economic system "may grind to a halt."[37] He has evidently not looked at the case of Japan, where they use half the energy we do with a GNP only a few points behind ours.[38] Nor is he aware of the Office of Technology Assessment (OTA) study - "The Direct Use of Coal" - in which the following statement is found, "recent economic and energy data imply that energy and GNP have been largely decoupled and a substantially different ratio will be established."[39] Mr. Lewis' failure to accept these new findings, and MSU's continued building are reflected in MSU's standing near the bottom of the nation's utilities coverage of its cash coverages of the dividends.[40] Luckily, Arkansas Power and Light has revised its demand forecasts from 5.47% growth a year to 3% while the actual figures may be even lower.[41] However, this revision may come too late. Consumers may be unwilling to pay for the construction of the two new power plants at White Plains and Independence, and the utilities may be forced to cancel construction of the plants. This is even more likely since so many utilities have ample reserve capacity to cover demand well into the next decade assuming optimistic demand forecasts of 5% or more.[42] Arkansas has a 30% reserve margin.[43] Demand for electricity has dropped off suggesting the demand for coal should drop further decreasing the need for an additional transportation network. Progress may further accentuate this downward trend of demand for electricity generated at large centralized facilities.

Many new technologies have entered the energy picture. The use of new burner technologies will affect the electricity and coal consumption patterns of

the new decade. Increased burner efficiency at the White Plains and Independence power plants may lower their coal requirements. Further, because so many large utilities have overcapacity, AP&L may be better off fiscally if they purchase electricity from the Tennessee Valley Authority (TVA), for example, rather than trying to generate their own. Moreover, there may be a trend towards smaller electric generation plants.[44] This latter item is not unrealistic because there are diseconomies of scale in very large power plants, and because a smaller plant will enjoy the advantages of mass manufacturing.[45] In addition, smaller plants are better suited to take advantage of new concepts in energy distribution, such as co-generation, or the collection of heat otherwise wasted in the generation of electricity and its redistribution as a good in district heating schemes or some other method of supplying heat directly to a consumer.[45a] If these smaller power plants were to use fluidized beds as a burner technology, they could be located in cities, without affecting the quality of the air significantly while using local coal. In Arkansas this local resource would be lignite, which is a poor quality coal not particularly suited for conventional burner uses.[46] In an area like Arkansas, where the coal is poor quality, fluidized beds are essntial because they are so efficient. I will examine this new technology in greater detail below, but nevertheless, the influence of this and similar technological improvements will affect the use of coal. The impact of alternative forms of energy will be felt incrementally throughout the next half century as more people begin to utilize renewable energies like the sun, wind and water movement. Four things will affect energy use in the coming two decades: 1. As the price of electricity generated at large centralized facilities increases, demand for it will drop. 2. As the price of energy increases, people will use energy more efficiently. 3. There will be a trend toward smaller scale, locally owned power plants that will make use of the waste heat and 4. Renewable energies will emerge incrementally being more cost effective in the long run. These four trends will directly affect the rate of consumption of coal dramatically. Therefore, it is important to support a coal transportation network that is both flexible and reliable. Railroads offer both of these feature; slurry pipelines do not.

(12)

I assumed that the ETSI slurry line has a optimum operating volume that is relatively rigid having found no discussion of minimum or maximum flow requirements in any of the related project documents. Because there are no cost figures that I could find, I could not determine the limitations of the pipeline, or how the pipeline compared with the railroads in cost-efficiency. When I spoke with ETSI, they mentioned they were hoping to deliver coal to the power plants for approximately $11/ton which confirmed suspicions I had about the project.[47] ETSI, and indeed, slurry pipelines, in general, seem only barely competitive with railroads.[48] In fact, a degree of competition might render the slurry line uneconomical.[49] And what would happen if two power plants on the ETSI supply route defaulted on their contracts? How would that affect the economies of the pipeline? Would ETSI have to pump the same quantity of coal through the lines to other power plants in order to keep the project competitive? I would like to see more discussion of the comparative costs of ETSI and the railroads.

Construction of the ETSI slurry pipeline will lock the utilities into receiving a set volume of coal which they must burn for electricity. The demand for electricity is dropping. These two factors oppose each other and threaten the financial security of the utility companies. [50] Such a situation has happened before. [51] Thus, railroads offer the better alternative because they are able to adapt to changes in coal demand on shorter notice and because they offer a degree of choice to receiving utilities should they decide to postpone or cancel power plants. Further, trains could adapt the delivery of their coal to a variety of smaller plants, without much difficulty.

Railroads fare better than slurry pipelines do in four major areas addressed by the DEIS. They are: 1. railroads are more energy efficiant,[52] 2. they employ more people over longer periods of time without creating "boomtown" pressures,[53] 3. fewer precious resources such as ground water are required for the rail alternative,[54] and 4. the railroads are in place and therefore will not incur any additional environmental impact.[55] After all the noise I had heard touting the energy efficieny of slurry pipelines, I

(13)

was amazed to see that railroads were still more efficient. Even the DEIS admitted that, even though its findings appear to be slightly optimistic when compared with EPA findings at the Black Mesa Slurry line. The EPA suggested that the pipeline was only 74.4% energy efficiant, a fact which contradicts the DEIS assertion that ETSI's slurry pipeline could be up to 96.05% efficient.[56] This discrepancy in figures leads me to believe that the project team did not properly evaluate the "coal quality loss" which in the EPA report accounted for 22.7% of the loss in energy efficiency.[57] If the DEIS computations have underestimated this factor, as I suspect, and if the figures for energy efficiency are near 75% efficiant, then the ETSI project would be a mistake. It would be a mistake because it would require one coal mine for every three transported. This waste cannot be tolerated in a society confronted with an energy shortage. The other concerns addressed above are equally important, and they support the use of the railroads. There may be only two potential drawbacks to the all rail alternative: 1. that the railroads may not be able to increase their rolling stock in time to handle the projected demands of growth in the elctric generation business. However, the Office of Technology Assessment found that in most cases, the lead time required to add more rolling stock to a railroad was shorter than the time required for a new power plants. This would appear to be the case for ETSI in the DEIS.[58] Secondly, additional railroad utilization will impact communities. Generally, these impacts are both beneficial and disruptive.[59] However, the problems, such as grade crossings, are being addressed by both the railroads and the impacted communities.[60] These groups are working to mitigate the more egregious problems.

The next few years will witness many changes in the forms of supply and uses of energy. Consumers will turn to solar, wind and water power. They will conserve more. The trend toward smaller community owner electrical generation facilities will probably spread. This trend is already occurring in New England where communities are expressing interest in revitalizing dormant turbines to augment some of their energy needs.[61] Consumers will switch from expensive electricity to cheaper, and locally more abundant forms of energy. e.g., Louisiana consumers may use more of their abundant natural

(14)

gas. Coal will probably become the "transition fuel" because America is blessed with an abundant supply. The emphasis on coal will be on the end technologies. The accent on efficient use. Hopefully, more use of coal will not predicate massive climatic change, although if such a change occurs, it is doubtful that we will be able to do anything about it. One of the most fascinating new technologies involving coal is the "fluidized bed." It is a simple and versatile device that will burn essentially any fuel with remarkable heat transfer characteristics.[62] A fluidized bed consists of a mass of red hot limestone particles kept in suspension by the constant flow of air through the mass. Smaller volumes of fuel are injected into this mass.[63] The whole bed resembles a boiling liquid, but because of the constant agitations, more surface area of the fuel particle is exposed to rapid oxidation resulting in fuel which is burned more complete and efficiently.[64] An added advantage, that the chemical properties of the limestone react with the burning coal, prevents sulfur and other elements from entering the atmosphere.[65] This technology is ready to be implemented by power plants and would allow smaller facilities to use local resources of coal such as the lignite in Arkansas.[66] Europeans have recognized the value of this technology and have used fluidized beds on ships for years.[67] The Chinese thought that if you could design a fluidized bed that could roll around in high seas, then you could surely design such a system for railroad locomotives.[68] According to Freemont Wheeler, one of this country's leading fluidized bed manufacturers, the Chinese have done just that and they are using lignite coal.[69] The technology is not remote, knowledge of its existence is in this country and it appears that railroads such as Burlington Northern will start looking into its development for the transportation sector in the coming decade.[70] Railroads are not dependent on the use of deisel fuel, as suggested in the DEIS. In fact, they ran for years on coal.[71] There is no reason why they could not revitalize the use of coal for locomotives. Railroads are particularly well adapted to reintroduce new or old kinds of locomotives because of the turnover they experience with rolling stock. Reinitiation of coal fired locomotive could be a gradual and incremental process with a minimum amount of disruption. Since the nature of energy supply and end use will change dramatically over the next several decades, it

(15)

is important to have a flexible supply system, not a rigid one such as the coal slurry lines.

Many myths pervade any discussion of the desirebility of coal slurry pipelines. Some suggest that competitive transportation systems are good for the consumer and for the country. Others say that by building pipelines now, Wyoming can avoid massive mine mouth facilities that will destroy the clean air and water while having a deleterious effect on wildlife, human health and quality of life. Still others advance specious arguments for national security we debunked above. But will ETSI really compete with the railroads? Probably not because ETSI could enter into contractual agreements with the nine power plants.[72] Those contracts would eliminate competition. The railroads would have to look elsewhere for markets. More importantly, the issue of competitive transportation systems is a vacuous one because the real competition is between additional electric capacity at $1.40 and up and conservation at low cost or no cost. I have already illustrated how the consumer is choosing between the two. But what about mine mouth developments? They seem to fall into three categories. 1. Those at the other end of the ETSI pipelines, who considering the financial condition of the Middle South Utilities, could not afford to build in Wyoming.[73] 2. Those utilities with local consumers, who would not build at the other end of the line to supply Wyoming, and who have justified the construction of new plants partially on the expectation that the ETSI pipeline will be built.[74] 3. Synthetic fuel industries who have already made plans to locate in the Powder River Basin.[75] They will not locate elsewhere because they do not need to. Reviewing all of this, one can determine that what is slated to occur in the Powder River Basin will occur despite ETSI. In fact, what ETSI will accomplish will be accelerated coal growth in the Powder River Basin - exactly what it is not supposed to do. The myths that surround slurry pipelines are spurious; the project its own worst enemy.

In contrast, railroads have many attendant benefits: the construction of a rail network that may become increasingly crucial to a reemergent passenger train service, maintanance of a rail system capable of delivering a variety of goods to a variety of markets, and the possibility of cultural exhibits being transported to smaller communities by "museum trains."[76] Railroads will play a more vital role in the future of the nation and Wyoming than they have in the past.

PART III   Conclusions

In reviewing the DEIS, I noticed that there were major deficiencies which need to be cleared up before the project can be properly evaluated from the standpoint of the document. An example of a gap that needs explanation is the lack of a spills and ruptures policy.

