San Juan Basin Action Plan

MINERAL RESOURCES TECHNICAL REPORT

for the
Environmental Impact Statement on Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town

United States
Department
of the Interior

Bureau of Land Management
New Mexico State Office
Santa Fe, New Mexico

October 1982

Report 8 of 22

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
P.O. BOX 1449
SANTA FE, NEW MEXICO 87501

IN REPLY REFER TO
NM30840EIS
1792.73(934A)

October 1982

Dear Interested Citizen:

Attached is one of twenty-two technical reports developed as a basis for writing the Environmental Impact Statement on Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town (NMGS EIS). (A list of the technical reports is attached.)

These technical reports provide detailed information on the existing environment, methods used for the impact analysis, and related data supportive of the analysis and conclusions presented in the EIS. These reports should be retained for use with the Draft and Final EIS and other documents related to BLM's San Juan Basin Action Plan (SJBAP).

The Draft NMGS EIS will be filed with the Environmental Protection Agency and released for public review on November 30, 1982. Comments on the Draft EIS will be due by close of business February 7, 1983, at the BLM New Mexico State Office. Because of the large volume of material presented in the technical reports, the BLM is distributing these reports in advance of the Draft EIS to provide sufficient time for public review. The technical reports will be available for public review at the places indicated on the attached list. Copies will also be available from the BLM New Mexico State Office, U.S. Post Office and Federal Building, Santa Fe, for a copy fee.

Informational public meetings are scheduled for December 1982 to provide a public forum to clarify questions and concerns about the SJBAP proposals and the related environmental documents, which will all have been issued by that time. The meetings are scheduled as follows:

- December 14, Civic Center, Farmington, 3 to 9 PM
- December 14, Convention Center, Albuquerque, 3 to 9 PM
- December 15, Chapter House, Crownpoint, 3 to 9 PM
- December 16, Holiday Inn, Gallup, 3 to 9 PM
- December 16, Kachina Lodge, Taos, 3 to 9 PM

In addition, formal public hearings will be held in January 1983 to solicit public comments on the SJBAP Proposals. These meetings are scheduled as follows:

- January 10, Chapter House, Crownpoint, beginning at 1:00 PM
- January 12, Civic Center, Farmington, beginning at 9:00 AM
- January 14 (and 15th if necessary because of the number of registrants), Four Seasons Motor Lodge, Albuquerque, I-40 and Carlisle Blvd., beginning at 9:00 AM (each day)

Questions on the public meetings, hearings, and the technical reports themselves should be directed to:

Leslie M. Cone
NMGS Project Manager
BLM, New Mexico State Office
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6184 FTS 476-6184

Sincerely yours,

Charles W. Luscher

Charles W. Luscher
State Director, New Mexico

List of Technical Reports

1. Purpose and Need
2. Project Description
3. Alternatives to the Project
4. Site Alternatives
5. Permit Reconnaissance
6. Air Quality
7. Geologic Setting
8. Mineral Resources
9. Paleontology
10. Soils, Prime and Unique Farmlands
11. Hydrology
12. Water Quality
13. Vegetation
14. Wildlife and Aquatic Biology
15. Threatened and Endangered Species
16. Cultural Resources
17. Visual Resources
18. Recreation Resources
19. Wilderness Values
20. Transportation
21. Social and Economic Conditions
22. Land Use Controls and Constraints

Availability of Technical Reports for Public Review

Individual copies of the technical reports can be obtained for a copy fee. Inquiries should be directed to:

Bureau of Land Management, New Mexico State Office
Title Records and Public Assistance Section (943B)
U.S. Post Office and Federal Building
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6107 FTS 476-6107

Copies of the reports are available for public review at the locations listed below. [Formal and informal cooperating agencies are denoted by an asterisk (*).]

BUREAU OF LAND MANAGEMENT OFFICES

New Mexico State Office

NMGS Project Staff (934A)
Room 122, Federal Building
Cathedral Place
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6184 FTS 476-6184

San Juan Energy Projects Staff (911)
Room 129, Federal Building
Cathedral Place
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6226 FTS 476-6226

Public Affairs Staff (912)
Room 2016
U.S. Post Office and Federal Building
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6316 FTS 476-6316

Division of Resources (930)
509 Camino de los Marquez, Suite 3
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6212 FTS 476-6212

Albuquerque District Office
3550 Pan American Freeway NE
P.O. Box 6770
Albuquerque, NM 87107
(505) 766-2455 FTS 474-2455

Farmington Resource Area Headquarters
900 La Plata Road
P.O. Box 568
Farmington, NM 87401
(505) 325-3581

Taos Resource Area Office
Montevideo Plaza
P.O. Box 1045
Taos, NM 87571
(505) 758-8851

Socorro District Office
198 Neel Avenue
P.O. Box 1219
Socorro, NM 87801
(505) 835-0412 FTS 476-6280

Las Cruces District Office
1705 N. Valley Drive
P.O. Box 1420
Las Cruces, NM 88001
(505) 524-8551 FTS 571-8312

Roswell District Office
1717 W. Second Street
P.O. Box 1397
Roswell, NM 88201
(505) 622-7670 FTS 476-9251

Carlsbad Resource Area Headquarters
114 S. Halagueno Street
P.O. Box 506
Carlsbad, NM 88220
(505) 887-6544

USDI, Bureau of Land Management
Division of Rights-of-Way (330)
18th and C Streets, NW
Washington, D.C. 20240
(202) 343-5441 FTS 343-5441

USDI, Bureau of Land Management
Denver Service Center (D-460)
Technical Publications Library
Denver Federal Center, Bldg. 50
Denver, CO 80225
(303) 234-2368 FTS 234-2368

NEW MEXICO STATE AGENCIES

New Mexico State Environmental Improvement Division*
725 St. Michaels Drive
P.O. Box 968
Santa Fe, NM 87503
(505) 827-5217, ext. 2416

New Mexico Energy and Minerals Department*
525 Camino de los Marquez
P.O. Box 2770
Santa Fe, NM 87503
(505) 827-3326

New Mexico Historic Preservation Bureau*
State Historic Preservation Officer
505 Don Gasper Avenue
Santa Fe, NM 87503
(505) 827-2108

New Mexico Natural Resource Department*
Villagra Building
Santa Fe, NM 87503
(505) 827-5531

New Mexico Public Service Commission*
Bataan Memorial Building
Santa Fe, NM 827-3361
(505) 827-3361

New Mexico State Engineer's Office*
Bataan Memorial Building
Santa Fe, NM 87503
(505) 827-2423

New Mexico State Planning Office*
505 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827-5191

OTHER ORGANIZATIONS

Public Service Company of New Mexico
Alvarado Square
P.O. Box 2268
Albuquerque, NM 87158
(505) 848-2700

Woodward-Clyde Consultants, Inc.
3 Embarcadero Center, Suite 700
San Francisco, California 94111
(415) 956-7070

PUBLIC AND UNIVERSITY LIBRARIES

Reading copies of the NMGS EIS and associated technical reports will be available at the following public and university libraries:

State and Public Libraries

Albuquerque Public Library
501 Copper Avenue NW
Albuquerque, NM 87102

Aztec Public Library
201 W. Chaco
Aztec, NM 87401

Crownpoint Community Library
c/o Lioness Club, P.O. Box 731
Crownpoint, NM 87313

Cuba Public Library
Box 5, La Jara
Cuba, NM 87027

Farmington Public Library
302 N. Orchard
Farmington, NM 87401

Gallup Public Library
115 W. Hill Avenue
Gallup, NM 87301

Mother Whiteside Memorial Library (Public)
525 W. High Street
P.O. Box 96
Grants, NM 87020

New Mexico State Library
325 Don Gaspar Avenue
Santa Fe, NM 87503

OTHER DEPARTMENT OF THE INTERIOR AGENCIES

Bureau of Indian Affairs*
Albuquerque Area Office
123 4th Street
P.O. Box 2088
Albuquerque, NM 87198
(505) 766-3374 FTS 474-3374

Bureau of Indian Affairs*
Eastern Navajo Agency
P.O. Box 328
Crownpoint, NM 87313
(505) 786-5228

Bureau of Indian Affairs*
Navajo Area Office
Box M - Mail Code 305
Window Rock, AZ 86515
(602) 871-5151 FTS 479-5314

Bureau of Reclamation*
Upper Colorado Regional Office
125 S. State Street
P.O. Box 11568
Salt Lake City, UT 84147
(801) 524-5463 FTS 588-5463

Minerals Management Service*
South Central Region
505 Marquette Avenue NW, Suite 815
Albuquerque, NM 87102
(505) 766-1173 FTS 474-1173

Minerals Management Service*
Resource Evaluation Office
411 N. Auburn
Farmington, NM 87401
(505) 327-7397 FTS 572-6254

National Park Service*
Southwest Regional Office
1100 Old Santa Fe Trail
Santa Fe, NM 87501
(505) 988-6375 FTS 476-6375

National Park Service*
Environmental Coordination Office
Pinon Building, 1220 St. Francis Drive
P.O. Box 728
Santa Fe, NM 87501
(505) 988-6681 FTS 476-6681

U.S. Fish and Wildlife Service*
Field Supervisor, Ecological Services
3530 Pan American Highway, Suite C
Albuquerque, NM 87107
(505) 766-3966 FTS 479-3966

U.S. Geological Survey (WRD)*
505 Marquette Avenue, Room 720
Albuquerque, NM 87101
(505) 766-2810 FTS 474-2817

OTHER FEDERAL AGENCIES AND ORGANIZATIONS

Environmental Protection Agency*
Region VI
1201 Elm Street
Dallas, TX 75270
(214) 767-2716 FTS 729-2716

Navajo Tribe*
c/o Division of Resources
P.O. Box 308
Window Rock, AZ 86515
(602) 871-6592

Pueblo of Zia*
General Delivery
San Ysidro, NM 87053
(505) 867-3304

Soil Conservation Service*
424 N. Mesa Verde
Aztec, NM 87410
(505) 334-9437

U.S. Corps of Engineers*
P.O. Box 1580
Albuquerque, NM 87103
(505) 766-2657 FTS 474-2657

USDA, Forest Service*
717 Gold Avenue
Albuquerque, NM 87102
(505) 474-1676 FTS 474-1676

USDA, Forest Service*
District Ranger
Mt. Taylor Ranger District
201 Roosevelt Avenue
Grants, NM 87020
(505) 287-8833

Harwood Foundation Library
(Public)
25 LeDoux
P.O. Box 766
Taos, NM 87571

University/College Libraries

University of New Mexico
General Library
Albuquerque, NM 87131

Navajo Community College Library
Shiprock Branch
P.O. Box 580
Shiprock, AZ 87420

Northern New Mexico Community College
P.O. Box 250
Espanola, NM 87532

New Mexico State University
San Juan Campus
4601 College Blvd.
Farmington, NM 87401

University of New Mexico, Gallup Campus
Learning Resources Center
200 College Road
Gallup, NM 87301

New Mexico State University/Grants
1500 Third Street
Grants, NM 87020

New Mexico Highlands University
Donnelly Library
National Avenue
Las Vegas, NM 87701

College of Santa Fe
Fogelson Memorial Library
St. Michaels Drive
Santa Fe, NM 87501

MINERAL RESOURCES TECHNICAL REPORT

for the

Environmental Impact Statement on Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town

Prepared by

Woodward-Clyde Consultants

for the

U.S. Department of the Interior
Bureau of Land Management

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MAPS AND FIGURE

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1.0
INTRODUCTION

BACKGROUND

Included in the recent Council on Environmental Quality Regulations (1979) are several important objectives to reduce excessive paperwork in the preparation of environmental impact statements (EISs):

- Discuss only briefly issues other than significant ones.
- Emphasize the portions of the EIS that are useful to decision makers and the public and reduce emphasis on background material.
- Prepare analytic rather than encyclopedic EISs.