Nonetheless, one can surmise from the DEIS that the whole Energy Transportation System, Incompany's coal slurry pipeline project is a white elephant. It is not needed. If the only pertinent impacts associated with increased rail traffic are socioeconomic, ones that the impacted towns and railroads are already striving to mitigate, and if railroads can meet the requirements of increased volumes of coal transportation without committing precious resources like water to limited ends such as pipelines to utility power plants, then there seems to be absolutely no reason to construct the ETSI slurry line. Since there may be no need to transport coal from Wyoming to the Middle South Utilities anyway, it seems ridiculous to build an additional coal transportation system (see page 8 of the DEIS for "Issues to be resolved"). At the end of careful review of the ETSI project, the Wyoming Chapter of the Sierra Club has no choice but to judge the slurry pipeline a redundant transportation system. Therefore, we consider the project unnecessary, and we support the No Action Alternative.

Respectfully Submitted,

Mark Gordon

Mark Gordon

Footnotes

1. Bureau of Land Management, Environmental Impact Statement, Energy Transportation System, Incompany, (Bureau of Land Management, Denver) November 1980, pages 5,8
2. ibid., page 2
3. ibid., page 3-10; Woodward-Clyde Consultants, Well-Field Hydrology, Technical Report, (Bureau of Land Management, Denver) November 1980, pages 3-11 through 3-18
4. ETSI EIS, pages C-8, C-16 through C-18, C-32
5. ibid., pages 3-10, 4-4
6. ibid., page 4-17
7. WWC, Well-Field Hydrology, page 5-11, 5-19
8. ETSI EIS, page 3-21
9. WWC, Well-Field Hydrology, pages 3-35, 3-38
10. Dr. Helen Caldicott, Nuclear Madness, (Autumn Press, Massachusetts) 1978 pages 26 Through 35
11. Dr. Peter Joseph's remarks at the Feathered Pipe Ranch in September 1980.
12. Woodward-Clyde Consultants, Project Description, Technical Report, (Bureau of Land Management, Denver) November 1980, pages 1-6, 1-94, 1-95
13. ETSI EIS, page 1-21; Project Description, pages 1-95, 1-82
14. ibid., page 2-6
15. ibid., page 1-21; Project Description, page 1-95
16. Howard S. Peavy, "Water Pollution Potential of Coal Slurry Pipelines," (Xeroxed copy) page 3
17. ibid., page 9
18. ETSI EIS, pages C-7, C-15, C-30; WWC, Project Description, pages 1-6, 1-7
19. ETSI EIS, pages 1, 1-48
20. ibid., page 1-22
21. Woodward-Clyde Consultants, Ruptures and Spills, Technical Report, (Bureau of Land Management, Denver) November 1980, pages 3,4

22. ETSI EIS, page 4-42
23. ibid., pages 3-55, 3-56, 3-57, 3-58
24. ibid., page C-3; WWC, Project Description, page 1-14
25. ETSI EIS, page 1-2
26. WWC, Project Description, pages 1-14, 1-95, 1-96, ETSI EIS,
27. Office of Technology Assessment, Coal Slurry Pipelines, Summary, (OTA, Washington, D.C.) September 1980, pages 11, 12
28. ETSI EIS, page 8
29. Jane Seaberry, "Vepco Halts Nuclear Plant, Seeks to Bill Users," The Washington Post, November 26, 1980, pages 1, 6
30. Amory Lovins and Hunter Sheldon Lovins, "Good News About Energy," New Age, October 1980, pages 31, 32
31. ibid.
32. ibid.
33. ibid.
34. Basil L. Copeland, Jr., J. Mark Davis, Ed Lowther, Walter W. Nixon, III, James Strangways, and Scott C. Trotter, "A Corpoate Haze That Spells Trouble For Arkansas," The Arkansas Gazette, August 31, 1980, Section E,
35. ibid.

35½. Personal handout from the files of the Arkansas Department of Energy, " Arkansas Power & Light Company meeting with Arkansas Department of Energy." Table "Arkansas Power & Light Company Demand Forcast (MW)" for 1979 "actual."

36. "A Corporate Haze That Spells Trouble For Arkansas"
37. ibid.
38. Remarks of David Harrison, Jr. at the "Environmental Conference of the Decade" in Estes Park, Colorado, April 10-13, 1980
39. Office of Technology Assessment, The Direct Use of Coal, (OTA, Washington, D.C.) page 34
40. " A Corporate Haze That Spells Trouble For Arkansas"

(3)

41. ibid.

42. ibid.

43. Conversation with Walter W. Nixon, III, deputy director of policy for the Arkansas Department of Energy.

44. The Oirect Use of Coal, pages 42 through 44

45. Remarks of Amory B. Lovins at the Feathered Pipe Ranch, Helena Montana, September 1980

45a. Amory 8. Lovins, Soft Energy Paths, (Harper and Row, New York) 1977, pages 04-35

46 Bureau of Land Management, Final Environmental Statement: Federal Coal Management Program, (Bureau of Land Management, Washington, O.C.) April 1979, pages 4-12 through 4-17

47. Conversation with the Energy Transportation System, Incompany office personel, December 16, 1980.

48. Energy and Environment branch, Office of Policy and Analysis, Interstate Commerce Commission, Western Coal Investigation -- Guidelines for Railroad Rate Structures, Ex Parte No. 347 (ICC, Washington, D.C.) October 1979, pages 4-41, 4-42, 5-5, 5-35, C-5.

49. ibid.

50. " A Corporate Haze that Spells Trouble for Arkansas"

51. ibid.

52. ETSI EIS, pages 5, 2-1 through 2-4

53. ibid., pages 4-111, 4-117

54. ibid., page 4-111

55. ibid.

56. U.S. Environmental Protection Agency, Environmental Assessment of Coal Transportation, Interagency Energy/ Environment Research and Development Report, (EPA, Springfield, Virginia) 1978, page 53

57. ibid.

58. Coal Slurry Pipelines, page 15

59. ETSI EIS page 4-111

(4)

60. ETSI EIS, pages 4-111, 4-117

61. Personal experience in the town of Middlebury, Vermont where the town has been talking about using a long dormant turbine already in place on the Middlebury River.

62. Soft Energy Paths, page 48

63. ibid., pages 46, 47, 48

64. ibid., page 48

65. ibid., page 47

66. The Direct Use of Coal, pages 102, 103, 104

67. Conversation with Amory Lovins, December 14, 1980

68. ibid., December 15, 1980

69. Covesation with the fluidized bed manufacturer Freemont Wheeler in New Jersey, December 15, 1980.

70. Conversation withAllen 8oyce of Burlington Northern Railroad, December 17, 1980. Also with Freemont Wheeler on December 15, 1980.

71. Look at any old Western movie.

72. Coal Slurry Pipelines, page 8.

73. "A Corporate Haze That Spells Trouble for Arkansas"

74. Tri-State Generation and Tranmission Association, Inc, "Demand Forcasts," 1980, page 17

75. Thorne Ecological Institute, "Vail Synfuels Conference," proceedings, October 1979, page 9

76. Christopher Swan, "Light Rail -- How to Make it Work," CoEvolution Quarterly, Apring 1980, page 55.

163

FALL RIVER FEEDLOTS, INC.

COMMERCIAL CATTLE FEEDERS

Box 892 Hot Springs, South Dakota 57747 605/745-4109

January 5, 1981

Richard E. Traylor
Office of Special Projects
3rd Floor East
555 Zang St.
Oenver, Colo. 80228

Dear Sir:

Enclosed please find the detailed history of our wells. We would like this included with the written testimony that was presented at the December 16, hearing (in Edgemont, SD) regarding the ETSI Pipeline.

It is easy to see that by this record, the formations without a doubt, communicate, and the water we are currently pumping has the qualities of Madison Aquifer water.

If I can funish you with any additional information, or can further explain the attached, please do not hesitate to contact me. We feel the drawdown of the Makison aquifer will, without a doubt, draw other quifer levels down, and therefore adversely affect the entire area.

Thank you,

DeVries

D. J. OeVries
Office Manager
Fall River Feedlots, Inc.

DJD/ps

"To help you realize a greater return on your cattle investment."

Fall River Feedlots, Inc.

December

Data on WSW #1, as of this date.

Date Installed	Static Level	Pump Setting	GPM	HP	Level Pumping	Temp.
9-7-73	482	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12-[illegible]-73	492	[illegible]	[illegible]	30	631	[illegible]
2-28-74	503	[illegible]	124	30	660	[illegible]
4-10-74	538	902	128	40	710	92
12-16-74	540	902	126	40	712	92
6-7-76	571	902	114	40	747	94
8-24-76	574	902	103	40	753	96
5-21-77	591	916	128	40	767	96
2-28-78	606	942	128	40	778	96
7-5-78	646	968	124	50	792	97
10-11-78	670	968	132	50	804	99
3-5-79	677	968	136	50	809	101

As pumping level dropped in wells, temperature rose and a much higher sulphuric condition is now present.

Data on WSW #2, as of this date.

Date Installed	Static Level	Pump Setting	GPM	HP	Level Pumping	Temp.
T.D. 1965'						
Casing 7" - 0 - 1960						
Perforations: 1748 - 1778						
1814 - 1844						
1922 - 1952						
3-6-73	491	762	134	30	568	87
11-19-73	494	762	130	30	574	87
4-6-74	506	762	127	30	616	88
4-8-75	514	896	141	40	771	91
10-6-75	540	896	141	40	791	91
3- -76	565	946	137	40	814	93
12- -76	592	946	110	40	833	94
6- - 77	621	946	118	40	865	94
4 - -78	667	946	120	40	897	96
12 - -78	778	997	125	40	897	96
1- -79	777	996	126	40	903	96
2- -80	778	1010	128	40	907	96

166

"NOTHING WASTED"

DENVER RECYCLING CO.

January 5, 1981

Mr. Richard E. Traylor
E.T.S.I. - E.I.S. Project Leader
Bureau of Land Managemnet
Office of Special Projects
555 Zang Street
Lehigh Building
Lakewood, Colorado 80215

Dear Mr. Traylor;

I would certainly like to voice my objection to any confirmation of the use of slurry pipelines to transport coal. Until such a time that the net effect and impact of such pipelines can be reviewed as they pertain to agriculture, livestock and to existing uses of the water from those acquifiers or rivers which the water for the pipelines is intended to come from.

To the present, most of the information I have read regarding water usage and estimated usage seems confused to say the least. I hope you will give this matter your most serious consideration and attention.

Sincerely,

Kenneth J. Heller
President

KJH/fk

5350 NORTH WASHINGTON STREET / DENVER, COLORADO 80216 / PHONE (303) 825-3702

170

CAMBRIA FOREST INDUSTRIES, INC.
P. O. Box 490 • Newcastle, Wyoming 82701 • (307) 746-4497
MANUFACTURERS OF KILN DRIED PONDEROSA PINE

Peter Field
President

January 5, 1981

Richard Traylor, Special Projects Staff
Bureau of Land Management
3rd Floor East, 555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor,

I am opposed to permitting ETSI to withdraw their requested 20,000 acre feet of water from the Madison formatinn for use in their proposed coal slurry pipe line. My reasons for being opposed are thus:

1. The scinece of underground water formation are extremely vague, we do not know the cnnsequences of removing this vast amount of water continuously. Even though, ETSI "promises" to cease pumping should municipalities, now drawing from the Madison, run dry, this process could be dragged through the court system for years. In the final analysis, the decision of the court would have to be made, assuming water is withdrawn from the Madison, is it politically more important for, let's say Little Rock , Arkansas, to have lights, or Newcastle, Wyoming to have drinking water.

2. I have no opposition to a slurry pipe line, per say, if water can be brought in from the Missouri River or from a parallel pipe line with a source outside of Wyoming.

3. The fate of the Ogallala Aquifer should teach us a lesson, that an aquifer is not endless and in time will run out. The economic consequences of the drying un of an aquifer are horrifying.

CAMBRIA FOREST INDUSTRIES, INC.
P. O. Box 490 • Newcastle, Wyoming 82701 • (307) 746-4497
MANUFACTURERS OF KILN DRIED PONDEROSA PINE

Peter Field
President

4. Why must the present users of Madison formation water be asked to make economic sacrifices solely for the benefit of the promoters of the ETSI pipe line.

Again, I am petitioning to deny the bid of the ETSI slurry pipe line to withdraw from the underground Madison formation.

Yours truly,

Peter Field

179

January 5, 1981

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, CO 80228

Dear Mr. Traylor,

This letter comprises the comments of the Black Hills Energy Coalition on the Draft Environmental Impact Statement (DEIS) for the proposed Energy Transportation Systems, Inc. (ETSI) coal slurry pipeline. The Black Hills Energy Coalition is a grassroots group of homemakers, ranchers, teachers, office workers, retired persons, professionals, laborers and farmers. Our several hundred members were responsible for initiating the Uranium Choice Initiative, which gained 49% of the vote in the largest electoral turnout in the nation in November of 1979. Our group works to educate the public toward practical energy alternatives which will not deplete nonrenewable resources. For this reason, we have long taken a position against building of a coal slurry pipeline, because of the need of South Dakotans for water. Our study of the DEIS has greatly strengthened our opinion that such a project would result in incalculable damage to South Dakota.

In this semi-arid region, we are seeing the rapid encroachment of big companies and big government, working together to extract energy necessary so that the more populous parts of the nation need not cut their extravagant energy consumption. Here on the plains, we have long been aware of the temporary nature of fossil fuels , and we have conserved them, as well as conserving our most precious resource--water.

It would be possible to remove every once of gold, coal, uranium and other minerals from the entire Great Plains; life could still exist here. But if our water is taken--as the coal slurry pipeline would surely take it--the foundation of our existence here is gone. If the great agricultural center of the United States is without water, the rest of the country will soon be sitting amid its electric toothbrushes, high-powered cars and snowmobiles, toasty warm in its poorly-insulated houses--without any food on the table.

To mine water in excess of its recharge, for the purpose of conveying coal to a region with excess water, MUST NOT HAPPEN.

ETSI's promise to compensate in water for our loss is ridiculous. The DEIS makes clear that no one knows how great the loss may be. The same quantity and quality of water may be unobtainable, at any price, if the Madison is depleted to the extent threatened. Every major stream and spring in the Black Hills will be depleted, according to the DEIS; how does ETSI propose to restore their flow?

These results will occur from only this pipeline; the DEIS hints that it may be only the first of several. Surely, if one is approved, precedent will exist for others.

How will the state of South Dakota or individual landowners marshal the evidence necessary to prive that ETSI is responsible for the water loss--and how much time might that process take, while cattle are sold for lack of water for them? How can the state's tourism industry exist with dry creeks instead of scenic beauty?

Besides the aforementioned, there are numerous specific major problems in the DEIS that must be addressed before any further steps toward the pipeline are taken. For example, the statement passes very lightly over the effects of the pipeline on South Dakota water. This DEIS should be scrapped, and further extensive studies done on the effects to South Dakota specifically. South Dakotans need a longer time to study and comment on the statement, and expert testimony that already exists (such as Dr. Perry Rahn's statement "Effect of the Proposed ETSI Coal Slurry Pipeline on Water Resources in Wyoming, South Dakota and Nebraska," Proceedings of the South Dakota Academy of Science, 1979) should be reconsidered and included in the next DEIS. The comment period given has simply not been adequate for obtaining the DEIS, reading it, and commenting. For example, p. 4-17 mentions the testing of the pipeline with millions of gallons of surface water, which would be discharged, with possible flooding, back into the source from which it came, carrying grease, oil and other debris. This is thoroughly unacceptable to the owners of water rights along the pipeline route.

The statement passes lightly over the West River aqueduct as a possible alternative; this pipeline would not be a panacea. While it may be better than depletion of underground water, it is not necessarily beneficial to South Dakotans, or acceptable to them. Small communities, which the DEIS says would benefit from such a pipeline, would be unable to afford such piped-in water without federal grants, which would tie the state and local regions even more closely to the federal bureacracy. We prefer not to be victims of the generic federal law.

The West River aqueduct would require interstate agreement, which would go one step further in making South Dakotans lose control of our water when we will clearly need it ourselves for agricultural and domestic purposes.

The U.S. Geological Survey is presently conducting a study of water in the Northern Plains. This study, which will give the public more information than has ever before been available on underground and surface water in the region, will not be completed until some time in 1982. We propose that the entire ETSI coal slurry pipeline project be halted until the U.S.G.S. study is complete and has been studied.

Further, we ask that this DEIS be scrapped, and on completion of the U.S.G.S. study, a new DEIS be written, to include results of a thorough study of the effects of such a pipeline on South Dakota's water supplies. At that time, a period of one year should be given for comment, after the DEIS has been made available to the public in all the affected states.

In addition, experts from outside the companies participating in the pipeline project should be responsible for writing a précis of the second DEIS, in layman's language, which should be distributed to all those attending a second series of public meetings in every community to be affected, directly or indirectly, by the pipeline.

It would seem feasible as well to require a study of all the energy projects proposed for this semi-arid region which will require the use of the region's underground or surface waters, so that some clear picture of the total depletion that would occur from these projects can be given to the public. The necessary studies to determine baseline data should accompany this regional environmental impact statement.

To conclude, we feel the DEIS is deficient in a number of areas. In substance, it demonstrates (contrary to its own conclusions) that moving coal by rail is a more logical step than transporting it by a slurry system which is untried. The coal slurry pipeline would be wasteful of energy, damaging to the environment, health, welfare and economy of the states where the water would be drawn, particularly South Dakota, and thoroughly illogical.

L.M. Hasselstrom

Linda M. Hasselstrom, for the

Black Hills Energy Coalition
Box 8092
Rapid City, SD 57701

181

NEIMAN SAWMILL, INC.
BOX 218
TELEPHONE 307 / 467-5700
HULETT, WYOMING 82720

January 5, 1981

Bureau of Land Management
Special Project Staff
3rd Floor East
55 Zang Street
Denver, Colo. 80228

Dear Sir:

The information from the EIS leads us to beleive the slurry pipeline will greatly affect the water level in Crook County, Wyoming.

I am working on a co-generation plant to be put in Hulett, Wyoming which is located in Crook County of Wyoming. This will require water to be used, possibly from the Madison formation or the level above. I am sure this could affect the level of water.

I do not want to see anymore of our water taken from the State of Wyoming.

Sincerely,

James S. Neiman

James S. Neiman, President

193

Sundance, Wyoming
January 6, 1981

Bureau of Land Management
Office of Special Projects
555 Zang Street, 3rd Floor East
Denver, Colorado 80228

Gentlemen:

The following recommendations for material to be more fully taken into account to improve the adequacy of the Bureau of Land Management Environmental Impact Statement relative to the slurry pipeline proposed by the Energy Transportation System, Inc. (ETSI) are respectfully submitted. These points are specifically directed to the use of water from wells in the Madison and other formations.

1. The total "water system" involved and the impact on this "system" is a very complex "open system", and is not amenable to adequate quantitative analysis - -.

2. Further, the impact on the environment and economics involved when the "water system" is impacted by use of the water by the slurry pipeline, would also be so complex that a meaningful analysis of future impacts cannot be adequately handled by direct analysis today.

RECOMMENDATIONS:

There are several areas in the United States and in the world where use of underground water has resulted in significant impact on the aquifers and substantial lowering of water tables. The geological and water system specifics of these existing cases, the effects on water tables, and the impacts of the lowering of these water tables should be more fully evaluated and used and applied as appropriate in the environmental impact analyses and statements relative to this proposed slurry pipeline operation.

Bureau of Land Management -2- January 6, 1981

As one involved for a lifetime in Northeast Wyoming ranching; water well and oil well drilling, completion and operation; and involved in the petroleum industry, including geology, wells, pumping, and currently a member of the American Petroleum Institute Subcommittee on Recommended Practices for Offshore Well Completion, Servicing, Workover, and Plug and Abandonment Operations, as well as in other advisory capacities to the world petroleum industry, I am firmly convinced that the impact of pumping water from the Madison and other formations for the proposed slurry pipeline will eventually result in very substantial, unacceptable impacts on our overall water tables and upon the Wyoming economics highly dependent upon this subsurface water.

Respectfully,

Robert O. Gose

Robert O. Gose, President
Inyon Kara Ranches, Inc.
P. O. Box 906
Sundance, Wyoming 82729

ROG:m

213

P.O. Box 32
Deadwood, SD 57732
January 7, 1981

Mr. Richard Traylor, Project Leader
BLM, Department of Interior
3rd Floor East
555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

Our comments follow in reference to the ETSI DEIS. Since we were not given either adequate notice or time for reviewing the DEIS, we have essentially touched on some of the major difficulties that lie in the DEIS.

First, and perhaps most significant, is the inadequate scope of the DEIS. Water is the singular issue of the Great Plains region, especially in the semi-arid site selected by ETSI for their proposed well field. This information is directly relevant to the DEIS because it not only points to a badly-flawed DEIS but implies the reason for that flaw as well.

Look at page IV of the DEIS: of the various counties, etc. "that could be directly effected", five lie in South Dakota. Yet, the BLM not only failed to hold scoping hearings in these counties, but was reluctant, indeed, to hold even a public meeting in Edgemont, South Dakota. Our county, Lawrence, had no opportunity for a scoping hearing in spite of the fact that we are probably the single greatest source of recharge into the Madison in the Powder River Basin on the entire west slope of the Black Hills.

Second, of the 10 scoping meetings held by your agency (11 with Edgemont which, by your admission, excluded the group process) 727 people attended. Does it concern you, or reflect upon the integrity of the DEIS, that of the 727 people, 515 were at two meetings in Alliance, Nebraska (285) and Edgemont, SD (230), respectively?

Third, of the documents selected for review or inclusion in your DEIS and EIS, several are glaringly absent. We cite but one. Are you acquainted with Desertification in the United States, Status and Issues, Working Review Draft, U.S. Department of Interior, June, 1980? If not, please become acquainted with same.

We quote from the above, page 19:

> The overriding influence that shapes the West is the desert. That is its one unifying force. It permeates the plains, climbs to all but the highest mountain peaks... For a million years a fire of low intensity has been burning, and it is still burning in the West. It is broader and more intense in the south, narrower and somewhat cooler in the North.