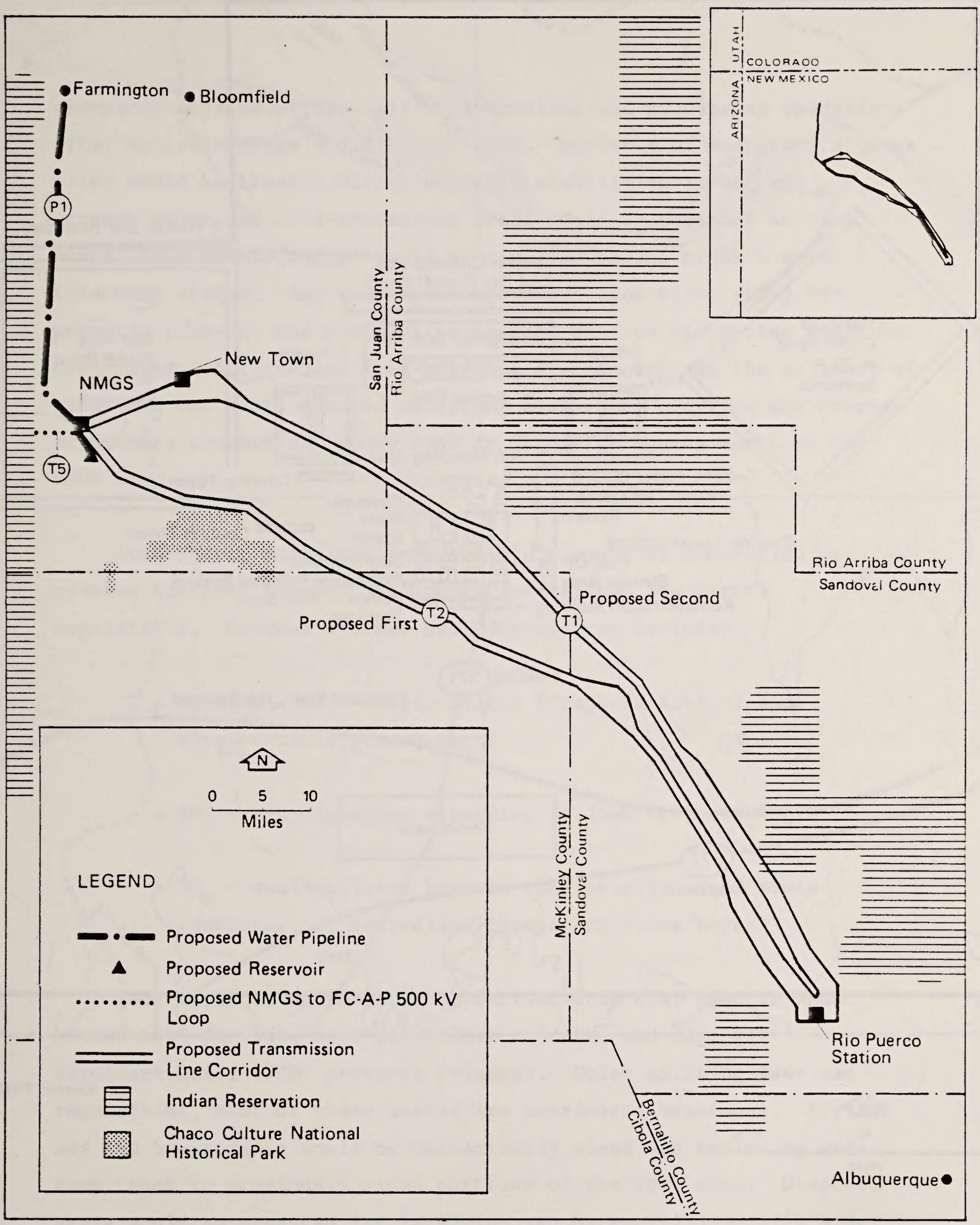
In order to accomplish these objectives and still provide the depth and background required for an analytic impact statement, this technical report has been prepared for the New Mexico Generating Station (NMGS) project. In this report, impacts that were not identified as significant but which are still considered important by the public or technical specialists are analyzed. Background material is provided for those issues and impacts that were considered necessary for the comparison of alternatives. Impacts that were not identified as significant or important by the public and by technical preparers are summarized, and reasons for their elimination from detailed analysis are discussed.

SUMMARY DESCRIPTION OF PROJECT COMPONENTS

Public Service Company of New Mexico (PNM) proposes to construct a 2000-megawatt (MW) coal-fired electric generation plant approximately 35 miles south of Farmington, New Mexico, in San Juan County (Map 1-1). The proposed NMGS, at ultimate development, would have four 500-MW generating units. Each generating unit would include a turbine generator area, coal pulverizer area, boiler area, particulate removal system, SO_2 removal system, and chimney stack. The proposed arrangement of these and other power plant components is shown in Figure 1-1. For the environmental analysis, it was assumed that commercial operation of the first 500-MW unit would begin in 1990 and that other units would start operating during the 1990s.

Coal for NMGS would be acquired through long-term contracts with Sunbelt Mining and Arch Minerals (Proposed Action) or other producers in the San Juan Basin (alternative coal supply). Coal acquired from a joint venture of Sunbelt and Arch Minerals would be supplied from surface mines (referred to as the Bisti mine in this analysis) in the immediate vicinity of the proposed plant site. Coal acquired from other producers in the San Juan Basin would be hauled from mines located as much as 30 miles from the proposed plant site. Coal required for NMGS would average 7.5 million tons per year, or a total of 300 million tons over the 40-year project life.

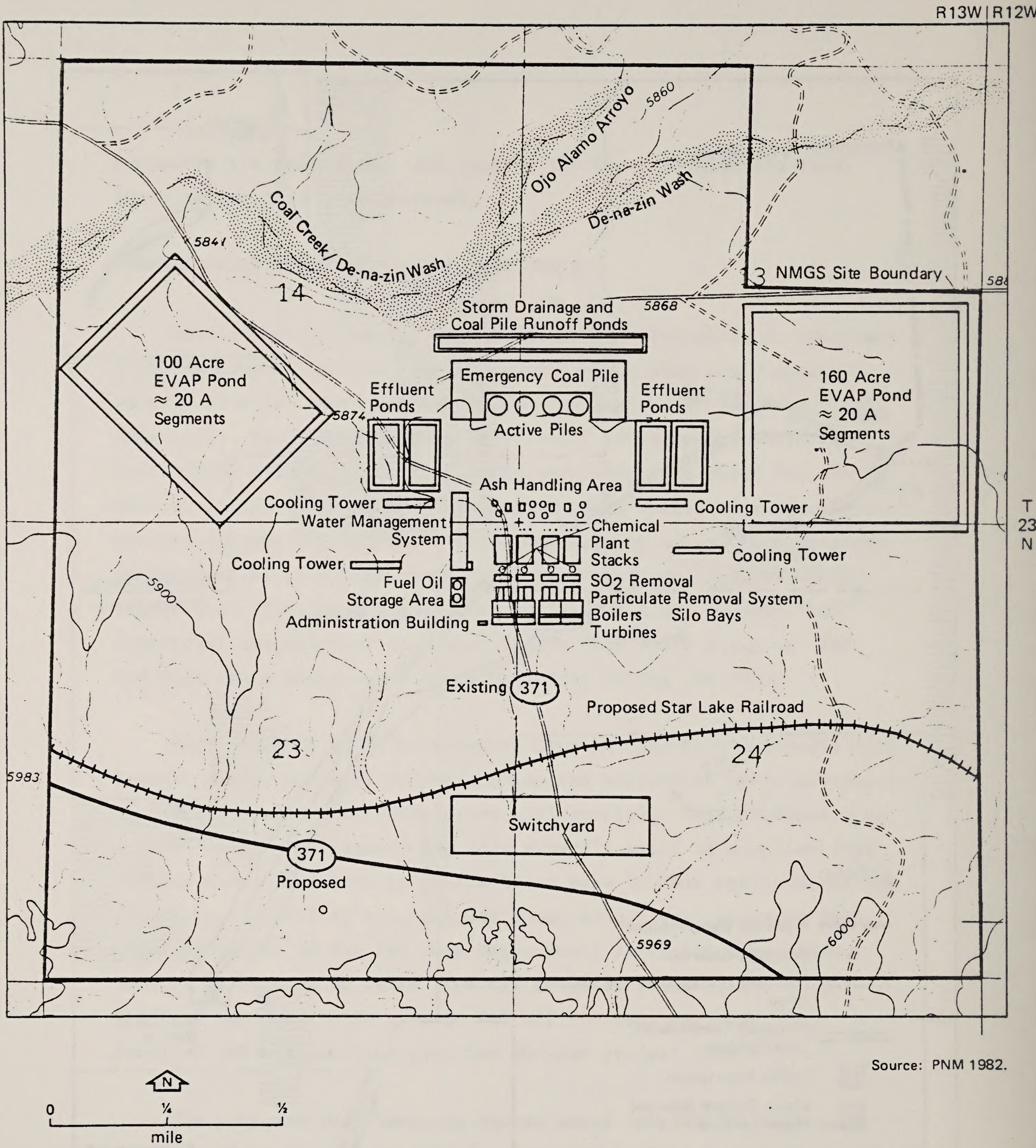
The proposed fuel-handling system would involve hauling coal from the Bisti mine (or other mine locations) by truck to a receiving facility located adjacent to the NMGS site. Coal would then be transferred via conveyor belt from the receiving station to active or



Note: For more information, see the location maps in Appendix G of the EIS.

Source: BLM 1982.

Map 1-1. GENERAL LOCATION OF PROPOSED ACTION



Source: PNM 1982.

Figure 1-1. STATION LAYOUT

emergency storage piles. All coal-handling and processing operations after active storage would be enclosed. Surfaces of emergency storage piles would be treated with a nontoxic stabilizing agent, and all storage piles and coal-processing areas would be designed so that runoff from precipitation would be diverted to the plant's water treatment system. Any coal spills from conveyor belts would be promptly removed, and percolation beneath on-site stockpiles would be controlled. Alternative fuel-handling systems include the delivery of coal from the Bisti mine to receiving station by conveyor and storage of primary crushed emergency coal on Sunbelt property north of the NMGS site.

Atmospheric emissions from the plant would be controlled by systems designed to meet applicable federal and New Mexico regulations. Control systems being considered include:

- Particulates - fabric filter (Proposed Action) and electrostatic precipitator
- SO_2 - wet limestone scrubbing or lime spray drying
- NO_x - dual-register burner, tangentially fired steam generator, or controlled-flow/split-flame burner

Four types of waste would be derived from coal used in NMGS: bottom ash, fly ash, coal pulverizer rejects, and flue gas desulfurization (FGD) products (sludge). Under existing laws and regulations, none of these wastes are considered hazardous. Fly ash and FGD by-products would be mechanically mixed and hauled by end-dump truck to previously mined portions of the coal mine. Disposal areas would be prepared for receiving ash by backfilling with mine overburden. Ash would then be dumped and spread in layers over the mine overburden. After the ash was placed and spread, it would be covered with layers of overburden and surface soil or topsoil and then a vegetative cover would be established. Bottom ash and pulverizer rejects would be collected for disposal in dewatering bins and then hauled by end-dump trucks for disposal into previously mined portions of the coal mine. Procedures for disposal would be the same as for fly ash.

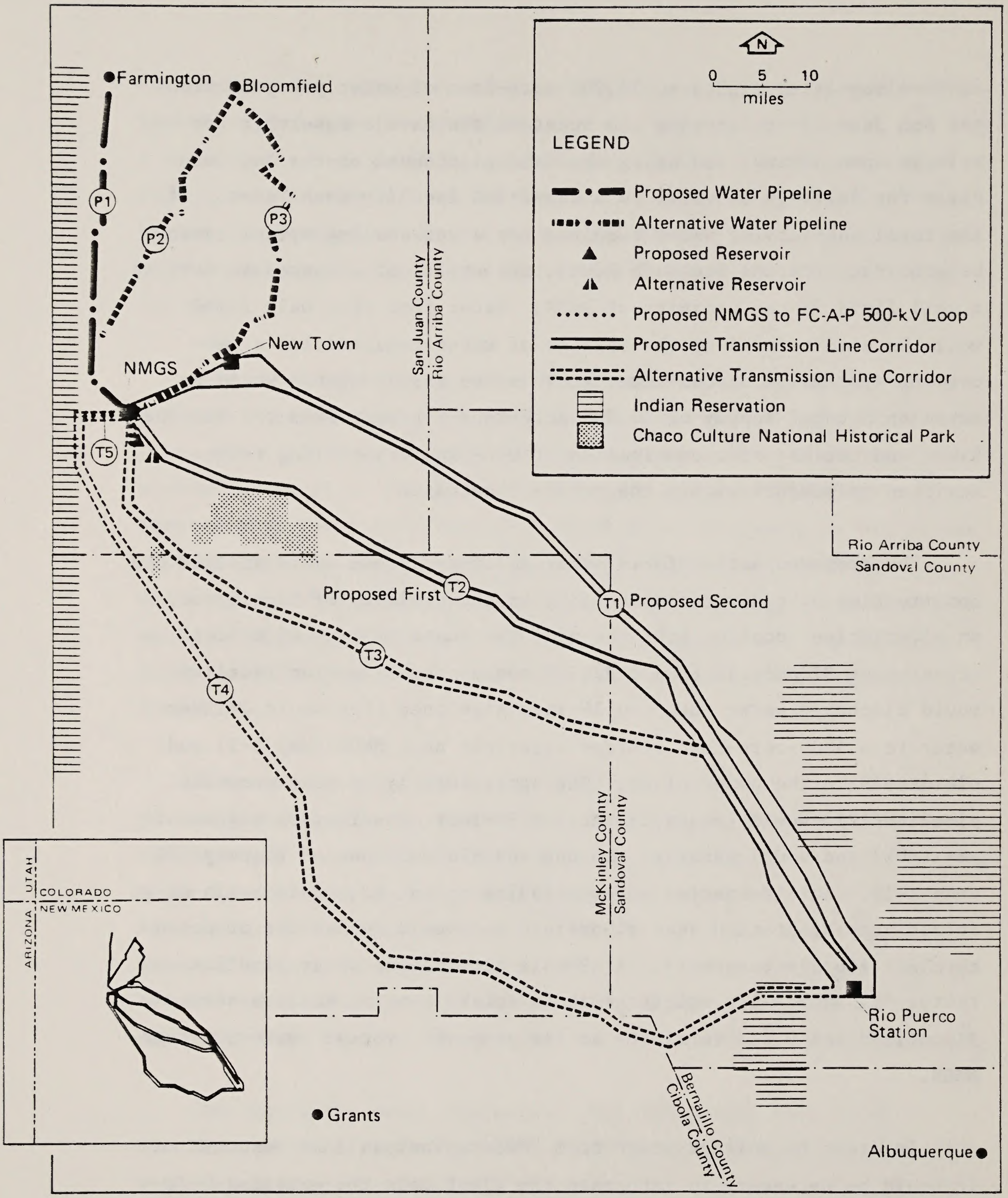
The water management system would contain all equipment necessary to treat and supply all the plant makeup water and potable water. The power plant would be designed and operated as a zero-discharge plant; wastewater would be reused by cascading it to uses requiring successively lower water quality. Used water, degraded to the extent that it could not be economically treated for further in-plant use, would be used for transport and disposal of plant-generated wastes or would be discharged to evaporation ponds (Figure 1-1). Evaporation ponds would be lined with impervious material to limit seepage losses.