Mr. Richard Traylor Page 2 January 7, 1981

A primary source--the primary source of consideration and information relevant to this DEIS--is western history. The question raised here in terms of overall impact is a historical question. We did not anticipate that Woodward Clyde Consultants would grasp that. We thought BLM, born as it was of the Taylor Grazing Service, would.

A second major failing of the DEIS lies in its complete failure to analyze the basic issue at hand--the impact of taking ground water away from a region that absolutely depends upon it. For your information, Madison ground water in the Black Hills is, excepting months of high runoff, surface water, and vice versa. It is all we have.

In this vein, we comment upon the DEIS' consideration of various alternatives. Please understand that the Crook County well field is not an alternative, but a transfer of the same problem to another and, in terms of impact, nearly identical area.

After publishing the fact that the rail (no-action) alternative would require 94,000 BTU less per ton of coal moved, the DEIS goes on to accept the ETSI premise that coal slurry would offer needed competition to the coal transportation industry.

The weakness in this argument is obvious. Water is a fugitive and (to date in this region) renewable resource. Fugitive resources have always been subject to depletion because users, public and private, exploit them on a first come, first serve basis. Because of their elusive nature as property, public or private, it is most difficult to assign values to them. Such renewables thus function as "free goods" even though they often underpin (as Madison water does) the civilization of an entire region.

In the absence of public regulation, usually federal, such resources become, in the hands of the private sector, a subsidy.

Our information comes from many sources, but a primary one is S.V. Ciriacy Wantrup, Resource Conservation: Economics and Policies, University of California Press, Rev. 1963. But any resource economist can tell you the same thing.

ETSI is, in essence, interested in sustaining the concept of plunder and, by the DEIS, it would appear in collusion with BLM. Surely the responsibilities of a federal agency handling a DEIS go beyond satisfying the greed of an industrial client.

The DEIS also mentions the fact that slurry systems have been supported by several senators. What does that matter, given that slurry legislation did not yet pass the Congress? How is it that BLM may go about deriving general EIS premises from the opinions of "several senators"?

The oceans offer a similar situation. There is no alternative to using ships for heavy transportation. If the Coast Guard were to issue an EIS regarding

Mr. Richard Traylor Page 3 January 7, 1981

slurry lines, we doubt they would support them on the premise that certain congressmen advocated the same. Lots of damn fool schemes have elicited the support of various congressmen in the past.

On the other hand, many people have also testified in opposition to slurry lines, in arid areas in particular, and for obvious reasons. Why is the DEIS so selective in this regard?

Fourth, there is dangerous distortion in the DEIS in regard to recharge into the Madison. We quote from pages 3-15:

> Based on the work by Rahn and Gries and uncalculated potential recharge (WCC 1980b) recharge to the Madison aquifer in the Black Hills can be stated to be in the range of 140,000 to 400,000 acre-feet per year.

BLM's terms, "can be stated to be" constitute a flagrant disregard for the rules of scientific language. There is a vast difference between the use and abuse of scientific language.

The 140,000 acre feet you refer to means all of the ~~flow~~ recharge leaving the Black Hills in all directions. Various drainages, as mentioned in the DEIS, leave the Black Hills in radial fashion. Only a portion of these seem to recharge the Madison in the area immediately under consideration, i.e., the Powder River Basin. At this point, given the findings of other geologists and the United States Geological Survey, nothing can be stated with any measure of certainty. We find your attempt to disguise these facts sickening.

Because BLM did not allow an extension of the time period for public comment, we have not been able to offer the extensive review of this DEIS that is in order. Please realize, however, that your deadlines are not our deadlines. ETSI is talking about the beginning of the end of civilization as we know it in this land. Our comments will be developed and filed with congressional delegations, agencies, and citizens in such fashion as to do something about this proposal, if BLM doesn't.

We appreciate the opportunity to file this brief statement.

Sincerely yours,

Dave Miller, Jr.

DAVE MILLER, JR.
Acting Chairman
Citizens for Responsible Use of Madison Water

220

JACK A. McGLOTHLIN
STATE LEGISLATIVE DIRECTOR
2809 NORTH BROADWAY, SUITE F
BRANCH P. O. BOX 1006
TELEPHONE (316) 232-2020
PITTSBURG, KANSAS 66762

united transportation union

KANSAS STATE LEGISLATIVE DEPARTMENT

R. E. (RON) CALBERT
ASSISTANT STATE
LEGISLATIVE DIRECTOR
1116 HARRISON
TELEPHONE (316) 283-5041
NEWTON, KANSAS 67114

January 9, 1981

Mr. Richard E. Traylor, Project Director
ETSI - Environment Impact Study
BUREAU OF LAND MANAGEMENT,
U. S. DEPARTMENT OF THE INTERIOR
555 Zang Street
3rd Floor, East
Denver, Colorado 80228

Re: Energy Transportation System, Inc.
Bureau of Land Management
ENVIRONMENTAL IMPACT STATEMENT - Draft

Dear Mr. Traylor:

Enclosed you will find the Response to the EIS Draft by the Kansas State Legislative Department, UNITED TRANSPORTATION UNION. We respectfully request that this response be included in the final response presentation. This is the position of our organization.

Respectfully,

Jack A. McGlothlin

Jack A. McGlothlin, Director
Kansas State Legislative Department
UNITED TRANSPORTATION UNION

JAM/mem

cc: R. E. Calbert, Assistant Director, KSLB
KSLB Executive Committee
J. R. Snyder, National Legislative Director, UTU
Interested Parties

SCP-EIS

JACK A. McGLOTHLIN
STATE LEGISLATIVE DIRECTOR
2809 NORTH BROADWAY, SUITE F
BRANCH P. O. BOX 1006
TELEPHONE (316) 232-2020
PITTSBURG, KANSAS 66762

united transportation union

KANSAS STATE LEGISLATIVE DEPARTMENT

R. E. (RON) CALBERT
ASSISTANT STATE
LEGISLATIVE DIRECTOR
1116 HARRISON
TELEPHONE (316) 283-5041
NEWTON, KANSAS 67114

January 9, 1981

To: Bureau of Land Management

RESPONSE TO EIS DRAFT

The purpose of this statement is to respond to certain areas of the draft of the Energy Transportation System, Inc. (ETSI). ENVIRONMENTAL IMPACT STATEMENT (EIS).

Introduction

The basic question concerning ETSI's proposed alternative to present methods of transporting of coal remains unanswered - both by ETSI and the EIS. IS IT NEEDED? No where has it been proven that present methods of transportation cannot handle all needed present and future coal transportation. And no where has it been established that the coal needs for energy production are going to increase to the volume ETSI feels compelled to project.

Water From The Madison

One of the major impacts discussed is the hydrologic drawdown of the Madison Aquifer as ETSI pumps 20,200 acre-feet of water per year to mix with coal for slurry. Using calculations that one acre-foot of water is 43,560 cubic feet of water (7.48 gallons per cubic foot), or 325,828 gallons per acre-foot. Multiplying 20,200 annual acre-feet by 325,828 gallons, the conclusion is

that 6,581,725,600 gallons of water per year will be drawn from the aquifer. (The City of Pittsburg, Kansas, with a population of approximately 20,000, consumes 3.5 million gallons of water per day). It becomes apparent that 1 mile of 42" pipeline contains 380,000 gallons of coal slurry, half of which (190,000 gallons) is water. At full capacity, there will be 354,920,000 gallons of water in the 1868 miles of pipeline. Slurry moving at a rate of 2 miles per hour means a flow-through of 9,120,000 gallons of water per day, or 3,328,800,000 gallons per year. ETSI's projected need is 6,581,725,600 gallons per year - (20,200 acre-feet annually) - from the aquifer. What necessitates nearly twice the gallonage drawdown per year compared to documented need?

Can the Madison Aquifer formations withstand this drawdown, and will the surrounding land be subject to subsidence (sinking as a result of drawdown)? Dr, is it felt that only cones of depression will occur around these wells - and if so, how big would they be?

In the event of a rupture and spill, the pipeline's lost gallonage would have to be filled with water from the spill area. We gather the source would be from local supplies in the spill area. Kansas farmers and communities in general have been in a groundwater crisis for quite some time, especially in the Western, Northwestern and Southern Mid-Central parts of the state. Non-Kansas users of precious Kansas water are not going to be all that welcome.

Water Conservation

At one time the United States decided to pump and use all the domestic oil it could. This put the United States in the position

of using the resource faster than it would replenish, put us in fear of running out before "the next generation", and making us dependent on foreign oil for the "necessities of life".

We are already faced with water crises across the nation. The aquifers may prove to be our "save it for a rainy day" accounts of water. The question posed by the BLM hydrologist hangs in the air: "Do we use that water for a "worthwhile" project such as (this) now, or conserve it for future generations?" If history teaches us what to expect for the future we certainly should conserve the most precious of all liquids, water. To support our position, as to the seriousness of water shortages, the following quote is taken from the MISSOURI RIVER BASIN COMMISSION's report, November-December 1980:

> "Conflicts over water - state against state, neighbor against neighbor - are forecast for the future unless residents of the Missouri River Basin change their lifestyles and unless officials in the basin states make tough decisions."

This is also applicable to the State of Wyoming. The "tough decisions" are most applicable to the Bureau of Land Management, Department of the Interior.

Socioeconomic Considerations

With an estimated peak work force on construction of the slurry coal pipeline of 6028, concentrated in approximately four major sites at any one time (and mostly non-local, transient workers) - it is stated several places (see Page 3, for example), that this influx would be mostly beneficial to those communities involved.

Since these are transient, temporary workers, it behooves us to take exception to the BLM-EIS treating them like visitng princes - and treating the possible permanent, local railroad employees, who are not itinerent workers, like town bums (See Section 4.1). These railroad workers purchase homes, pay local taxes year round, have families and participate in civic endeavors - and do not go on welfare in the off-season.

The BLM position appears to be that it is bad for communities in rural geographic areas to increase their existing population with railroad workers. It also insinuates that the influx of ETSI's temporary, transient, construction workers would be beneficial. We question the validity of the BLM "conclusion".

Table 4-32 on page 4-91 purports to show tax benefits to be derived from the pipeline. The projection is for the year 1980, made by ETSI. The claim is that 30% of 100% valuation for taxing purpose should be reduced to the "uniform" 6% to 12% of 100% used to tax other properties. Furthermore, pipelines have a depreciation factor for taxing purposes not enjoyed by railroad right-of-ways. The worth of exhibits such as Table 4-32 are questionable to say the least. Due to court cases pending, brought by utilities based upon an alleged discrimination of application of the "uniform and equal" provisions in the Kansas Constitution, the 1981 Kansas Session of the Legislature will consider a Constitutional Amendment to allow classification of real property.