Water supplies available for NMGS are believed to be sufficient to construct an all-wet heat-rejection system, based on evaporative cooling, and to use forced-draft cooling towers (Figure 1-1). Cooling-tower makeup water would be drawn from the nearby raw-water storage reservoir. The makeup water would replace the tower losses from evaporation, drift, and blowdown. If sufficient water could not be secured for a totally evaporative system, a water-cooling system employing both dry and conventional wet towers might be required.

The estimated water requirement for NMGS, with four units operating at rated capacity and a heat-rejection system equipped with wet-cooling towers, would be 35,000 acre-feet per year. In order to supply this quantity of water to NMGS, the Proposed Action would involve acquiring rights to 35,000 acre-feet of water per year from the San Juan River, storing the water in the Navajo Reservoir for release upon demand, and using the natural channel of the San Juan River for delivery of water to a diversion facility downstream. If the total quantity of water required for a wet-cooling system cannot be acquired from the San Juan River, the applicant proposes to develop a well field in the vicinity of NMGS. Water from this well field would be used to make up the balance of water required for a wet-cooling system. A second alternative water supply system would be based on a total supply of 20,000 acre-feet per year from the San Juan River and the use of a combination of wet- and dry-cooling towers designed to perform within the supply constraint.

The Proposed Action for a water delivery system would include the construction of a diversion facility in the vicinity of Farmington; an alternative location would be near the State Highway 44 bridge crossing at Bloomfield (Map 1-2). Pumps at the diversion facility would discharge water into two 36-inch pipelines that would deliver water to a 4000-acre-foot storage reservoir near NMGS (Map 1-1) and ultimately to the power plant. The approximately 40-mile proposed pipeline (P1) would generally require 90-foot construction rights-of-way (ROW) and would parallel the new and old portions of Highway 371 (Map 1-1). An alternative water pipeline route, P2, would begin at an intake pumping station near Bloomfield and would end at the proposed terminal storage reservoir. A 49-mile alternative water pipeline route, P3, would also originate at an intake pumping station near Bloomfield and would terminate at the proposed storage reservoir near NMGS.

In order to deliver power from NMGS to various load centers, it would be necessary to integrate the plant into the existing bulk



Note: For more information, see the location maps in Appendix G of the EIS.

Source: BLM 1982.

Map 1-2. GENERAL LOCATION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION transmission systems of PNM and neighboring utilities. Thus the proposed transmission system would consist of a 500-kilovolt (kV) loop linking NMGS with PNM's approved 500-kV Four Corners-Ambrosia-Pajarito (FC-A-P) line, located approximately 5 miles west of NMGS, and two 500-kV lines linking NMGS with the Albuquerque distribution and load center at the proposed Rio Puerco Station (Map 1-1). The NMGS-Albuquerque system would be installed in phases: the 500-kV loop in 1990 with commencement of commercial operation of Unit 1, the first 500-kV line with Unit 2 in 1993, and the second 500-kV line with Unit 4 in 1998.

Four routes are considered technically and economically feasible for construction of the 500-kV transmission system. Route T2 is proposed for the first 500-kV line and route T1 is proposed for the second 500-kV line; routes T3 and T4 are alternatives to the Proposed Action. The total distance traversed would be similar for the two proposed and two alternative corridors: 101 miles (T2), 107 miles (T1), 105 miles (T3), and 126 miles (T4). With the exception of tower sites, the proposed 200-foot ROW could support other compatible land uses, such as grazing. PNM would keep the transmission line ROW closed and would patrol the line by helicopter each month. Lands disturbed by heavy equipment and temporary access roads would be restored to their original condition.

Table 1-1 displays construction work force estimates over time. Construction employment for station facilities would reach peaks of 1515 employees in 1987 and 1530 employees in 1992. Operations employment at station facilities would increase steadily, from 30 employees in 1989 to 900 employees in 1999 when all four units are expected to be on-line.

Table 1-1. NMGS CONSTRUCTION AND OPERATION EMPLOYMENT

Year	Intake Pipeline and Reservoir	500-kV Transmission Line	NMGS Construction Unit 1	NMGS Construction Unit 2	NMGS Construction Unit 3	NMGS Construction Unit 4	NMGS Construction Total	NMGS Operation Unit 1	NMGS Operation Unit 2	NMGS Operation Unit 3	NMGS Operation Unit 4	NMGS Operation Total	Total Employment	Annual Change
1985	—	—	85	—	—	—	85	—	—	—	—	—	85	+85
1986	—	—	800	—	—	—	800	—	—	—	—	—	800	+715
1987	115	—	1515	—	—	—	1630	—	—	—	—	—	1630	+830
1988	295	104	1180	30	—	—	1505	—	—	—	—	—	1505	-125
1989	—	—	360	450	—	—	914	30	—	—	—	30	944	-560
1990	—	—	100	940	40	—	1080	200	—	—	—	200	1280	+336
1991	—	—	—	750	570	—	1320	250	—	—	—	250	1570	+290
1992	—	—	—	270	1260	—	1530	250	24	—	—	274	1804	+234
1993	—	—	—	105	955	30	1090	250	160	—	—	410	1500	-304
1994	—	78	—	—	325	435	838	250	200	30	—	480	1318	-182
1995	—	—	—	—	90	940	1030	250	200	200	—	650	1680	+362
1996	—	—	—	—	—	775	775	250	200	250	—	700	1475	-205
1997	—	—	—	—	—	255	255	250	200	250	24	724	979	-496
1998	—	—	—	—	—	95	95	250	200	250	160	860	955	-24
1999	—	—	—	—	—	—	0	250	200	250	200	900	900	-55

Source: PNM 1980, unpublished data.

According to PNM (unpublished data, 1980), estimated construction employment skill requirements would be as follows:

Skill	Percent of Total Construction Work Force
Boilermakers	9.4
Pipefitters	14.2
Electricians	14.4
Carpenters	5.6
Ironworkers	10.0
Operators	10.0
Laborers	9.0
Teamsters	4.1
Cement masons	0.8
Millwrights	3.3
Insulators	4.0
Sheetmetal workers	1.1
Painters	1.2
Others	0.5
Supervision	12.4

The above estimates are averaged for construction of all four units.

SAN JUAN BASIN ACTION PLAN OVERVIEW AND RELATIONSHIP OF THE NMGS EIS TO ACTIONS INCLUDED IN THE PLAN

The proposed site for the NMGS is located in the San Juan Basin of northwestern New Mexico. The Bureau of Land Management (BLM) is responsible for the management of much of the land and mineral resources in this area, and currently has six separate but interrelated proposals under consideration within the basin. In order to respond to these, the BLM has developed a San Juan Basin Action Plan (SJBAP). This plan provides for the organizational arrangements whereby the environmental analyses and decision making can be implemented in a timely and efficient manner. The plan describes the process for preparation of three site-specific EISs (including the NMGS EIS) and three Environmental Assessments (EAs):

- Coal Preference Right Lease Applications (EA)
- San Juan River Regional Coal Leasing (EIS)
- Wilderness Study Areas (WSAs) (EIS)
- New Mexico Generating Station (EIS)
- Ute Mountain Land Exchange (EA)
- Bisti Coal Lease Exchange (EA)

In addition to these documents, the action plan provides for the preparation of a Cumulative Overview (CO). The CO is intended to focus on the cumulative impacts that would result from the proposed actions analyzed in the EISs and EAs listed above and therefore to facilitate public review and decision making. As a result of this organization, the impact analysis in the NMGS EIS and technical background reports concentrates on the impacts expected to result from the specific NMGS components proposed. The cumulative impacts expected to result from the proposed NMGS, in addition to the cumulative impacts of other proposals to be developed in the same time period, are described in the CO.

BASELINE CONDITIONS ASSUMED FOR THE NMGS TECHNICAL REPORT IMPACT ANALYSES

The site-specific impact analysis for this technical report was based on the affected environment and available resources that would be existing at the time of construction and operation of the NMGS facility. Since construction at the NMGS facility would not begin until 1985, certain assumptions regarding project development in the San Juan Basin were necessary. Two levels of project development were considered, along with criteria for each, in developing a status for the various non-SJBAP actions proposed for the San Juan Basin area.

- Baseline 1 - The projects considered in this level of development are those that have approval and are to be built or under construction in 1985. This level represents the projected existing environment without the proposals included in the SJBAP.

- Baseline 2 - The projects considered in this level are in some phase of the application stage. In this level, Baseline 1 projects are added to any projects in Baseline 2 along with any revision in resource production or uses (e.g., coal).

Where differences in Baselines 1 and 2 affect the results of impact analyses, discussion is provided. If no differences are identified, it should be assumed that consideration of the two different baselines did not alter the impact analyses.

A complete list of projects and comprehensive location maps for Baselines 1 and 2 are provided in Appendix C of the NMGS EIS.

ORGANIZATION OF THE REPORT

Section 2.0 of this technical report describes the assumptions and methodological approach used in the assessment of potential impacts of the Proposed Action on the affected environment. In addition, Section 2.0 contains a definition of the study area and identification of data sources.

Section 3.0, Affected Environment, contains baseline data on existing conditions in the study area, as well as projections of future conditions without the Proposed Action. Information on historical trends is presented where it is useful in providing a basis for predicting most likely future trends. The description of projected future trends takes into consideration the changes in the environment that are expected to occur as a result of the projects identified in Baseline 1. This provides a reasonable estimate of the future existing environment against which the potential impacts of the Proposed Action and alternatives can be assessed.

Section 4.0 describes the potential effects of implementing the Proposed Action and alternatives. Impacts identified are measured against indicators of significance in order to estimate the importance of the impact to the affected human environment. (Potential impacts associated with alternatives to the Proposed Action are compared in Section 9.0.)

In Section 5.0, mitigation measures are suggested. These measures would help to alleviate the potentially significant adverse impacts or enhance the beneficial impacts identified in the Section 4.0 analysis. Those potentially adverse impacts for which no appropriate mitigation measures have been suggested are discussed in Section 6.0 as "unavoidable adverse impacts."

MINERAL RESOURCES

The proposed NMGS would be located within a region that is rich in a variety of mineral resources. Among the more important mineral commodities are coal, oil and gas, sand and gravel, uranium, and limestone. The generating station and related facilities would occupy land underlain by most or all of these commodities, and some would be consumed during construction and operation of the proposed project. Other mineral deposits in the region include humate and baked shale. This report is intended to provide basic data concerning how the project relates to, and may affect, these various mineral resources. As the project may affect mineral resources in two ways--i.e., by occupying deposits or by consuming deposits--the project region may be defined in two ways: (1) it may be narrowly defined as the area directly underlying the proposed project features, or (2) it may be broadly defined as the San Juan Basin and the Grants region.

The impact of the project on mineral resources is analyzed on the assumption that all coal now considered strippable will eventually be mined. The consumptive and preemptive use of minerals other than coal would be insignificant, regardless of any reasonable projected baseline for future development. Therefore Baselines 1 and 2 were not considered, since no discernible differences in assessment findings could be expected. The mineral resources that would be or might be affected by the proposed project are described in Section 3.2.

commodities are sand, oil and gas, sand and gravel, granite, and limestone. The generating station [illegible] would be [illegible] under[illegible] by some or all of these [illegible], and some could be [illegible] during construction and operation of the [illegible] project. [illegible] deposits in the region include [illegible] and [illegible]. This report is intended to [illegible] basic [illegible] and [illegible] how the project relates to, and may affect, these [illegible] resources. [illegible] the project [illegible] affect [illegible] resources [illegible] by [illegible] of [illegible] resources [illegible]. [illegible] may be [illegible] in [illegible] way. [illegible] may be [illegible] of the area directly underlying the proposed project features [illegible] may be [illegible] [illegible] and the [illegible].

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2.0
FRAMEWORK FOR ANALYSIS

2.1 GEOGRAPHIC AREA OF INFLUENCE

The geographic area of influence considered for the assesment of project impacts on mineral resources includes the following individual areas:

1. Areas immediately underlying proposed project features
2. Valley of San Juan River (sand and gravel source)
3. Grants region (possible limestone source)
4. Southeastern Utah (possible limestone source)
5. Southwestern Colorado (possible limestone source)
6. Belen area (possible limestone source)

Areas 1 and 2, above, would be directly affected during construction. The impacts in areas 3 through 6 would be indirect, as these areas are not contiguous with areas 1 and 2 and they would not be affected until the proposed plant is ready for operation (if, indeed, they would be affected at all).

2.2 INDICATORS OF IMPACT SIGNIFICANCE

The following indicators of significance were considered in reviewing the data and performing the assessment:

1. Preemption of extraction of mineral resources underlying project features in cases where those mineral resources are not readily available elsewhere nearby or where the value of the preempted resource exceeds that of the proposed project feature.

2. Construction and/or operation of the project would require consumptive use of 1 percent or more of the available mineral resource.

2.3 METHODS OF DATA COLLECTION

Data Collection Procedures

The initial studies leading to this report included the following steps:

1. Computer-assisted data searches, using the GEOREF, MILS, and CRIB information retrieval systems
2. Review of geologic map indexes for New Mexico
3. Review of U.S. Geological Survey Card Catalogue listings for New Mexico
4. Review of WCC files on PNM regional siting study
5. Review of publications identified by above-listed means
6. Ground and aerial reconnaissance of project region

Verification Methods

The information gained by the procedures listed above was verified and supplemented by means of contacts with representatives of federal and state agencies and institutions, including the following:

1. Bureau of Land Management; Farmington, Albuquerque, and Santa Fe

2. U.S. Geological Survey, Albuquerque
3. New Mexico State Highway Department, Santa Fe
4. New Mexico Energy and Minerals Department, Santa Fe
5. New Mexico Bureau of Mines and Mineral Resources, Socorro
6. Department of Geology, University of New Mexico, Albuquerque

Identification of Data Gaps and Means of Resolution

Data gaps were identified by means of Woodward-Clyde Consultants' internal QA system, which involves a peer review process, and by means of BLM and PNM review of the preliminary draft report. The questions that were raised as a result of this process were resolved by means of supplementary contacts with persons having special information on the project area, and by obtaining additional references mentioned by those persons. Data and maps previously reviewed were examined in more detail in this stage, so that more complete descriptions and assessments could be made where requested.

2.4 INTERRELATIONSHIPS

The assessment of impacts related to mineral resources took into account information gained during studies of other technical areas and of social issues. Due to the total dependence of mineral resource occurrence on geologic processes, the same individual served as task leader for both mineral resources and geology. This greatly facilitated the work, as the data sources were essentially the same. Contacts were made with, and information passed along to and received from, the other discipline leaders as items of mutual interest were encountered during the course of the work.

During one working meeting attended by all of the discipline leaders, a chart was compiled in an attempt to examine the interrelationships. The following relationships were noted for mineral resources:

a. Minerals (impact)
b. Geology (issue)
c. Paleontology (issue)
d. Cultural (issue)
e. Soils (impact)
f. Hydrology (issue)
g. Water quality (issue)
h. Vegetation (issue)
i. Visual (issue)
j. Social and economic conditions (issue)
k. Transportation (important impact)

The reasons for these judgments of the interrelationships are summarized below, using the same letter designations as above.

a. Consumptive use of certain minerals would reduce the available supply of certain minerals.

b. Mining of minerals would disturb the existing geologic environment (although in a relatively minor way); in the case of mining of coal, there would be a potential for spontaneous combustion.

c. Mining of limestone probably would reduce the volume of paleontological specimens available for study, collection, or sale.

d. Some minerals have been used by the Indians, but the specific locations at which they were obtained are not known. It may be considered appropriate to ascertain whether any of these (unknown) locations would be disturbed by the Proposed Action.

e. Mining of minerals for use in construction or operation of the proposed power plant would entail disturbance of the surface soil, perhaps causing accelerated erosion.

f. Hydrologic conditions, both surface and subsurface, could be modified by mining activity for extraction of minerals to be used by the Proposed Action.

g. Runoff across strip-mined areas would tend to pick up minerals in suspension or in solution, possibly reducing the quality of the body of water into which the runoff would move.

h. Vegetation would be removed prior to mining, and might be difficult to reestablish.

i. Strip mines, such as might be developed for extraction of minerals for project use, are not visually attractive in many cases.

j. Consumption of minerals by the project would provide economic opportunities, presumably thereby improving the social condition of persons availing themselves of these opportunities.

k. Transportation of sand, gravel, and limestone to the NMGS site would entail the movement of many truckloads of material per day from the quarry sites, potentially creating undesireable conditions of traffic, noise, and dust in communities through which these trucks might pass.

3.0 AFFECTED ENVIRONMENT

3.1 OVERVIEW

Extensive deposits of gravel are present along the San Juan River and its major tributaries, in or near the general vicinity in which the various proposed water intake structures would be located. The pipeline routes would cross areas underlain by deposits of oil, gas, coal, and baked shale. The proposed NMGS site and one of the proposed reservoir sites also contain deposits of coal and baked shale. Various proposed transmission line routes would cross deposits of coal, baked shale, and uranium. Deposits of minerals used by the Indians are present at unknown locations in the general region that would be traversed by the project. Vast deposits of limestone, potentially valuable for the NMGS emissions control process, are present in the Grants District, near Belen, and in adjacent states in the Four Corners area. Mines and mineral resources in the vicinity of NMGS project components are shown on Map 3-1.

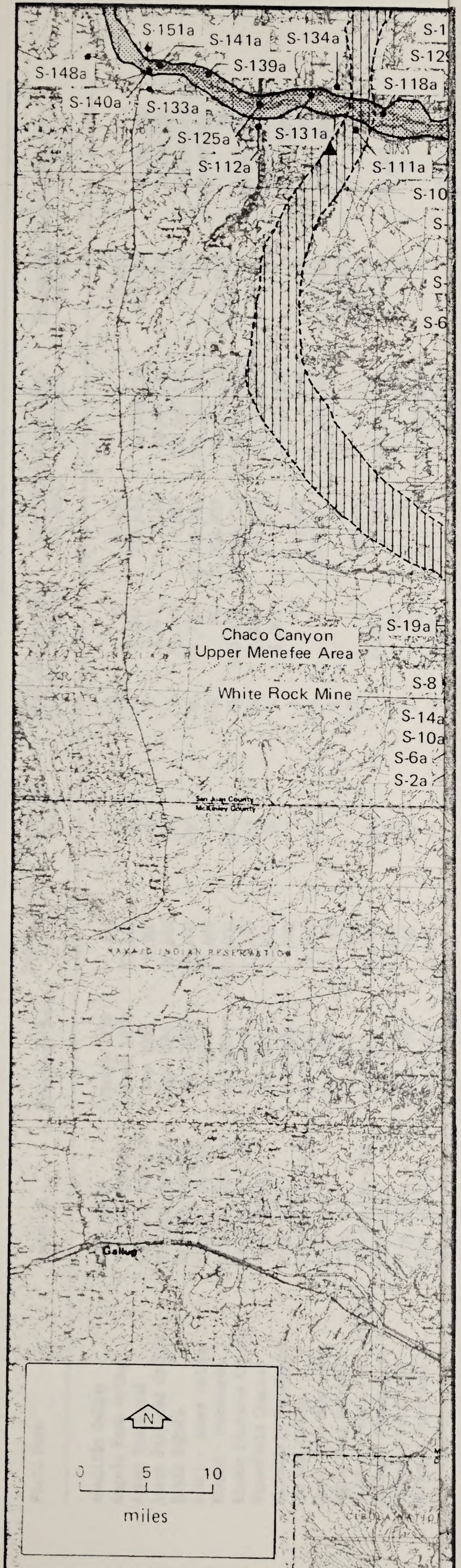
3.2 SUMMARY: MINERAL RESOURCES IN PROJECT AREA

The stratigraphy of the geologic units referred to in the following section is discussed in detail in the Technical Report on Geologic Setting.

Oil and gas were first discovered in the project region about 60 years ago. Most of the oil is produced from stratigraphic traps in the Gallup and Niobrara sandstones. There are a few fractured shale reservoirs in the Niobrara part of the Mancos Shale, and several small structurally controlled fields in the Dakota Sandstone. Small amounts of oil are also produced from stratigraphic-structural traps in channel sandstones of the Menefee Formation (Molenaar 1977). Oil discoveries have been made recently in small structural traps in the Entrada Sandstone (Arnold and Hill 1981).

The major production of gas comes from the Dakota, Point Lookout (Mesaverde), Menefee (Mesaverde), Cliff House (Mesaverde), and Pictured Cliff sandstones (Molenaar 1977). Gas production also comes from the Graneros, Greenhorn, Sanostee, Mancos, Farmington, and Gallup formations. Structural traps are responsible for some gas accumulations, but all of the major gas-producing fields of the San Juan Basin represent stratigraphic traps (Fassett and others 1978). One of the largest accumulations--the Basin Dakota field--is in a stratigraphic trap (Meiji 1979); Deischl (1973) presents detailed information concerning this field. Another large field--the Blanco--produces from the Fruitland, Mesaverde, and Pictured Cliffs formations (Fassett et al. 1978). This field is unique in that the accumulation is hydrodynamically controlled in the structurally low part of the San Juan Basin (Molenaar 1977).

Relatively comprehensive information on production history and estimated reserves of specific fields has been compiled by the Four Corners Geological Society (Fassett et al. 1978). Selected data pertaining to fields that would be crossed by various features of the proposed project have been excerpted from that publication and are presented in Table 3-1. The project features that would cross these fields are indicated in Table 3-2. However, it is not anticipated that construction of the project would significantly affect operation and continued development of these fields, because the well spacing



LEGEND

Coal considered strippable. From Link and Kelly (1980).

Coal considered strippable. From Tabet and Frost (1978).

Quaternary alluvium and terrace deposits. From New Mexico State Highway Department (undated).

• Mine or quarry, as defined by U.S. Bureau of Mines (MILS). The prefix denotes which 1 x 2 sheet the mine is located on (Al = Albuquerque, S = Shiprock). The suffix "a" denotes an aggregate resource. See Appendices A and B for further detail.

■ Recently located or newly identified mine; not in MILS data base.

▲ Limestone quarry.

Map 3-1. MINES AND MINERAL RESOURCES IN PROJECT AREA the Gallup and Niobrara sandstones. There are a few fractured shale reservoirs in the Niobrara part of the Mancos Shale, and several small structurally controlled fields in the Dakota Sandstone. Small amounts of oil are also produced from stratigraphic-structural traps in channel sandstones of the Menefee Formation (Molenaar 1977). Oil discoveries have been made recently in small structural traps in the Entrada Sandstone (Arnold and Hill 1981).

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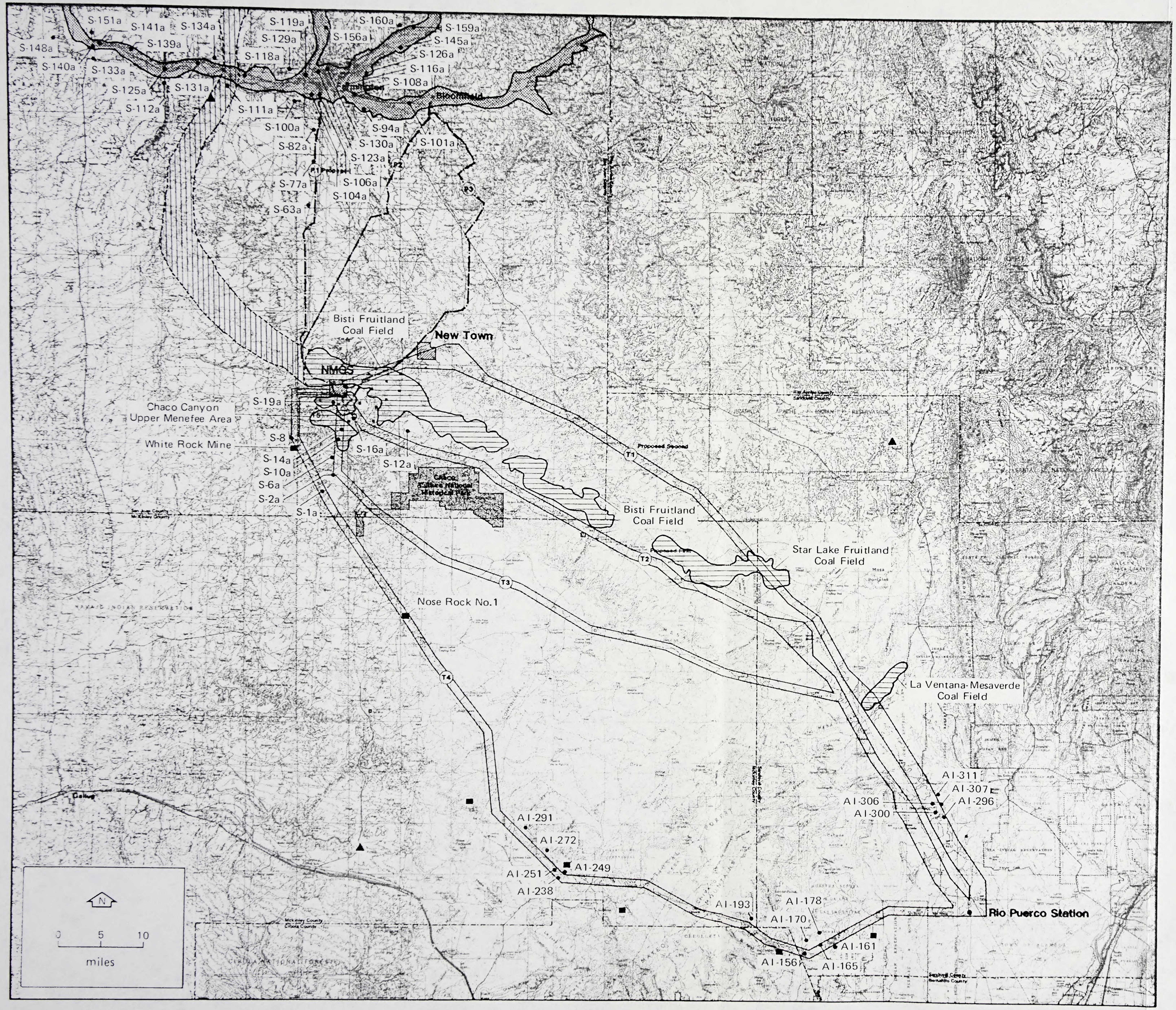

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Coal considered strippable. From Link and Kelly (1980).