Ruptures and Spills

The lack of concern over impacts in the event of a coal slurry spill leaves us to wonder what the researchers consider important. Many statements - "asides" - are seemingly off the cuff, i.e., "A coal slurry spill is not expected to result in any risk to

the health or safety of any human." (Page 4) When? How do we know what long-term impacts could occur. In referring to impacts on groundwater, worst-case conditions, it is (assumed), "..no chemical reactions would occur and no contaminants would be absorbed by the soil, only the federal secondary drinking water standards for TDS, sulfates, and possibly manganese may be exceeded." "No biological impacts of any significance are anticipated." (Page 4-41).

It is noted several places, that a spill would be "long-term" and "significant", if occurring in aquatic or wetland situations. This, to us, seem to say it would be significant.

The one Black Mesa Pipeline spill referred to on Page 4-40 had a devastating affect on the terrain involved, as photos show. (Attached). This was a "significant impact" to the area, even in the desert.

Living in a coal producing area, Southeast Kansas, we have seen where residue of coal products have been impounded and have spilled. In every instance, the affected land area was left arid and barren forever.

The statement that a "detailed contingency plan would be prepared prior to initiating pipeline operations.", is a questionable public policy approach. (Page 1-22).

Possible Unemployment and Market Loss - Railroads

The BLM's EIS assumes that the market loss of 37.4 ton of coal will not hurt the railroad industry. On Page 4-40 is found the statement: "Most likely the railroads would replace the lost markets with new markets. What would result would be a shift in the rail routes used and a possible shift in employment from one rail line to another." The person that wrote this statement obviously knows nothing about transportation economics. If this assumption were true, all freight from the former Rock Island railroad would be abandoned and all 400 former Rock Island workers in Kansas would be employed by other railroads; they are not - they are, for the most part, unemployed.

This basic idea that the rail freight base is so large and solid that the railroads could lose 37.4 ton of coal hauling business withough suffering economically, or that it would not result in serious unemployment, is completely inaccurate. The fact of the matter is the railroads would be forced to raise their freight rates on grains, remaining coal hauls and other products causing added inflation to an already intolerable inflationary condition.

Energy

The BLM's EIS states (Pages 2-5 and 2-12 for instance) that rail transportation is the most energy-efficient method of transporting coal - well over pipeline efficiency in BTU's/ton. It does add that railroads use diesel fuel, and assumes this contributes to U. S. reliance on foreign oil. This statement is a conclusion of BLM, based on their subjective understanding of the national energy policy (See page 2-12). We question the waste of energy

in using damp coal, which would require more energy to make energy - to produce electricity.

In the same vein, we question the projections for the amount of coal needed. An article in BUSINESS WEEK, October 1980, states the Burlington Northern railroad is cutting back on its projected $1 billion expenditure by 1985 for rebuilding its facilities. "For a number of reasons, including the fact that the demand for electrical power generation has not grown as rapidly as expected, the Burlington Northern Railroad has not hauled as much coal out of the basin (Powder River Basin) as anticipated."

Basis for Comparison

It seems that the feasibility of constructing a coal slurry pipeline has been based upon comparison of the proposed project with the one existing similar project, the Black Mesa Pipeline. Assumptions have been based upon a 273 mile pipeline, built in the desert where the terrain is unchanging and the climate is predictable on an annual basis. The Black Mesa Pipeline is 18" in diameter, less than half the proposed size of ETSI's pipeline. The Black Mesa Pipeline crosses no rivers, is in conjunction with no other mineral pipelines and crosses no privately-held land intended for specific purposes, such as agriculture. We feel that the Basis for Comparison is irrelevent.

- 11 -

Summary

It is understood that comments should be directed to the adequacy of the scope of the EIS or the impact analysis of the proposed action and alternatives. However, the EIS is a projection based upon certain matters presumably accepted as facts. We realize that the BLM has gone as far as it can go in this study with what facts are available to them. Alas, most of the "facts" available have come from ETSI. It is unfortunate that the Bureau of Land Management does not have the resources or the unbiased personnel to draw from in order to make this EIS the tool it was intended to be. Throughout an extended time of working with federal regulatory bodies dealing in projections, it has been our experience that the basic ingredient in reliable projections is the absolutely factual ingredients which are used to arrive at the projected conclusions. In the instant case, the analyses of the proposed action and alternatives is based upon statements made and positions taken by the Energy Transportation Systems, Inc. for the past eight years. However, the statements and positions proclaimed by ETSI have not prevailed in the U. S. Congress, nor in the Nebraska and Kansas Legislatures. Projections based upon a questionable foundation of fact miss the mark completely and to a greater degree as the projection is increased.

Respectfully submitted,

J. A. McGlothlin

Jack A. McGlothlin, Director
Kansas State Legislative Department
UNITED TRANSPORTATION UNION

JAM/mem

SCP-EIS

cc: Interested Parties

233

DERN & POLK RESOURCE CONSULTANTS

Resource Inventories
Land Planning & Reclamation

Box 230 Squaw Creek Route
Lander, Wyoming 82520
Phone: 307-332-3777

Offices in
Lander, Wyoming — Belton, Texas

February 1, 1981

Mr. Richard E. Traylor
Office of Special Projects
3rd Floor East
555 Zang St.
Denver, Colorado 80228

Dear Sir:

We have reviewed the draft ETSI Coal Slurry Pipeline Environmental Impact Statement with reference to soils, wildlife and vegetation. It is our opinion the pipeline shall cause minimum temporary disturbance in regard to wildlife habitats and vegetation providing stated mitigation measures are taken.

We see no difference between temporary damages which may be caused by the ETSI Coal Slurry Pipline and the thousands of existing pipelines. In addition, the ETSI Pipeline reduces many hazards associated with conveyance measures for coal.

Sincerely,

George Dern

George Dern
Principal

GD/mw

cc Fred Eiserman

234

D & P RECLAMATION

George Dern
Phone 332-3777

Box 230 Squaw Creek Route
Lander, Wyoming 82520

Don Calhoun
Phone 332-9445

February 2, 1981

Mr. Richard E. Traylor
Office of Special Projects
3rd Floor East
555 Zang St.
Denver, Colorado 80228

Dear Sir:

I have reviewed the draft ETSI Coal Slurry Pipeline Environmental Impact Statement with particular reference to revegetation. It is my opinion that reclamation of surface disturbances can be successfully achieved within acceptable time frames.

Sincerely,

Don Calhoun

Don Calhoun
Reclamation Specialist

DC/mw

cc Fred Eiserman

RECLAMATION IS NOT OUR SIDELINE, IT IS A FULL TIME BUSINESS

24

theRapidCityJournal

P.O. Box 450
507 Main Street
Rapid City, SD 57709
Tel: 605 342 0280

Information and Perspective for the Black Hills Region.

Dec. 10, 1980

Mr. Richard Traylor
ETSI Project Leader
Burea of Land Management
555 Zang St., Third Floor East
Denver, CO 80228

Dear Dick:

As you requested, here are my stories covering the ETSI hearings in Rapid City and Edgemont.

I should point out an apparent typographical error in the draft EIS. Some sentences appear to be lost between pages C-15 and C-16 in my copy, which reproduces those pages sideways on a page.

Thank you for your help before and during the hearings. I'll be in touch as the developments continue.

Sincerely,

Malcolm Ritter

Malcolm Ritter

28

H. E. STUCKENHOFF, M.D.
PHYSICIAN AND SURGEON
~~xxx Wyoming Building~~ Box 1050
CASPER, WYOMING 82601

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects

Comments to be added to the meeting re: Slurry pipeline hearing held in Lusk, Wyoming. As principal stockholder and officer of the B.B. Brooks Co., a large ranching operaion in the Casper area, I would voice my objections to a coal slurry pipeline taking it's water from the Madison aquifer for the following reasons:

1. On Smith Creek according to records of the B.L.M. we lose a little less than one second foot of water to the Madison throughout the year. Smith Creek traverses the Madison formation. Will the loss of water to the Madison formation increase if water is taken from the Madison formation in fairly large quantities?

2. Will some of the springs on Muddy Mountain and west deer park be involved? This could become a serious problem. I am sure that not all springs arise from the Madison aquifer but who is to say which do and which don't.

3. Would the many streams in Converse and Niobrara counties be reduced or dried up?

4. Would the many streams off the eastern slope of the Big Horn mountains lose more to the Madison as a result of the draw down of the Madison aquifer? The Madison is an aquifer that spans as a blanket the entire Powder River basin. WOULD not E.T.S.I. be ahead to get their water from Oahe dam rather than risk the hazards that could occur as a result of a draw down of the Madison aquifer?

B. B. BROOKS COMPANY

H E Stuckenhoff

H. E. Stuckenhoff, M.D.
President

HES:vh

29

December 18, 1980

Editor
Casper-Star Tribune
Casper, Wyoming

Editor:

I am writing this letter as a spokesman for my family, which has lived in Wyoming since 1865. We have been taught, from generation to generation, to preserve and take care of our water, as it has always been a most precious commodity in a semi-arid state, such as Wyoming.

Yet, past members of our Wyoming State Legislature have unwisely seen fit to grant an out-of-state company to come into our state and slurry this precious water into other parts of the United States, which have water in abundance!

We would like to ask the following questions of a qualified person, other than a representative of E. T. S. I.:

1. Does anyone fully understand the channeling of the underground water in Wyoming? I pose an example of the "Sinks", near Lander, Wyoming.

2. Does the underground water of Wyoming, along with other Western states, act as a "cushion" for the great earthquake fault of the Rocky Mountains?

3. Will any "ancient water" be used in the slurrying? If so, will Wyoming have "sink holes", which are found in Arizona, from the draining of their underground water?

4. If it is safe to use the brackish water of the Madison Formation, then why couldn't it be piped in-state for agricultural and industrial use? Why would we be piping this water out-of-state at all?

5. The above principal should also be applied to the slurrying of our good, Wyoming water, near Sheridan, to out-of-state companies. If Cheyenne can pipe their water across the state from the South Platte River, why can't the unused, run-off of water from the Little Big Horn be used for other towns in the State of Wyoming, who are in such a dire need?

It has been a warm, dry winter in Wyoming, however, those of us who have lived here awhile, know that we need the snow pack in the mountains, or we are in trouble the following spring and summer. Now, wouldn't it be ironic to have a drought one summer, and yet, see E. T. S. I. pumping thousands of gallons of Wyoming water out-of-state?

I am addressing this letter to the B. L. M., and hopefully, all Wyomingites. We surely hope that someone can answer these questions for us, as the slurrying of our water, out-of-state, is one of the most serious actions that Wyoming has ever undertaken.

Cherie Daly
Box 943
Douglas, Wyoming
(358-4865)

cc: B. L. M.

32

Star Route 1 Box 34
Chadron, Nebraska 69337
December 22, 1980

U.S. Department of the Interior
Bureau of Land Management
Special Projects Staff
3rd Floor East, 555 Zang St.
Denver, Colorado 80228

Reference: Environmental Impact Statement, Proposed ETSI Coal Slurry Pipeline, Volume 1 of Draft (Nov. 1980)

Dear Sirs:

Map 4-1 on page 4-8 of the EIS shows the extent of expected drawdowns in the Madison Aquifer if ETSI pumps water required for the pipeline from the Niobrara County well field (Plan 1.) Any existing privately owned domestic well with a depth which would not extend below the ground-water draw down level would fail.