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Quaternary alluvium and terrace deposits. From New Mexico State Highway Department (undated).

• Mine or quarry, as defined by U.S. Bureau of Mines (MILS). The prefix denotes which 1 x 2 sheet the mine is located on (AI = Albuquerque, S = Shiprock). The suffix "a" denotes an aggregate resource. See Appendices A and B for further detail.

■ Recently located or newly identified mine; not in MILS data base.

▲ Limestone quarry.

Map 3-1. MINES AND MINERAL RESOURCES IN PROJECT AREA

Table 3-1. OIL AND GAS FIELDS IN PROJECT AREA

Field Name	Location	Discovery Date	Proved Area (acres)	Producing Wells	Daily Production		Cumulative Production		Estimated Ultimate Recovery	
					Oil(bbl)	Gas(mcf)	Oil(bbl)	Gas(mcf)	Oil(bbl)	Gas(mcf)
Amarillo Gallup	T28N, R13W	March 1958	240	2	2.5	-	47,454	-	55,000	-
Angels Peak Gallup	T26-27N, R9-10W	March 1958	15,680	41	70	5,260	728,414	54,058,726	854,000	66,000,000
Aztec Fruitland	T29-30N, R10-11W	June 1952	8,160	49	-	2,473	2,114	13,607,752	2,114	33,600,000
Aztec Pictured Cliffs	T28-31N, R9-12W	Sept 1941	80,640	504	-	29,385	9,069	232,992,542	9,069	432,992,540
Basin Dakota	T23-32N, R3-14W	April 1947	766,400	2395	NA	416,720	27,186,314	2,753,610,459	NA	5,000,000,000
Bisti - Lower Gallup	T25-27N, R9-14W	Oct 1955	37,460	94	450	NA	33,704,857	72,572,151	45,000,000	NA
Blanco - Mesaverde	T25-32N, R2-13W	Dec 1927	857,000	2400	NA	640,000	17,849,174	4,398,817,947	NA	12,000,000,000
Blanco Pictured Cliffs	T28-32N, R7-12W	Dec 1927	73,120	457	NA	77,882	159,610	218,357,633	NA	818,357,633
Bloomfield Chacra	T29N, R10-11W	May 1972	2,080	16	-	1,066	-	1,534,280	-	11,000,000
Bloomfield Farmington	T29N, R11W	July 1924	100	1	1	-	>43,425	NA	NA	NA
Cha Cha Gallup	T28-29N, R12-15W	Oct 1959	7,840	42	274	7	8,699,177	17,965,301	9,000,000	17,978,000
Chaco Wash Mesaverde	T20N, R9W	Sept 1961	40	5	6	-	NA	-	100,000	-
Eagle Mesa Entrada	T19N, R4W	Aug 1975	215	4	460	-	280,684	-	1,615,000	-
Fulcher - Kutz Pict. Cliffs	T27-30N, R9-13W	Nov 1927	53,760	336	-	77,882	5,445	226,374,510	5,445	326,375,500
Gallegos Farmington, S.	T26N, R12W	Aug 1976	160	0	0	0	NA	NA	NA	522
Gallegos Fruitland	T27N, R11W	March 1972	160	1	-	20	-	804,649	-	NA
Gallegos Fruitland, S.	T26N, R11-12W	May 1968	2,500	14	-	1,754	-	3,333,680	-	10,000,000
Gallegos Gallup	T26-27N, R11-13W	Sept 1954	10,240	27	73	1,753	1,685,794	31,889,888	2,256,000	38,911,000
Kutz Farmington	T28N, R11W	Oct 1955	640	1	-	20	-	259,468	-	500,000
Kutz Fruitland	T28N, R10-11W	Oct 1956	2,080	NA	-	1,328	-	5,963,750	-	16,000,000
Kutz Gallup	T27N, R11W	July 1958	1,600	1	2	-	540,862	2,214,900	542,000	2,300,000
Kutz Pictured Cliffs	T26-29N, R10-13W	May 1950	31,840	199	-	10,825	297	121,800,873	297	211,800,873
Marcelina Dakota	T16N, R9-10W	Jan 1975	70	6	15	NA	9,342	18,366	650,000	NA
Media Entrada	T19N, R3W	Oct 1953	216	4	140	-	960,457	-	2,198,000	-
Media Gallup	T19N, R3W	May 1969	80	1	13	-	21,620	-	NA	-
Nipp Pictured Cliffs	T25-26N, R12W	April 1975	4,960	31	-	3,000	-	1,435,314	-	7,500,000
Papers Wash Entrada	T19N, R5W	Oct 1976	405	6	690	-	244,422	-	NA	-
Pinon Fruitland	T28N, R11-12W	June 1966	1,920	12	-	925	-	3,734,562	-	5,406,000
Pinon Gallup	T28N, R11-12W	May 1966	1,640	3	20	76	314,378	684,058	350,000	809,000
Rusty Chacra etc.	T22N, R7W	Nov 1974	6,400	16	16	76	1,385	34,450	NA	6,000,000
Stoney Butte Dakota	T21N, R14W	Sept 1950	NA	0	0	-	7,714	-	7,714	-
Stoney Butte Mesaverde	T22N, R14W	Sept 1953	15	0	-	-	NA	NA	NA	NA
Torreon Mesaverde	T18-19N, R4W	Dec 1953	40	0	-	-	350	NA	350	NA
Totah Gallup	T28-29N, R12-14W	Sept 1959	5,600	48	48	462	3,323,447	6,753,066	3,394,000	6,753,066
Walker Dome Mancos	T15N, R10W	NA 1945	NA	0	-	-	0	0	-	-
WAW Fruit.-Pict. Cliffs	T26-27N, R13W	June 1970	8,960	30	-	750	-	626,412	-	4,000,000

Data source: Fassett and others (1978).

Note: bbl = barrels
mcf = thousand cubic feet

Table 3-2. PROJECT FEATURES CROSSING OIL AND GAS FIELDS

Project Feature	Oil and Gas Fields Crossed
Intake, Pipeline Route P1	Basin Dakota, Blanco Mesaverde, Cha Cha Gallup, Kutz Pictured Cliffs, and Totah Gallup
Pipeline Route P1	Amarilla Gallup, Basin Dakota, Bisti, Lower Gallup, Blanco Mesaverde, Cha Cha Gallup, Kutz Pictured Cliffs, Totah Gallup, and WAW Fruitland - Pictured Cliffs
Intake, Pipeline Route P2	Aztec Fruitland, Aztec Pictured Cliffs, Basin Dakota, Blanco Mesaverde, Blanco Pictured Cliffs, Bloomfield Chacra, Bloomfield Farmington, and Fulcher - Kutz Pictured Cliffs
Pipeline Route P2	Same as intake for P2; also, Gallegos Farmington South, Gallegos Fruitland South, Gallegos Gallup, Kutz Fruitland, Kutz Pictured Cliffs, Nipp Pictured Cliffs, Pinon Fruitland, and Pinon Gallup
Intake, Pipeline Route P3	Same as intake for Pipeline Route P2
Pipeline Route P3	Same as intake for P3; also, Angels Peak Gallup, Bisti Lower Gallup, Gallegos Fruitland, Gallegos Fruitland South, Gallegos Gallup, and Kutz Pictured Cliffs
Transmission Route T2	Papers Wash Entrada and Torreon Mesaverde
Transmission Route T1	Chaco Wash Mesaverde, Eagle Mesa Entrada, Media Entrada, Rusty Chacra/Gallup/Menefee

is sufficiently wide to allow multiple use of the ground surface (see Table 3-3).

COAL

Coal occurs in nearly all of the continental Upper Cretaceous rock units in the project region (Beaumont 1968). However, strippable coal deposits are confined principally to the Fruitland, Menefee, and Crevasse Canyon formations (Read et al. 1950; Beaumont et al. 1976). The thickest coal beds, and by far the largest reserves, occur in the Fruitland Formation (Beaumont et al. 1976). Fassett and Hinds (1971) present detailed information on the origin and nature of the coal in the Fruitland Formation. Bauer and Reeside (1921) present numerous analyses of the Fruitland and Menefee coal beds. The most complete information on coal in the project region is provided by Shomaker et al. (1971). The strippable coal reserves in the Fruitland Formation have been estimated at 6.5 billion tons, of which about 1.5 billion tons are reported to be present in the Bisti area (Arnold and Hill 1981). This amount of coal is perhaps best understood in terms of equivalent barrels of petroleum. Beaumont (1971) states that a ton of bituminous coal from the Fruitland Formation has a yield potential of 3 to 3.5 barrels of oil or liquid hydrocarbons per ton. This translates to maximum figures of nearly 23 billion barrels for the entire Fruitland Formation or about 5.3 million barrels for the Bisti area.

According to Beaumont (1971) a research pilot-plant operation using a Consolidation Coal Company process has produced gasoline from coal for as little as 10.5 cents per gallon. However, he cautions that a moderately priced hydrogen source is needed for this process. Nonetheless, Arnold and Hill (1981) suggest that reserves of several hundred million tons of coal might eventually be required to supply

Table 3-3. SPACING OF OIL AND GAS WELLS

Field	Approved Spacing (acres)	Principal Commodity
Amarillo Gallup	40	Oil[a]
Angels Peak Gallup	80	Oil
Angels Peak Gallup	320	Gas
Aztec Fruitland	160	Gas
Aztec Pictured Cliffs	160	Gas
Basin Dakota	320	Gas
Bisti - Lower Gallup	40	Oil
Blanco - Mesaverde	2/320	Gas
Blanco Pictured Cliffs	160	Gas
Bloomfield Chacra	60[b]	Gas
Bloomfield Farmington	None	Oil[a]
Cha Cha Gallup	80	Oil & Gas[c]
Chaco Wash Mesaverde	5	Oil[a]
Eagle Mesa Entrada	160	Oil
Fulcher - Kutz Pict. Cliffs	160	Gas
Gallegos Farmington, S.	160	Gas[a]
Gallegos Fruitland	None	Gas[a]
Gallegos Fruitland, S.	160	Gas
Gallegos Gallup	80	Oil
Gallegos Gallup	320	Gas
Kutz Farmington	160	Gas
Kutz Fruitland	160	Gas
Kutz Gallup	80	Oil & Gas[a]
Kutz Pictured Cliffs	160	Gas
Marcelina Dakota	10	Oil[a]
Media Entrada	40	Oil
Media Gallup	40	Oil
Nipp Pictured Cliffs	160	Gas
Papers Wash Entrada	40	Oil
Pinon Fruitland	160	Gas
Pinon Gallup	80	Oil & Gas[a]
Rusty Chacra	160	Gas
Stoney Butte Dakota	None	Oil[a]
Stoney Butte Mesaverde	5	Oil[a]
Torreon Mesaverde	40	Oil[a]
Totah Gallup	80	Oil[a]
Walker Dome Mancos	NA	Oil[a]
WAW Fruit.-Pict. Cliffs	295[d]	Gas

Data Source: Fassett and others (1978).

[a]Production less than 3 bbl/day per well and/or fewer than four producing wells in field (see Table 3-1).

[b]Actual spacing 130 acres.

[c]Gas more than 90 percent depleted (see Table 3-1).

[d]No approved spacing; 295 acres actual.

the demand for synthetic fuel development. They also indicate that development of the Fruitland Formation coal in the project area for use outside the immediate area would require construction of the proposed Star Lake-Bisti Railroad. However, the Secretary of the Interior has failed to exercise his authority to grant approval for right-of-way across Navajo lands.

The coal crops out in a relatively narrow band around the margins of the San Juan Basin and dips toward the center of the basin (USGS 1965). The location of this band with respect to the various alternative features of the proposed project is shown on Map 3-1. The discontinuity of this band as presented on Map 3-1 reflects the fact that coal beds must be relatively continuous <u>and</u> at least 3 feet thick to be considered strippable. Thus, for example, while coal beds thicker than 3 feet are present in the Torreon Wash area (Tabet and Frost 1979), they are too discontinuous to be shown on this map. The relationships of specific project features with respect to reported deposits of strippable coal are described below.

<u>Proposed Generating Station Site</u>

Coal is exposed on the ground surface at the proposed plant site. This coal evidently is part of an outlier of the Fruitland Formation, delineated as a marginal prospect pending the results of further exploratory work (Shomaker 1971). The station layout as currently contemplated would overlap the northern edge of this deposit in Section 24. Shomaker (1971) states that the coal beds at this location are extremely lenticular and that it is not likely that significant strippable reserves exist. San Filipo (1981) suggests that the value of the coal that might be lost to use as a result of the construction of the proposed plant probably is not significant. The logs of exploratory borings drilled at the site indicate that only a relatively few, thin seams of coal were encountered (Sergent et al.

1978). Moreover, the results of studies performed by Dames and Moore (1979), Jentgen and Fassett (1977), and Wilson and Jentgen (1980) do not demonstrate the presence of strippable coal at the plant site.

The NMGS site is partly within a U.S. Geological Survey (USGS)-designated known recoverable coal resource area (KRCRA). According to the minutes of the September 7, 1977, meeting of the Mineral Land Evaluation Committee, "areas which contain, or can reasonably be expected to contain, one or more Menefee coal beds three or more feet thick at depths less than 3,000 feet are included in the KRCRA." An accompanying map indicates that one deep boring has been drilled in the plant area; this boring encountered a 3.5-foot-thick coal bed at a depth of 2311 feet and a 5-foot-thick coal bed at a depth of 2366 feet. While such depths can be reached by underground mining methods, there appears to be scant reason to incur either the expense or the inherent hazards of doing so when large strippable reserves exist nearby. Therefore, the presence of the reported deep coal reserves at the site is not considered significant for the purposes of the NMGS project.

The proposed NMGS would consume approximately 300 million tons of coal over its planned 40-year life. This would represent approximately 20 percent of the estimated coal reserves of the Bisti area but only about 5 percent of the estimated strippable coal reserves in the Fruitland Formation. Based upon figures presented by Beaumont (1971), this same amount of coal could be used to produce 900 million to 1050 million barrels of oil or liquid hydrocarbons.

Power Transmission Route T1

The second proposed power transmission route, T1, as currently planned, would cross the Bisti Fruitland coal field in a northeasterly direction. According to Shomaker (1971) this strippable coal area is underlain by a clearly developed three-bed coal section. The lower bed is said to range from 9 to 32 feet in thickness, apparently thickening northeastward from the outcrop to a maximum at a depth of 250 feet. Over large areas, the middle bed is considered uneconomic because it is either less than 3 feet thick or because it splits into two beds that are each less than 2 feet thick. Shomaker (1971) states that the upper bed underlies about half the area underlain by the lower bed, and varies from 0 to 21 feet thick. The thickest portion is along the eastern side of T23N, R12W, and the thinnest is along the northern side. Shomaker (1971) estimates that the strippable coal reserves in this township amount to 545.6 million tons, making it the richest in coal in the Bisti Fruitland area.

The draglines that typically are used for strip mining can neither excavate under nor cross under power lines. Therefore, if power lines were constructed prior to mining, coal underlying the power lines would become unavailable during the useful life of those power lines. The strip of coal deposits lost would be somewhat wider than the spread of the power lines, as a stable slope would have to be maintained beneath the towers. If one assumes a maximum mining depth of 250 feet (the cutoff figure typically used in estimating reserves of strippable coal), and assumes cut slopes of 1.5:1, the berm on which the towers would be constructed might be 1000 feet across at the base at the maximum section. The width of this berm would, of course, taper off to a minimum at the coal outcrop line. The minimum width would be dependent upon how closely the excavation equipment could safely approach the support towers and whether safety regulations would allow some equipment (such as bulldozers or front-end loaders) to encroach upon areas beneath the power lines. The results of rough calculations using an assumption that the coal beds have a dip of 100 feet per mile beneath the alignment, indicate that approximately 8 million tons of coal would be contained in a 4.5-mile-long berm where the second proposed power transmission route (T1) would cross the Fruitland-Bisti coal field immediately northeast of the NMGS site.

Transmission route T1 would cross the eastern end of the Star Lake Fruitland coal field, at and near the boundary between McKinley and Sandoval counties. Shomaker and Lease (1971) estimate that about 385 million tons of coal lie under less than 250 feet of overburden in this area. They present data from a single borehole, showing the presence of two beds of coal that have numerous shaly streaks; one of these beds is 13 feet thick and the other is 15.9 feet thick.

Meiji (1979) provides a description of T19N, R4W, which lies within the Star Lake Fruitland area and which would be crossed by T1. According to that report, a coal bed near the top of the Fruitland Formation extends through parts of sections 7 and 8. Coal beds are also stated to be present in sections 9, 11, and 18. These beds are within the range of 3.5 to 6 feet thick, but are described as impure. A prospect tunnel 4.5 feet wide and 60 feet long has been driven along the 6-foot-thick bed in the southeastern corner of section 7. The total length of the crossing of the Star Lake Fruitland coal field would be approximately 5.5 miles. Using similar geometric assumptions as were employed in the rough calculations for the Bisti Fruitland coal field, and assuming that the coal beds would be only half as thick in the Star Lake area, it is estimated that about 4.9 million tons of strippable coal might underlie the berm that would be left beneath the transmission lines if the area were mined.

Finally, route T1 would cross the La Ventana Mesaverde field. Shomaker (1971) states that the Cleary Member of the Mesaverde Group contains a coal bed averaging 3.9 feet thick. He estimates that the reserve beneath less than 150 feet of overburden in Township T17N, R2W, which the route would cross, is about 11.3 million tons. Using the same approach as before, it is estimated that approximately 0.9 million tons of coal would underlie a 2.5-mile-long berm to a depth of 150 feet.

In summary, it is estimated that construction of a power transmission line along route T1 would prevent mining of approximately 13.8 million tons of coal. The total length of those portions of the route that cross coal fields would be approximately 12.5 miles. This impact would be only partly offset by the enhanced availability of power to the coal fields that would be crossed, as the NMGS site abuts the Bisti Fruitland field in any case, and T2 is better located than T1 with respect to the Star Lake Fruitland field. T1 is well situated for providing power to the La Ventana Mesaverde field, thus offering an advantage at this location.

Power Transmission Route T2

The first proposed power transmission route, T2, would cross part of a small outlier of the Bisti Fruitland field in Sections 25 and 26, T23N, R13W. Shomaker (1971) examined data that Bauer and Reeside (1921) collected in this area, and he concluded that the three coal beds present are so extremely lenticular that it is unlikely that significant strippable reserves exist. Route T2 would not cross any other mapped deposits of strippable coal, but would pass along the southern margin of the Fruitland coal outcrop area. Thus, construction of power lines along this route would not prevent mining of coal and would enhance the availability of power for future mining operations in the adjoining area.

Power Transmission Route T3

Alternative transmission route T3 would head due south from the NMGS site, crossing the same coal area that would underlie T2. Depending upon its exact alignment, it would then cross the Chaco Canyon Upper Menefee coal field for a distance of about 1.5 to 3 miles. Lease (1971) provides a description of this area based upon observations in Tsaya Canyon, stating that two coal beds, each about 5 to 6 feet thick, are present. These are described as being burned at the outcrop. Rough calculations for a 2-mile crossing produce a figure of 3.6 million tons for the amount of coal lost in a 250-foot-high berm across the coal field.

Power Transmission Route T4

A map presented by Shomaker (1971) indicates that alternative power transmission route T4 would cross the Newcomb Upper Menefee coal-bearing area in Townships 21N, 22N, and 23N, adjacent to the eastern boundary of the Navajo Reservation. Shomaker states that, within the Reservation, the coal beds tend to be highly lenticular and of irregular and limited areal extent, and to be present only in the highest hills and mesas. However, he also mentions that two coal beds, one 3.1 and the other 6.6+ feet thick, are exposed in the White Rock Mine in Section 31 of T22N, R13W. Route T4 would pass a short distance to the northeast of this mine. Shomaker also states that measurements of coal beds in sections 24 and 30, T23N, R14W, "indicate that a fairly important coal zone is present at this horizon." He suggests that a test boring be drilled in section 20 to ascertain whether this zone continues eastward and downdip. A map of the Chaco Canyon Upper Menefee area, to the east, does not indicate the presence of strippable coal in adjoining townships T22 and 23N, 13W (Speer 1971). Nonetheless, there is a possibility that the exploratory drilling suggested by Shomaker might demonstrate the presence of strippable coal beneath route T4 within T23N, R13W.

Water Pipeline Routes

Each of the three water pipeline routes crosses areas reported to be underlain by strippable coal (Link and Kelly 1980). Proposed pipeline route P1 and alternative pipeline route P2 would follow the access road to NMGS from Highway 371, crossing the Bisti Fruitland coal field for a distance of approximately 5 miles in Townships 23 and 24N, 13W (Map 3-1). Shomaker (1971) indicates that the total thickness of strippable coal in this general area is about 21 feet. Alternative pipeline route P3 would follow power transmission route T1, for which the coal resource is described above. Pipelines present much less of an impediment to mining activity than do power transmission lines, as excavation equipment of all types can pass over them and work near them. Nonetheless, it is estimated the amount of the coal that could not be mined while a pipeline is present could amount to about 1 million tons per mile along any of the water pipeline routes. However, if both T1 and P3 were to be constructed, the coal resource loss figures would not be additive; the pipeline could be contained within the T1 "corridor," as could the county road that passes the possible new town site.

SAND AND GRAVEL

Sand and gravel deposits characterized by the New Mexico State Highway Department (undated) as being almost unlimited in volume are present in the valleys of the San Juan, Animas, and La Plata rivers (Map 3-1). Small, isolated deposits are also present along the Chaco River and are adjacent to a few minor tributary streams. Older sand and gravel deposits are available at some localities in the San Jose, Chuska, and Ojo Alamo formations. As is discussed in subsequent paragraphs, construction of the project would entail consumption of large volumes of sand and gravel, and some of the project features would occupy deposits of these materials. However, because of the immense volume of sand and gravel present, preemption of some material by construction of the project would not have a significant adverse impact on the available supply.

According to the sixty-eighth annual report by the New Mexico Energy and Minerals Department (1981), a total of 456,550 cubic yards of sand and gravel were produced in San Juan, McKinley, and Valencia counties during 1980. Separate statistics by county are not presented. However, using the number of operations and the number of employees working for aggregate suppliers as bases of comparison, it is estimated that San Juan County produced 56 percent of this total, or about 256,000 cubic yards.

Proposed Generating Station Site

The Public Service Company of New Mexico (PNM) has estimated that about 125,000 cubic yards of sand and gravel may be consumed in concrete production and that an additional 100,000 cubic yards of sand and rock may be needed for backfill. Based on San Juan Generating Station Unit 4 records, it is estimated that the peak construction requirements would be 27,000 cubic yards per year. This would represent about 10 percent of the annual production for San Juan County. It is anticipated that this material would be excavated from privately owned land in the San Juan River valley and transported by truck to the construction site. According to a report prepared by the New Mexico State Highway Department (undated), an "almost unlimited supply" of sand and gravel is present along the San Juan River and its major tributaries. The set of maps presented by the Highway Department (undated) shows that these deposits cover a surface area of about 100 square miles. Therefore the proposed use of 225,000 cubic yards of these materials would not significantly reduce the available supply of the resource. However, it appears probable that production of such a volume for a single project would entail expansion of any given operation. Thus, there would be a positive economic impact over the construction period as a result of additional employees being required to excavate, screen, load, and haul the material.

Water Supply System

The proposed and alternative water intakes on the San Juan River probably would be located on potentially valuable sand and gravel deposits, and pipeline routes P1, P2, and P3 would cross sand and gravel deposits between the river and the mesa to the south (Map 3-1). However, as the volume of sand and gravel deposits in this area is extremely large, the impact of this possible preemption of their use in a limited area would appear not to be significant.

Other Project Components

The various proposed and alternative power transmission routes would pass over streams that might, at least locally, contain deposits of sand and gravel. Route T3, in particular, would cross over several known aggregate deposits. However, it is unlikely that "straddling" any existing operations in these deposits would create a significant problem. Moreover, considering the vast volumes of aggregate that are available in the region, the possible loss of gravel beneath a few support towers would not constitute an impact.

BAKED SHALE

Spontaneous combustion of coal deposits "bakes" the overlying shale, producing a reddish brown to black slaglike material. This material, locally called clinker or "red dog," has been used rather extensively as a base course for roads. There are several rather extensive deposits of this material in the Fruitland Formation near Bisti and in the Menefee Formation near White Rock (New Mexico State Highway Department undated). Bauer and Reeside (1921) delineate baked shale deposits south of the NMGS site (in Section 25) and northwest of the site (in Sections 6 and 7). They also delineate an area of widespread baked shale deposits extending about 2 miles westward into the Navajo Reservation from the latter deposits. Allen (1955) also indicates that this material is available over a wide area of the Navajo Reservation.

Proposed Generating Station Site

Baked shale was seen at the generating station site during the course of the current study. Meiji (1979) reports that an inactive baked shale prospect pit is located in this area and that large reserves have been delineated. According to Meiji, the north half of Section 23 (which is part of the proposed site) is an Indian withdrawal area. Because large deposits of baked shale are reported present elsewhere on Indian land, this may not present a problem. However, loss of baked shale as a result of construction of the proposed power plant could be avoided by stripping off and stockpiling this material prior to erection of the facilities. (From a geotechnical engineering standpoint, the stripping should be done in foundation areas whether or not the material is to be used.) Alternatively, it might be considered appropriate to trade another baked shale deposit for the one at the site; as this material is widespread adjacent to coal outcrops, location of a deposit of similar extent and value probably would not be difficult.