In order to restore an adequate domestic water supply, the owner of a well that has thus failed would have to drill the well deeper and perhaps substitute a more powerful pump, or the owner might be required to drill a new well.

If the drawdown was sufficient to result in an insufficient domestic water supply even if the well was drilled deeper, the owner would need a substitute alternate supply of water piped into his property.

What provision will ETSI make to reimburse the owner for the cost of whatever alternative action must be taken to restore his lost domestic water supply? Will ETSI provide a temporary supply of water until the new source is established? What procedure must the owner take to obtain assistance and cost reimbursement from ETSI?

Sincerely,
Byron Radcliffe

39

JOHN PAUL GRIES
Consulting Geologist
230 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

December 23, 1980

Mr. Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, Colorado 80228

Dear Mr. Traylor:

I appreciate very much receiving a draft copy of the Environmental Impact Statement pertaining to the ETSI pipeline. Your group is to be commended on the objectivity with which the data have been collected, studied, and presented. I planned to make the following comments at one of the local public hearings, but was tied up watching an oil test in the Edgemont area.

There are two areas in the hydrology section where I believe the report takes an unduly pessimistic view.

The first pertains to the assumption of low transmissivity across the drag folds which bound the eastern side of the Powder River Basin. In the area west of the Niobrara County well field, I do not believe that faulting is required to give the sharp differences in elevation that occur within a very few miles. When the section is drawn with no vertical exaggeration, downfolding, possible with some small step faults, seems the most logical interpretation. Certainly, nothing that would cause a discontinuity in flow through the Madison formation across the zone in question. Examination of the less pronounced drag folds that occur around the Black Hills shows that tension fractures are present; these in turn should improve rather than restrict transmissivity. If greater transmissivity across this zone is assumed, the bullseye on the drawdown Map 4-1 need not be so asymmetrical, and the influence on the area to the east of the well field would be subsequently reduced.

Secondly, I find it hard to believe that the influence on the potentiometric head in the Minnelusa formation will be nearly as great as in the Madison. Admittedly, the Minnelusa is not everywhere separated from the Madison by the conspicuous paleosol at the base of the Minnelusa, but it is present over most of the area under consideration, and should prove a fairly effective seal over the geologically short period of time represented by the life of the pipeline. My own work with the stratigraphic trap fields in the Leo sands makes me doubt that pumping the Madison would have any appreciable effect upon the hydrology of these apparently sealed local systems. The Red Marker shale which separates the lower and upper Minnelusa is so persistent as to make the hydrologic systems in the lower and upper Minnelusa distinct in the area around the Black Hills where I am most familiar with them.

JOHN PAUL GRIES
Consulting Geologist
230 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

Traylor - 2 -

I find it difficult to believe that pumping the Madison would have any appreciable effect on the hydrology of the oil fields developed in the upper Minnelusa Converse sands. In brief, I believe the first paragraph on page 4-11 is unduly pessimistic although I agree that the possibility had to be addressed.

I appreciate the opportunity to submit the above thoughts.

Sincerely,

J P Gries

J. P. Gries
Certified Professional Geologist
No. 771

JPG/me

90

January 1, 1981

Dick Traylor
E.T.S.I. Project Leader
Bureau of Land Management
555 Zang St. Third Floor East
Denver, Colo. 80228

Dear Mr. Traylor;
I appeared before your Public Hearing Board in North Platte, Nebr. on December 11, 1980. I talked with you during the break in the hearings about the area of your report dealing with the so called "no-action" alternatives the railroads offer. I told you I would be sending you an article that recently appeared in our newspaper on solid fuel railroading, meaning coal. Enclosed you will find that article. Another engineer, Gary Patterson, also testified on solid fuel and the railroads study of possible electrification of the rails. Mr. E. L. McCulloch, Vice President of the Brotherhood of Locomotive Engineers and our National Legislative Representive in Washington, D.C. has testified before Congressional and House Commmittees in Washington on the railroads feasibility of alternative fuels (coal and electricity). I would hope that you will send for his reports. I am sure that you will find that the railroads are seriously studying alternative fuels. Your report admits that rail transportation is the most efficient way of moving the coal out of Wyoming, in regards to energy efficiency. Why not leave well enough alone?
As I stated before your board, MONEY is the top and bottom line in this entire proposal; how much money E.T.S.I. can make, how much money will the railroads lose in lost revenues, and how much money will the employees,directly involved in the movement of coal by rail, lose??? I know how much money I will lose if this pipeline goes through. Multiply that by the number of employees affected on the railroads and you are talking about a tremendous amount of money that will be lost to the economies of the cities and towns where rail workers now live. Your report did not deal directly with this very adverse aspect of a coal slurry pipeline, but IT SHOULD HAVE. North Platte, Nebraska is a main hub for the movement of coal out of Wyoming to points in the Eastern and Southern parts of the United States. There are close to 3,000 employees working for the Union Pacific Railroad in North Platte, alone. Take away the coal

page 2

business from the railroad (and that's what a slurry line would do) and the economy of North Platte is going to be put in a tailspin. Proponents of the slurry line say that the railroads need the competition from a slurry line to promote lower utility rates. You can't really believe that E.T.S.I. is spending all this money for a slurry line if they don't plan on making BIG money on it, once it is in!
Water is a big concern with this project, too. I cannot in good conscience believe that taking all of the water that is going to be needed for this line out of Wyoming is going to help that state's already short supply of water, whether it be surface water or water from deep wells. Will the socalled benefits of this pipeline come anywhere near off setting the known detrimental factors let alone the unknown ones??? I say NO. E.T.S.I. officials have stated that if anyone comes up without a water source (because of the line using up the water) they will supply water to that party; where in the world will they come up with <u>that</u> water??? Most of the present officials with E.T.S.I. will be dead and buried before the full impact of this line will be felt 50 years from now; but what about the farmer or rancher's son or grandson who will farm or try to run a ranch in this area 50 years from now? E.T.S.I. will be gone, but the railroads will still be here.
What about land subsidence? Look at what has happened to Mexico City; it has sunk 8'. Look at what is happening in China; several cities, including Peiking, are sinking . The San Joaquin valley in California has sunk 30' since 1925. Homes in Baytown, Texas have sunk enough to allow the tide waters from Galveston Bay to flood them, making them uninhabitable. All of these incidences have been documented and all of them point to the ground water being pumped out from beneath as the culprit.
I could go on and on, but I am sure that you have received many other letters opposing this pipeline as well as testimony that was received during your hearings. I would only ask that you deny E.T.S.I. request for this pipeline for the reasons listed above ; there are too many unknowns. The railroads can handle the coal, if only given the chance.
E.L. McCulloch's address is: V.P. of B.L.E. National Leg. Rep.
819 Railway Labor Building 400 First St. NW, Washington, D.C. 20001
Thank you for taking the time to read this and I hope the BLM will take the stand against these pipelines. Dick [illegible]
211 Parkridge Rd. No. Platte, Neb. 69101

97

Rex T. Coffee, Jr.
Box 25
Harrison, Nebr. 69346
Phone 308-668-2282

January 2, 1981

ETSI Project Leader
Bureau of Land Management
555 Zang St., 3rd. floor East
Denver, Colo. 80228

Re.-ETSI Environmental Impact Statement.

Gentlemen:

Having reviewed the Environmental Impact Statement Draft I notice a glaring omission that should be a prominent part of the Impact Statement.

This omission concerns the effects of ETSI wellfielo water pumping on water wells, streams, springs, seeps and other sources of water, including moisture levels under land surface, that rise or are supported from below, on the entire area overlying the Madison drawdown area.

There should be an inventory of these water sources and a scientific study that examines the relationship between such sources ano their support by underlying waters through the Madison formations.

Once this study is complete, the effects of Madison formations water withdrawal upon overlying waters, including moisture levels, up to the surface, could be more accurately judged. Thus the effects upon land users would be better judged by the public ano decision makers.

These areas nave been drilled by oil companys, over the years, and their logs should show much information, if they will permit examination. The plugged drill holes are still there, examination of which might yield information on aforementioned relationships.

It is logical to assume that ETSI pumping of water from the Madison formations will tend to dry up a huge area, the impact of which should be included in the Environmental Impact Statement.

Being a cattle rancher in the affected area, I am vitally concerned with this study and wish to offer any assistance possible.

Please enter my name on your list of requests for the final Environmental Impact Statement.

Respectfully yours,

Rex Coffee Jr.

Rex T. Coffee, Jr.

136

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

COLLEGE OF EARTH SCIENCES
DEPARTMENT OF HYDROLOGY AND WATER RESOURCES
TEL. (602) 626-1131

January 2, 1981

Richard E. Traylor
ETSI EIS Project Leader
Bureau of Land Management
Special Projects Staff
3rd Floor, East
555 Zang St.
Denver, Colorado 80228

Dear Sir:

I have studied the Madison Limestone aquifer in the Weston County, Wyoming, area of the Powder River Basin for the past 18 months. I am presently doing research at the University of Arizona. This letter, however, is an expression of my own conclusions and does not represent an official response of the University or any other organization. My work has concentrated on geochemical and isotopic variations in Madison ground water from the recharge area to points west in the Powder River Basin. Much of the work is relevant for the prediction of impacts from proposed ETSI well field development and the following comments concern the Woodwood-Clyde Consultants (WCC) report, "Well-Field Hydrology," 1792 (142) ETSI.

WCC's transient numerical model used to predict 50-year drawdowns in the Powder River Basin is based on faulty assumptions and is incapable of representing realistic impacts on water resources in the western Black Hills. First, the spacial distribution of Madison transmissivities as determined by the calibration of a steady state model fitted to Swenson's potentiometric map is not justified by the physical system. An example of the arbitrary nature of the transmissivity fitting is in the area of Newcastle, Wyoming. This area was designated a low transmissivity area with a transmissivity of only 0.01 of the average basin value of 0.03 sq. ft./sec. Flow tests of Newcastle's four municipal Madison wells conducted by Anderson and Kelly Consultants in 1978 yielded transmissivity values of 0.02 sq. ft./sec, two orders of magnitude higher than that predicted by the steady state model calibration. This points up the fact that WCC's assignment of low transmissivity areas along the Black Hills monocline was arbitrary and is not representative of the physical system. Replacing the model's transmissivity value of 0.0003 sq. ft./sec with the flow test's 0.02 sq. ft./sec would allow the sphere of influence from ETSI pumping to propagate quickly through the Newcastle area and would stress the springs and rivers near the Black Hills recharge area to a much greater extent than predicted in the report.