Other Project Features

Baked shale probably is found adjacent to the coal-crop lines throughout the project area. Therefore the various project features that have been stated to cross strippable coal could be expected to cross deposits of baked shale. However, owing to the large volumes of this material that are available in the area, this would not appear to constitute a significant adverse impact.

URANIUM

Uranium occurs in numerous geologic units in northwestern New Mexico; the most economically important ones occur in the Morrison Formation and the Todilto Limestone, with minor production having come from the Dakota Sandstone. The uppermost of these, the Dakota

Sandstone, is about 3900 feet below the ground surface in the East Chaco Canyon area (Lease 1979). Therefore, although uranium deposits have been found in exploratory borings into the underlying Morrison Formation (Lease 1979), the most important potential function of these formations in the vicinity of the proposed NMGS is as a group of aquifers (see the Hydrology Technical Report). By contrast, uranium-bearing rocks crop out at the surface in the Ambrosia Lake and Laguna districts, on the southern margin of the San Juan Basin. About two-thirds of the uranium production has been from the Ambrosia Lake district, and most of the remainder has been from the Laguna district (Hilpert 1969). These districts are part of the Grants uranium region, which has been rated as the "premier uranium mining district of the world" (Wright 1980). The geology and mineral technology of the uranium deposits of this region are exhaustively treated in compilations by Kelley (1963) and Rautman (1980). Hilpert (1969) provides descriptions of stratigraphic and structural geologic relations of the various types of uranium deposits, and presents tabulated descriptions of individual deposits. Chenoweth (1977) and Ridgley et al. (1978) each provide an overview of geologic and economic information, and Gay (1963) presents information on mining methods.

Although uranium-bearing rocks crop out at the surface in the Grants region, most of the ore production has been from underground mines. Kittel (1963) and Baird et al. (1980) present data on open-pit mines in the Morrison Formation, which underlies part of the project area at shallow depth. Open-pit mining also has been done in the Todilto Formation (Chenoweth and Holen 1980); however, the principal exposures of this geologic unit are well outside the project area. The trend of mine development in recent years has been to deeper exploration and to deeper mines. Average exploratory drilling depths increased from 212 feet in 1964 to 1651 feet in 1975, and exceeded 1000 feet during every year from 1971 through 1978 (Chenoweth and

Holen 1980). Drilling depths in recent exploration programs in the Morrison Formation range from 500 feet to more than 5000 feet (Fitch 1980). Thus, as the mineral values are followed to greater depth, open-pit mines are being phased out; the Jackpile open-pit mine (in the Laguna district) was reported to be closing in 1980 (Beck et al. 1980). The surface facilities of an underground mine typically occupy a relatively small area, and two sections may be mined from a single shaft (Gay 1963). Therefore, because there are no existing open-pit uranium mines along any of the proposed or alternative transmission line routes, and because the trend is to deeper underground mines, power transmission lines will not be incompatible with mining of uranium. In fact, due to the increased availability of power for mine machinery, the impact of constructing power lines would be a positive and beneficial one.

Route T1 would cross over or near several groups of uranium claims between approximately mileposts 91 and 96. The publications reviewed do not indicate any activity on these claims. However, some data on the mineralization are presented by Hilpert (1969). There are no reported uranium mines or prospects in the immediate vicinity of power transmission line routes T2 and T3.

Route T4 would cross Phillips Uranium Corporation's Nose Rock No.1 uranium mine, in the vicinity of milepost 35. This mine was under development as of July 1980 with a shaft being sunk to 3200 feet, in Sec. 31, T19N, R11W (Arnold and Hill 1981). The Westwater Canyon Member of the Morrison Formation, which is the geologic host unit for the uranium deposits at this location, is about 170 feet thick under Section 31, but is reported to thicken markedly northward (Clark 1980). Phillips has estimated that 25 million pounds of uranium oxide lie within a 1920-acre tract in this vicinity (Clark 1980). As of July 1980, work was also proceeding on two uranium mines in the Marquez Canyon area, a short distance off the route in the vicinity of milepost 95. The target depths for shafts in these mines was 2100 to 2200 feet (Arnold and Hill 1981). The ore body in this area is contained in the Westwater Canyon Member of the Morrison Formation (Livingston 1980). A number of deposits have been discovered adjacent to T4 between mileposts 95 and 105 during recent years (Chenoweth and Holen 1980; Fitch 1980). However, there are no readily available published data on most of these discoveries. The single exception is Exxon Minerals Company's San Antonio Valley uranium deposit, which--according to small-scale maps presented by Fitch (1980) and by Chenoweth and Holen (1980)--is located very near to milepost 100. According to Moore and Lavery (1980), the ore body at this location was found in the Westwater Canyon Member of the Morrison Formation at a depth of more than 800 feet.

The locations of the transmission routes with respect to nearby mines and prospects are shown in Map 3-1, and data on these mineral properties are presented in Appendix A.

LIMESTONE

Limestone occurs in numerous geologic units in northwestern New Mexico. These include some members of the Mississippian and Pennsylvanian systems; the Permian Yeso Formation and San Andres Limestone; the Jurassic Todilto Limestone; the Upper Cretaceous sequence; and travertine and calcareous tufa of Cenozoic age. Most of these limestones are impure, being cherty, arenaceous, argillaceous, gypsiferous, or dolomitic. However, some of this impure limestone has been used near Farmington to make lime.

As of 1979 there were only four active limestone mines in the state: the Hurley and Mathis lime quarries in Grant County; the San Antone pit in McKinley County; and the Tijeras quarry in Bernalillo

County (Siemers and Austin 1979). The nearest of these to the project is the San Antone pit, in the Todilto Limestone near Thoreau (Map 3-1). The reported production from this pit, which is about 55 miles south of the proposed NMGS plant site on Highway 371, is 500 tons per day. The Todilto Limestone is reported to be only about 25 or 30 feet thick, but the results of mapping by Chapman et al. (1979) and Green and Pierson (1971) indicate that it is exposed over an area of several square miles in the Thoreau area. Perry (1963) presents a description of the nature of the Todilto Limestone, indicating that it is largely the result of reef growth. Allen (1955) offers chemical analyses of Todilto Limestone samples taken from several locations in the Navajo Reservation, southwest of the plant site. NUS (1978) suggests that selective mining may produce high-lime material. The Todilto Limestone may contain radioactive impurities (as does coal), as it has been mined for uranium in the Grants region.

The San Andres Limestone, which is about 145 feet thick, crops out over an extensive area about 70 miles south of the site (Chapman et al. 1979). However, there are no reported limestone quarries in this region, and no analyses are available. Jicha (1956) and Kottlowski (1962) report the presence of high-calcium limestone, suitable for industrial use, in a deposit in Valencia County. This deposit, which is located 34 miles west of Belen, in T6N, R5W, Sections 10, 11, 14, 15 and 22, is estimated to contain more than 100 million tons of material (Jicha 1958). Other limestone deposits are present in Arizona, Colorado, and Utah (Love 1981). Limestone for the Four Corners Power Plant is obtained from a deposit near Mexican Hat, Utah (San Filipo 1981; U.S. Bureau of Reclamation 1975).

Depending on the process used for sulfur dioxide emission control, the proposed New Mexico Generating Station may require about 270 tons of limestone a day (about 100,000 tons per year). As discussed above, vast tonnages of limestone are available in the region; thus consumptive use of limestone by the plant would not significantly deplete the resource. However, depending on which source is chosen, it might be necessary to enlarge existing mining operations, develop a new quarry, and/or construct new transportation facilities (i.e., roads or railroads).

OTHER MINERAL RESOURCES

Humate

Humate is a brownish carbonaceous mudstone that has been marketed as a soil conditioner. It is commonly found to be associated with thin subbituminous coal seams. Most of the known deposits of economic value are found in the Menefee Formation (Siemers and Waddell 1977). Because of the close association of humate to coal deposits, it should be anticipated that the project features which would cross coal beds of the Menefee Formation might also cross humate deposits. Transmission route T1 passes near a humate mine (Map 3-1) west of the Zia Indian Reservation (Siemers and Austin 1979), but there is no reason to anticipate an impact at this location.

Lightweight Shale Aggregate

Upper Cretaceous shales in the project region have been tested to ascertain their possible adaptability for use as aggregate (Foster 1966). However, these materials are not reported to be mined in the immediate vicinity of any component of the project (Siemers and Austin 1979; U.S. Bureau of Mines 1981). Moreover, Cretaceous shales are so widely distributed that preemptive use of some areas underlain by shale would not significantly diminish the total available potential resource.

Gypsum

Selenite, a translucent variety of gypsum, was formerly used by the Pueblo Indians in place of glass in windows. The principal source area is believed to have been in the badlands area near South Garcia, Suwanee, and Yeso (Ellis et al. 1974). Gypsum occurs, evidently as a secondary mineral, in the vicinity of the proposed plant site. However, no crystals of sufficient size for use in windows were observed during a recent site visit. Nonetheless, there may be some possibility that this or other components of the proposed project may impinge on deposits such as those formerly mined by the Indians. Mica has also been used for the same purpose (Ortiz 1979), but this mineral is less likely to be present in the project area. Given the current ready availability of commercially manufactured glass windows, it is unlikely that either gypsum or mica crystals would be considered necessary or valuable for that purpose. Gypsum crystals are also used in sand paintings. It is probable that small crystals of gypsum could be found at numerous locations in the badlands, so the project impact appears insignificant.

Clay

Clay suitable for production of pottery is found in the vicinity of Zia Pueblo; the Laguna and Zia Indians have used white clay, together with mineral pigments, in the production of pottery (Ortiz 1979; White 1962). Deposits of a similar nature may be present in the project area. Fire clays are commonly associated with coal beds, especially within the Mesaverde Group (NUS 1978); this may be the type of clay that was used by the Indians. If that is the case, there would not be an impact.

Travertine

Travertine has been used in the production of fetishes by the Laguna Indians (Ortiz 1979). Travertine is of value in the production of lime, so there may be a potential for conflicting use if the deposit near Belen is used for the NMGS emissions control system. However, it is probable that the available deposits are of sufficient size to accommodate continued use by the Indians as well as possible use as a source of lime for the NMGS (see discussion on limestone).

4.0

ENVIRONMENTAL CONSEQUENCES

4.1 OIL AND GAS

Due to the wide spacing of wells, the Proposed Action is not expected to have a significant impact on exploration for or production of oil or gas.

4.2 COAL

There is a major coal resource in the project region. As this resource is best recovered by means of strip mining, there is a potential for conflict wherever a project feature would occupy or cross economically recoverable deposits of coal.

New Mexico Generating Station Site

Consumption of 300 million tons of coal over the 40-year life of the proposed NMGS would be considered a significant impact on a local/regional level. More than 1 percent of the estimated strippable coal reserves in the Bisti area (local) and within a 30-mile radius of the NMGS plant site (regional) would be consumed. From a national perspective, this coal consumption would not constitute a significant impact.

Pipeline Route P1

Approximately 5 miles of pipeline P1 would cross recoverable coal deposits. It is estimated that about 5 million tons of strippable coal underlies proposed pipeline P1. Since this pipeline would be placed primarily within the existing New Mexico State Highway Department ROW for NM 371, the preclusion of the development of this coal is preexisting and therefore would not be attributable to the proposed project.

Pipeline Routes P2 and P3

Pipeline routes P2 and P3 would cross approximately 5 miles (5 million tons) and 4.5 miles (4.5 million tons), respectively, of recoverable coal deposits. The BLM Chaco-San Juan Management Framework Plan decision precludes the usurpation of coal resources by linear projects such as these pipelines (i.e., PNM could be required to relocate the pipeline or compensate the lessee).

Power Transmission Lines

Power transmission line alternatives T1, T2, T3, and T4 would cross approximately 12.5 miles (13.8 million tons), 0 miles, 2 miles (3.6 million tons), and an unknown amount, respectively, of recoverable coal deposits. The BLM Chaco-San Juan Management Framework Plan decision precludes the usurpation of coal resources by linear projects such as these transmission lines (i.e., PNM could be required to relocate the transmission lines or compensate the lessees).

4.3 SAND AND GRAVEL

There are vast volumes of sand and gravel in the valleys of the San Juan River and its major tributaries. Therefore, consumptive use of these materials for construction of the proposed project would not constitute a significant impact.

4.4 BAKED SHALE

No significant impact would occur as a result of preemption of deposits of this material by the Proposed Action.

4.5 URANIUM

Construction of the proposed project would have a potential beneficial impact from the standpoint of power supply to the mines. However, because high-voltage transmission lines are already present in the major mining areas and because the uranium mining industry is not expanding conspicuously at present, this beneficial impact would not necessarily be considered significant.

4.6 LIMESTONE

The project consumption of limestone would be minuscule as compared to the total volume available in New Mexico and adjacent states. However, depending upon the source chosen, there could be a significant adverse impact on existing transportation facilities.

4.7 OTHER MINERALS

No significant adverse impact is expected to occur as a result of the Proposed Action occupying or consuming mineral resources other than those mentioned above.

5.0
MITIGATION

5.1 OIL AND GAS

Due to the wide spacing of wells, the project would not have an impact on oil and gas production. Therefore, no mitigation is needed.

5.2 COAL

General Options for Power Transmission Lines

Possible measures for avoiding potential postconstruction relocation of the power transmission lines (or compensation to lessees) in areas where strippable coal deposits are crossed include:

1. Mine out the coal along the route prior to construction (probably not feasible).

2. Defer mining until end of useful life of transmission line (probably feasible only if route is at margin of, and part of, a large parcel that would be mined starting at the same future date).