The second faulty assumption was the use of a constant head boundary condition along Black Hills recharge area. This boundary condition is only valid for use under steady state conditions. It is not acceptable for a transient model used to predict pumping impact in the Black Hills area. Using a constant head boundary in the Black Hills essentially assumes infinite recharge in that area and restricts the model from representing consequences of ETSI pumping on Black Hills' streams and springs. Assuming infinite recharge and at the same time predicting minimal impact in recharge areas is an inescapable circular argument, particularly, if certain small springs and streams are made to disappear by the pumping. The constant head boundary condition becomes critical when the imposed zones of low transmissivity, as at Newcastle, are removed and pumping impact is allowed to propagate to recharge areas. Springs and streams in these areas must then respond with lower discharges. Use of a constant head boundary here excludes prediction of this impact and should be replaced by a prescribed flux boundary condition to realize a realistic impact prediction.

Further evidence that relates to possible pumping impacts on the Black Hills' water resources comes from analyses of water quality and tritium content of ground water from the Madison aquifer in Weston County. Chloride concentrations do not increase significantly from shallow wells near recharge to wells in Fiddler Creek oil field about 35 miles west. This implies continuous water movement from recharge down through the aquifer. Tritium analyses for the same area indicate water is traveling from recharge to depths of greater than 8000 ft. through the Madison in less than 70 years. Both the insignificant increases in chloride concentrations and the tritium concentrations exceeding 1.5 T.U. in the Fiddler Creek oil field at depths greater than 8000 ft. indicate rapid westward movement of water from recharge down through the Madison flowing actively past the Black Hills monocline. This almost pipelike connection of Madison ground water to recharge areas will accentuate impact from ETSI pumping on the springs and streams of the western Black Hills.

I conclude that impacts on western Black Hills' water resources have been probably underestimated and impacts from extensive pumping in the Powder River Basin might cause large reductions in discharges of springs and streams in that area. This possible impact results from high transmissivities and large ground-water flow velocities in the Madison aquifer. I recommend amending the transient ground-water flow model by correcting the misplaced zones of low transmissivity and replacing the constant head boundary in the Black Hills with a prescribed flux boundary in order to predict the extent of ETSI pumping impact on the water resources of the western Black Hills.

Sincerely,

Phillip L. Fitzwater

Phillip L. Fitzwater
Hydrogeologist

151

310 12th Avenue NW, Apt. 2
Mandan, North Dakota 58554
January 5, 1981

Richard E. Traylor, Project Leader
Bureau of Land Management
Office of Special Projects
3rd Floor East, 555 Zang Street
Denver, Colorado 80228

Dear Sir,

I have reviewed the Draft Environmental Impact Statement on the Energy Transportation Systems, Inc. Coal Slurry Pipeline Transportaion Project and find it to be inadequate. My comments can be summarized around the following points.

(1) The DEIS neglects to consider the quality of the dewatering plant waste water as it relates to its proposed end use and eventual disposal. Considerable amounts of contaminants, including radioactive elements and toxic organic and inorganic compounds, will be leached from the pulverized coal. At minimum the DEIS should have provided a list of potential contaminants and given worst case estimates for the expected water quality of the waste water. Without these data assurances that industry can use this water and that its disposal will present no environmental problems are not credible. The final EIS should correct this oversight and provide specifics on the safe containment and treatment of the waste water, particularly with respect to radioactive elements and toxic compounds.

(2) The DEIS lists possible effects on biotic components without any attempt at functional analysis. Government (States *et al*., 1978) and nongovernment scientists (Blewett, 1980; Holling, 1978; Ward, 1978) have criticized the "encyclopedic approach" as inappropriate for environmental assessment purposes, especially when monitoring programs are to be established. In this DEIS the encyclopedic approach results in a failure to consider a number of impacts. Drawdowns of the Madison formation aquifer will reduce streamflows (see DEIS, page 4-52), but the effects of this reduction on stream and streamside communities is not considered in a systematic way. Some effects which could be predicted are reduced species diversity, reduced productivity, and possible destruction of habitats used by certain endangered and threatened plant species in southwestern South Dakota (*Adoxa moschantellina* L., *Epipactis gigantea* Dougl., and *Adiantum capillus-veneris* L.). Although the possiblility of spills are mentioned, the DEIS does not mention the possibility of bioaccumulation of toxic elements or compounds released during these spills.

(3) The DEIS inadequately discusses the relationship between the water use by ETSI and that of other existing, planned, or potential users. A regional EIS, which considers the ground water

page 2

impacts of mining and agricultural water use in addtition to ETSI's proposed use, should be completed.

(4) Calculations of the relative energy costs of the the proposed action and various pipeline alternatives neglect certain key data, including the energy costs of construction of pipeline, pumping stations, and microwave towers, the energy costs of maintenence of these facilities, the energy costs of materials required in construction and maintenence, and the energy costs to present water users for additional pumping or trucking of water following drawdowns.

(5) The justification for this pipeline (Section 1-C) is presented as if coal is the only alternative to natural gas and oil in generation of electrical energy. Consequently, the DEIS fails to consider certain "no action alternatives". The final EIS should address the energy savings generated by equivalent capital expenditure in solar heating or conservation projects and should reassess the need for this project in light of these savings. Also, the recent discoveries of significant "deep gas" reserves may reduce the need for coal in the states that this pipeline will serve. The final EIS should consider whether new deep gas supplies would render the coal slurry pipeline unnecessary.

Please keep me informed of developments regarding the ETSI pipeline. I request a copy of the final EIS when it is completed.

Sincerely,

Donald Pay

Donald Pay

REFERENCES

Blewett, T.J. 1980. Philosophy of environmental assessment. In An Analysis of the Socio-Economic and Environmental Impacts of Mining and Mineral Resource Development on the Sokaogon Chippewa Community. Volume II. COACT Research, Inc. Madison, Wi.

Holling, C.S. 1978. Adaptive Environmental Assessment and Management. John Wiley & Sons, New York, 377 pages.

States, J.B., P.T. Haug, T.G. Shoemaker, L.W. Reed, and E.B. Reed. 1978. A Systems Approach to Ecological Baseline Studies. FWS/OBS-78/21.

Ward, D.V. 1978. Biological Environmental Impact Studies: Theory and Methods. Academic Press, New York, 157 pages.

153

Jan 5, 1981

Bureau of Land management
Office of Special Projects
55 Zang St, 3rd Floor East
Denver CO 80228

Dear Mr. Richard Traylor,

This letter is a follow-up to the telephone call I made today with my comments on the coal slurry pipeline system. I don't like the idea of shipping all the water out of the arid Rocky mountain area and surrounding states, but I believe that this will happen unless a better system is presented. I would like to propose the building of 2 pipelines - in one trench - one to carry the coal slurry away to Louisiana and the other to return the water (without the coal) to this area (Wyo/Colo/etc). The dual pipeline should be initially filled with either the plentiful gulf water or other Eastern local water. With a closed water system, all that would leave this area would be coal. The cost for the extra pipe should be quickly offset by the savings in water. The land price would be the same. Many tempers would also be saved.

Thank you for considering this option.

Sincerely
John Gishpert
2898 So. Ingalls Way
Denver CO 80227

CC Red Fenwick, Denver Post

156

Harrison, NE
January 5, 1981

To Whom It May Concern:

We, the undersigned as residents and land owners of Sioux County, Nebraska wish to bring to your attention the following comments based on information contained in the Environmental Impact Statement prepared for the coal slurry pipeline proposed by Energy Transportation System, Inc.

On page 2 of the Impact Statement it states "Madison aquifer over a 50-year period were calculated using a numerical model that contains estimates of aquifer system properties. Conclusive assessments of impacts can be made only when the effects of large-scale, long-term withdrawal are carefully observed and documented."

In our opinion the amount of time and method of assessment of the scope of the Madison formation are inadequate. A 50 year project with the possible impact of the coal slurry pipe line to the livelihood of all living within a radius of 3800 square miles and three states should be implemented with no less documented data time period than the life of the project.

Members of our family settled this northwestern corner of Nebraska 100 years ago and the land has been retained by family members since that time. Only through prudent water and range management has the land remained productive enough to enable ranching and limited farming activities.

We feel that any department of the government of the United States would be acting in an unresponsible manner to approve a project as potentially dangerous as the pipeline to the economic welfare of its citizens.

John & Mary Lou Federle
John and Mary Lou Federle

160

1792 (42)
E.T.S.I.
Jan. 3, 1981

Mr. Richard E. Traylor Project leader
Bureau of Land Management
Denver Colo.

I am Joel Rickenbach Fall River County S.D. I ranch near Oelrichs S.D. and am a member of S.D. legislature. My ranch is partially within the area that is projected to experience drawdown of the Madison Aquifer should E.T.S.I be allowed to pump 20,200 acre feet of water per year from the well field in Niobrara County Wyo.

The E.I.S. does not adequately address the adverse impact that the use by E.T.S.I., of the Madison water, would have on southwestern S.D., Northwest Neb., and Northeast Wyo. In fact there is no recognition in the cover sheet that there will be any direct effect on Fall River or Custer Counties in S.D. However the Map 5-8 shows the greatest area and amount of drawdown to be in Fall River County if the Niobrara wellfield is used.

The E.I.S. does not address an alternate source of water that would be necessary if in fact the actual drawdown is more than what is speculated. Our Southern Black Hills environment includes the springs, the running streams and vegetation in the subirrigated valleys. These valuable areas of our environment could be adversely affected by a comparatively minor drawdown. The E.I.S. does not show any requirement by E.T.S.I. to stop pumping in case of detrimental drawdown.

The E.I.S. does not give an economic assessment of the loss of 20,200 acre feet of water per year from a semi arid area that is short of usable water. Only present Wyoming users are offered any protection or compensation. There should be an economic value given one million plus acre feet of water that will be lost to the future use and development of this area.

I believe there should be consideration given to the points I have mentioned. I do not believe there was sufficient justification in the E.I.S. to justify sending our good water down a pipeline.

Thank you Joel Rickenbach

P.O. Box 464
Sterling, CO 80751
January 5, 1981

ETSI Project Leader
Bureau of Land Management
555 Zang Street, Third Floor East
Denver, Colorado 80228

Dear Sir:

The undersigned, as a private citizen, hereby makes the following statement in opposition to the proposed ETSI coal slurry pipeline:

Reference is made to enclosure #1, an article from a Denver newspaper. The water crisis is here. I will let the article speak for itself and add only that pumping precious water from the arid west to the humid east is in direct opposition to what this respected author states will have to be done in the future. To my mind, the ETSI plan is not only blind to what will have to be done in the future, but is also totally unconscionable in light of even present day western water uses and needs.

Reference is now made to enclosure #2, another article from a Denver paper. Mr. Wallop no doubt has his reasons for making the statements attributed to him in this article. They are, in fact, grossly in error. First of all, a coal-fired, steam-generating plant uses but a small percentage of the water that passes through it. The steam used to power the turbines is actually condensed in huge coolers and is reused, resulting in little actual water use. Water used for other purposes in such plants is purified and returned to its natural source. It is not, as in the case of the proposed coal slurry pipeline, pumped out of its natural area, never to be returned. Secondly, his statement that "Coors beer annually ships out of Colorado in cans approximately the same amount of water that would go in a slurry pipeline" is so far from fact that it borders on the ridiculous. Coors produced in 1980 13,500,000 barrels of beer at 31 gallons each for a total production 418,500,000 gallons. The proposed coal slurry pipeline would use 20,200 acre feet of water at 325,900 gallons per acre foot for a total of 6,583,180,000 gallons. To say that the difference in the figures is obvious would be a classic understatement. Moreover, Coors is planning to build a new brewery in the humid east, where water is plentiful. The slurry pipelines look only to the arid west for their water needs.

Reference is now made to enclosure #3, a letter written to the editor of the Brotherhood of Locomotive Engineers union newspaper. Our western water would not only be pumped away forever, but the acids that would be borne by it in the coal slurry pipeline would pollute eastern waters. Our western environment cannot withstand this loss of water any more than the eastern environment can withstand any additional pollution of its waters.

Reference is now made to the Energy Efficiency portion of the ETSI Draft Environmental Impact Statement Public Hearings handout. I doubt that the high energy efficiency shown in alternative number 1, the all-rail alternative (370,000 BTU/ton) reflects the fact that the rail carriers are seriously contemplating electrifying their major coal hauling routes. Such electrification would result in even greater efficiency, much of which would result from what is called "regenerative braking". This refers to when a electric train is descending a grade, the engineer can electrically switch the locomotive traction motors to become generators. The power thus generated slows the train and returns to the trolley wire the electrical power produced. This energy is in turn utilized by other trains and reduces the overall electrical demand at the main generating station. In addition to being more efficient, the electric locomotive is non-polluting.

Reference is now made to the portion of the above mentioned handout relating to railroad grade crossing accidents. I doubt if the figure given, 17 accidents per year, reflects the fact that rail/highway grade separation projects are being planned. Even now, in Littleton, Colorado, construction has already begun to place a coal hauling railroad line in a subway in order to eliminate grade crossings. In the east, such projects have been commonplace since the turn of the century. They now will become so in the west.

Reference is now made to land use efficiency. The capacity of a coal slurry pipeline is totally inflexible. When its capacity is to be increased, more land must be acquired so that another pipeline can be constructed. When a railroad wishes to increase its coal hauling capacity, it merely adds another train. If the capacity of a single track is exceeded, a second track is built on the present right of way, and no additional land acquisitions are required.

Claims that I have read in the papers about coal slurry pipelines using mediums other than water to move the coal- mediums such as liquid carbon dioxide- are just not practical. I question how much energy it would take to produce the required 20,200 acre feet of liquid carbon dioxide needed. I also question if the pipeline could remain competitive using such a medium. I doubt it very seriously.

Reference is made to the book To Hell in a Day Coach by Peter Lyon (J.B. Lippincott Co. 1968). On pages 205, 209 and 210 the author reviews a history of the unit train (about all of our western coal moves via unit trains). He also discusses coal slurry pipelines as competition the railroads had to contend with circa 1961. I quote from page 209: "The New York Central admired the idea of the unit train but, for a wonder, its officers wasted no profit margins by competing along the seaboard. Instead, they posted new rates for hauling coal from West Virginia to Cleveland, Ohio, in competition with the one established coal slurry pipeline in the country. Before long that one pipeline had been closed down." The bottom line that has been proved historically is that coal slurry pipelines are not competitive with the unit train.

Coal slurry pipelines are not an actual necessity in order to transport western coal to markets. The railroads have already proven that they can and will expand their coal hauling capabilities to meet any and all increases in demand for western coal. They have, in less than a decade, converted sleepy secondary main lines into heavy duty coal hauling first class main lines. These improvements, which have cost millions of dollars, benefit not only the coal customers, but all other users of the railroad as well, because the railroad is a common carrier. There is little that a railroad cannot transport, but I have yet to hear of anyone shipping a load of lumber via a slurry pipeline.

The known damage that the proposed coal slurry pipeline would do to the western water reserves, the pollution that it would cause to eastern waters, its low energy efficiency as compared to the unit train (even lower when compared to the higher energy efficiency of the proposed electric unit train), its use of valuable crop and pasture lands which are already being lost at a high rate, its non-competitive nature when compared to the unit train, and the fact that, after all that has been said, it is not even needed, are reason enough that the proposed pipeline should never be allowed to be built.

Yours truly,

Paul J. Templeton

Paul J. Templeton

encl: Enclosures #1,2&3

In addition to the above letters that included substantive comments (comments that directly addressed the adequacy and accuracy of the Draft EIS), the BLM received numerous letters that included only opinions about whether the slurry pipeline should be built. The letters printed below are typical of those received on each side of the issue. In all, 132 letters received during the public comment period were against the project and 6 letters were for the project. Some of the 132 letters included petitions with many names on them.

Encampment, Wyoming
January 5, 1981

Bureau of Land Management
Water Resourses Div.
Denver Federal Center
Lakewood, CO.

Dear Sirs;

As concerned citizens of the State of Wyoming, we, the undersigned, would like to take this method to register our complete, and unequivical opposition to the idea of any, and all, coal slurry pipelinee being built in thie State.

Our firet concern, naturally, is the loss of water, without which, our land would immediately revert to a desert condition, such as our ancestors found here, yeare ago. This condition cannot be allowed to take place, under any circumetances.

Regarding traneportation, there are established surface systems, truck, and rail, that must be maintained for everyone's benefit. Transporting coal, regularly over these systems, will help to keep them in good condition, an absolute requirement.

In view of the above, plus countless other negative aspects, We hereby protest any, and all, coal slurry pipelines being built in Wyoming, now, or in the future.

Otto Wirz
Duain Cruse
Walt Cornell
J. William Hall
Cliff Womback
Ronald Wolfard
John McClure
Richard M. Rossire
Ruth O. & Richard D. Tyler
Stephana Herring
Eunice Nyly
Lorraine Cruse
Evelyn Thomas
Dora Harris
Priscilla L. Crook
[illegible]
Vyla Curry
Violet Hall
Lila Payton
Melvin & Julia Briquet
Barbara Herring
Mark G. [illegible]
[illegible]
Fay W. Jackson
Kay Keller
[illegible]

To: Mr. Richard Traylor
555 Zang St. 5th Floor East
Denver, Colorado 80228

FROM

Subject: Coal Slurry Pipeline   Date: 12/11/80

MESSAGE: I wish to express my approval for the pipeline for two primary reasons:

1). I feel that it is a necessary step toward the U.S. becoming self sufficient in energy.

2). The railroads cannot handle the volume of coal necessary and if they could we could not stand the volume of trains and tied up intersections, noise, etc.

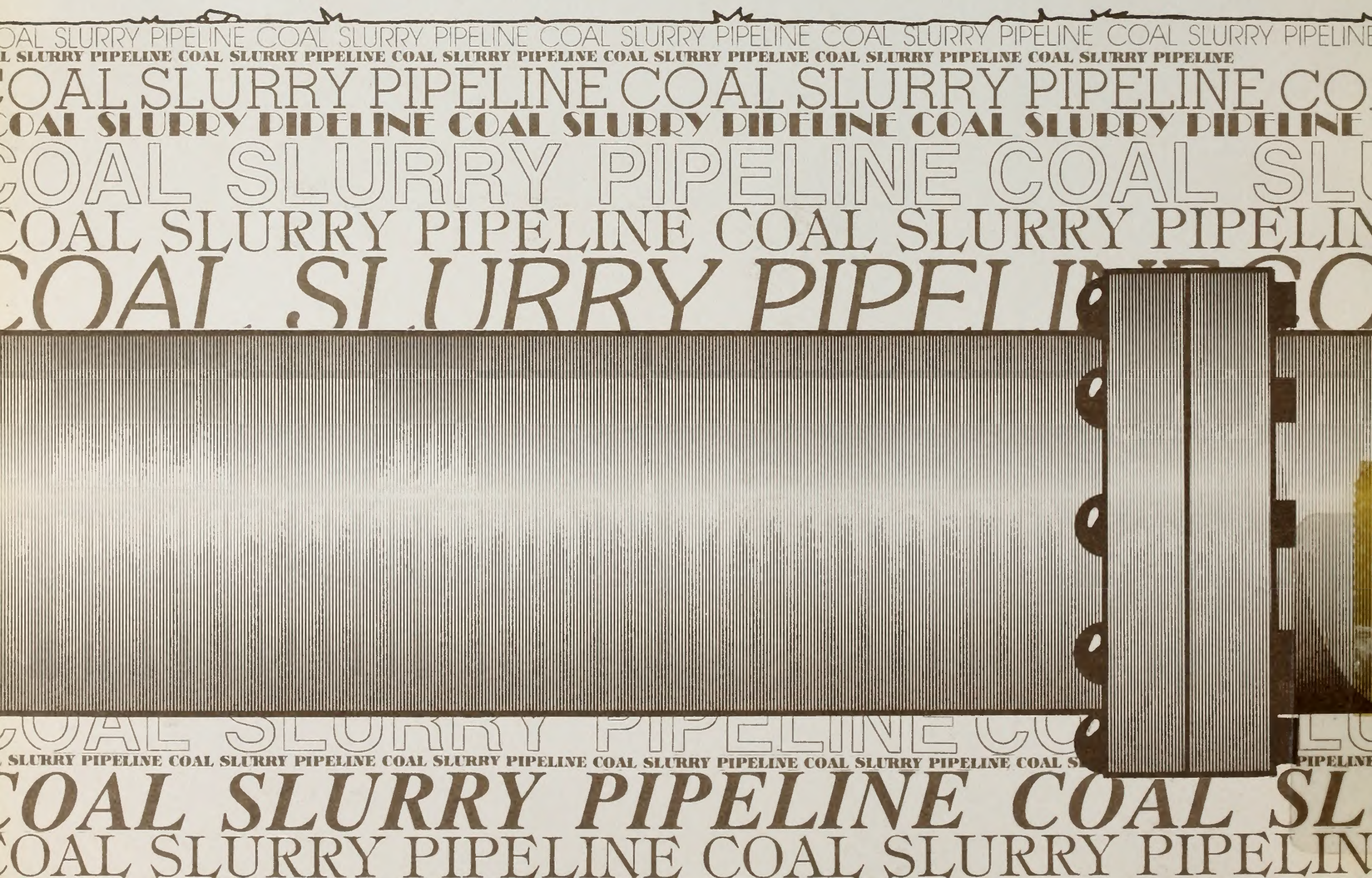
I have noticed in the past 3 or 4 years the trains are getting longer and longer. There are also more and more of them. They hurt the environment much more than the pipeline would.

Signed: Philip A. [illegible]

Rediform 45 468
Poly Pak (50 sets) 4P468

NO REPLY NECESSARY   REPLY REQUESTED — USE REVERSE SIDE

☆ U.S. GOVERNMENT PRINTING OFFICE: 1981 — 777-116/10 Region No. 8


COAL SLURRY PIPELINE COAL SLURRY PIPELINE COAL SLURRY PIPELINE COAL SLURRY PIPELINE COAL SLURRY PIPELINE
COAL SLURRY PIPELINE COAL SLURRY PIPELINE COAL SLURRY PIPELINE
COAL SLURRY PIPELINE COAL SLURRY PIPELINE
COAL SLURRY PIPELINE