3. Reroute
   a) Take shortest possible direct route across coal field.

   b) Partially reroute, crossing trend of coal-crop area in location not underlain by strippable coal.

c) Reroute locally to avoid isolated coal fields.

d) Cross coal field(s) in established transportation corridor within which no mining would be done--i.e., along Highway 371 and/or the proposed Star Lake Bisti R.R.

4. Shift transmission lines subsequent to placing in operation, at such time as future mining operation closely approaches them. Make advance preparations for this shift during initial design and construction process, providing for relatively rapid tapping/interconnection of old and new lines in a manner that would minimize or eliminate time out of service.

5. Abandon route alternate in favor of an alternate that does not cross deposits of significant economic value.

All of the suggested rerouting options described below would require transmission line alignments outside of the current corridor study areas.

Power Transmission Route T1

Route T1 could cross the coal field in a due north direction from NMGS, thence eastward along the township boundary between T23N and T24N. This would make a 50 percent reduction in the length of the coal bed crossing.

Alternatively, the route could go eastward from NMGS into T23N, R12W, thence southward through Sections 19, 30, and 31 to meet route T2. It could follow T2 to milepost 20, at which point it could turn northeast to rejoin the currently mapped T1 at milepost 27. In so doing, it would cross the Bisti Fruitland coal field at a location where no economic deposits are believed to be present.

In order to avoid crossing the Star Lake Fruitland and La Ventana Mesaverde coal fields, route T1 should be diverted again at milepost 45. It should proceed from that location to a point near Eagle Mesa, thence turning more sharply southeastward toward the northwestern corner of T17N, R2W, Section 17. The modified route could then rejoin the currently mapped route T1 at any convenient location to the east or southeast.

Power Transmission Route T2

Route T2 could avoid crossing potentially (if marginally) strippable coal deposits by means of a minor reroute in the vicinity of the plant. This would entail leaving NMGS in an easterly direction into T23N, R12W, Section 19, thence turning southward to meet the currently mapped route.

Power Transmission Route T3

Route T3 could avoid crossing strippable coal deposits near the NMGS and in the Chaco Canyon Upper Menefee by shifting the northern end of the route to the east, along the same path suggested above for T2. The revised route could join the planned route in the vicinity of milepost 12.

Power Transmission Route T4

Route T4 could be shifted eastward, outside of the Navajo Reservation, to avoid crossing coal fields that are potentially strippable.

5.3 SAND AND GRAVEL

Occupation of sand and gravel deposits by features of the proposed project, or use of sand and gravel for the project, are not expected to cause a significant impact. Therefore, in general, there is no need for mitigation. However, where economically feasible to do so, it would be good conservation practice to mine out deposits that would be occupied by project facilities.

5.4 BAKED SHALE

There are extensive deposits of baked shale in an arc along the western and southern parts of the San Juan Basin. Therefore, in general, there should be no impact to mitigate.

5.5 LIMESTONE

At such future time as a limestone source is selected (assuming that a currently or previously active commercial quarry is not to be used), an environmental assessment of that source should be conducted. In the case of the deposit near Belen, consideration of native use should be included. Other, more general considerations, valid at all sites, would be visual impacts and transportation. It would be preferable for the quarry to be out of direct line of sight from parks, and for it to be located adjacent to a railroad. Construction of the Star Lake-Bisti Railroad would tend to substantially mitigate the adverse impacts of hauling limestone to the site.

5.6 OTHER MINERAL RESOURCES

Mineral deposits known to be of major religious, cultural, or economic significance to the Indians should be avoided or should be replaced with similar deposits of equal utility if construction of the project feature(s) would prevent continued access to and/or use of the deposits. No such deposits are known at this particular time. In the case of large deposits where multiple use is possible (such as the travertine/limestone deposit near Belen), quarrying operations should be designed so as to readily accommodate continued access and use by the Indians.

6.0

UNAVOIDABLE ADVERSE IMPACTS

Construction of the proposed or alternative pipelines or transmission lines would not result in unavoidable adverse impacts on the coal resources underlying those facilities, since the BLM Chaco-San Juan Management Framework Plan decision precludes the usurpation of coal resources by these linear features.

The consumptive use of 300 million tons of coal resources (greater than 1 percent of the strippable coal reserves in the region) would preclude future availability of this coal and therefore constitutes an unavoidable adverse impact.

7.0 RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

The proposed project would consume 300 million tons of coal in the short term, making it unavailable for use in the long term.

8.0
IRREVERSIBLE AND IRRETREIVABLE COMMITMENTS OF RESOURCES

A total of 300 million tons of coal, mined in the San Juan Basin, would be consumed during the project life. This coal would be unavailable for future beneficial use, such as conversion to motor vehicle fuel. Based upon the available data, the coal consumed over the life of the plant might otherwise be converted to approximately 1 billion barrels of liquid hydrocarbons.

9.0 COMPARISON OF ALTERNATIVES

The BLM Chaco-San Juan Management Framework Plan decision precludes the usurpation of coal resources by linear projects such as the transmission lines and water pipelines. PNM could be required to relocate the lines (or compensate the lessees) in areas where strippable coal deposits are crossed. For transmission line alternatives, T2 and T4 would not cross any known recoverable strippable coal deposits; thus the potential for relocation is negligible (Table 9-1). Strippable coal deposits would be crossed by both T1 (approximately 12.5 miles) and T3 (approximately 2 miles); thus the potential for relocation exists along these alternative transmission lines. Water pipeline alternatives P1, P2, and P3 would cross similar amounts of strippable coal deposits (Table 9-1).

Table 9-1. COMPARATIVE ANALYSIS OF IMPACTS TO MINERAL RESOURCES

Transmission Line Alternatives

T1	T2	T3	T4	T5
Coal underlies 12.5 miles (13.8 million tons) of this transmission line ROW.	No coal deposits underlie this transmission line ROW.	Coal underlies 2 miles (3.6 million tons) of this ROW.	The extent and amount of coal deposits are unknown.	No coal deposits.

Pipeline Alternatives

P1	P2	P3
Coal underlies 5 miles (5 million tons) of pipeline P1.	Coal underlies 5 miles (5 million tons) of pipeline P2.	Coal underlies 4.5 miles (4.5 million tons) of pipeline P3.

ROW = right-of-way.

POSSIBLE NEW TOWN

1.0
AFFECTED ENVIRONMENT

Potential oil or gas fields are the only commercial mineral resources that are expected to occur in the vicinity of the possible new town site.

2.0

ENVIRONMENTAL CONSEQUENCES

Drilling of potential oil or gas fields would not be prevented or restricted by possible construction of a new town. Any potential wells would be expected to be widely spaced and would not conflict with development of a possible new town.

APPENDICES

U.S. Bureau of Mines MILS Data

Appendices A and B present computer printouts of data on mines and mineral deposits in the immediate vicinity of various features of the proposed project. These data were obtained from the U.S. Bureau of Mines Mineral Industry Location System (acronym MILS), which stores mine and mineral claim data in a format that permits ready retrieval by commodity within 1° x 2° map sheets. The system generates maps showing mineral property locations numbered to correspond with those used on the data printouts. (In the case of the NMGS project, two 1° x 2° map sheets--Shiprock and Albuquerque--contain mineral properties of interest, so prefixes have been added to the numbers shown on Map 2-1.)

The Bureau of Mines MILS file includes data drawn from a variety of sources; thus, the reliability of the data is not consistent, but is dependent upon the reliability of the original source. The original sources include: the USGS CRIB system (another computer retrieval system for mineral industry data), the New Mexico State Highway Department files, New Mexico State Mine Inspector's files, New Mexico Bureau of Mines and Mineral Resources publications, U.S. Geological Survey publications, U.S. Geological Survey topographic maps, U.S. Department of Labor mine file, Geological Society of America bulletins, U.S. Bureau of Mines publications, Bureau of Land Management maps, Engineering and Mining Journal Directory, and Mining Engineering (technical journal). These data are presented here to provide project planners and other interested persons with ready access to available data on mineral properties that might be directly affected by the planned project.

Appendix A

U.S. Bureau of Mines MILS Data:
Mines and Mineral Deposits,
Shiprock 1° x 2° Quadrangle

ABBREVIATED DESCRIPTION OF DATA BASE ENTRIES

```
1 NAME- MATERIALS PIT                              SEQUENCE NUMBER- 03504S0207
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1810M:100M
  LATITUDE-    N 36 0[illegible] 31         PRECISION-    UNK
  LONGITUDE- W 108 1[illegible] 54  REFERENCE POINT- ORE BODY
  UTM:  ZONE 12N  NORTHING 3992000  EASTING 750900
  PUBLIC LAND SURVEY  TOWNSHIP- 021 N   RANGE- 013 W
  '   DESCRIPTION     SECTION- 22  SECTION SUBDIVISION- NW
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- INDIAN RES
  STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- LA VIDA MISSION    TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- MATERIALS PIT
  COMMOD/MOD-   SAND & GRAVEL
  NM STATE HWY DEPT FILES

2 NAME- MATERIALS PIT                              SEQUENCE NUMBER- 03504S0205
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1800M:100M
  LATITUDE-    N 36 04 17         PRECISION-    UNK
  LONGITUDE- W 108 11 55  REFERENCE POINT- ORE BODY
  UTM:  ZONE 12N  NORTHING 3995300  EASTING 752300
  PUBLIC LAND SURVEY  TOWNSHIP- 021 N   RANGE- 013 W
  '   DESCRIPTION     SECTION- 11  SECTION SUBDIVISION- NW
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- INDIAN RES
  STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- LA VIDA MISSION    TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- MATERIALS PIT
  COMMOD/MOD-   SAND & GRAVEL
  NM STATE HWY DEPT FILES

6 NAME- MATERIALS PIT                              SEQUENCE NUMBER- 03504S0204
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1788M:100M
  LATITUDE-    N 36 06 04         PRECISION-    UNK
  LONGITUDE- W 108 11 55  REFERENCE POINT- ORE BODY
  UTM:  ZONE 12N  NORTHING 3998600  EASTING 752200
  PUBLIC LAND SURVEY  TOWNSHIP- 022 N   RANGE- 013 W
  '   DESCRIPTION     SECTION- 35  SECTION SUBDIVISION- NE
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- INDIAN RES
  STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- LA'VIDA MISSION    TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK     `     MINERAL PROPERTY FILE-
  PRIMARY NAME- MATERIALS PIT
  COMMOD/MOD-   SAND & GRAVEL
  NM STATE HWY DEPT FILE

8 NAME- UNNAMED MINE                               SEQUENCE NUMBER- 03504S0267
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1824M:100M
  LATITUDE-    N 36 07 52         PRECISION-    100M
  LONGITUDE- W 108 17 03  REFERENCE POINT- CLAIM
  UTM:  ZONE 12N  NORTHING 4001700  EASTING 744400
  PUBLIC LAND SURVEY  TOWNSHIP- 022 N   RANGE- 014 W
  '   DESCRIPTION     SECTION- 25  SECTION SUBDIVISION- SENW
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- BLM ADMIN
  STATUS- PAST PRODUCER  OPERATION TYPE- UNDERGROUND
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- THE PILLAR NE      TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- UNNAMED MINE
  COMMOD/MOD-   COAL
  USGS 7 1/2 TOPO 1966

10 NAME- MATERIALS PIT                             SEQUENCE NUMBER- 03504S0209
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1821M:100M
  LATITUDE-    N 36 07 54         PRECISION-    UNK
  LONGITUDE- W 108 11 19  REFERENCE POINT- ORE BODY
  UTM:  ZONE 12N  NORTHING 4002000  EASTING 753000
  PUBLIC LAND SURVEY  TOWNSHIP- 022 N   RANGE- 013 W
  '   DESCRIPTION     SECTION- 24  SECTION SUBDIVISION- NWNW
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- INDIAN RES
  STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- TANNER LAKE        TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- MATERIALS PIT
  COMMOD/MOD-   SAND & GRAVEL
  NM STATE HWY DEPT FILES

12 NAME- PIT 79-05-S                               SEQUENCE NUMBER- 03504S0215
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1950M:100M
  LATITUDE-    N 36 08 43         PRECISION-    UNK
  LONGITUDE- W 108 02 37  REFERENCE POINT- ORE BODY
  UTM:  ZONE 12N  NORTHING 4003900  EASTING 766000
  PUBLIC LAND SURVEY  TOWNSHIP- 022 N   RANGE- 011 W
  '   DESCRIPTION     SECTION- 18  SECTION SUBDIVISION- NE
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- BLM ADMIN
  STATUS- PRODUCER         OPERATION TYPE- SURFACE
  MESA ID NO. '          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- PRETTY ROCK        TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- PIT 79-05-S
  COMMOD/MOD-   SAND & GRAVEL
  NM STATE HWY DEPT FILES

13 NAME- UNNAMED MINE                              SEQUENCE NUMBER- 03504S0268
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1812M:100M
  LATITUDE-    N 36 08 56         PRECISION-    100M
  LONGITUDE- W 108 18 44  REFERENCE POINT- CLAIM
  UTM:  ZONE 12N  NORTHING 4003620  EASTING 741820
  PUBLIC LAND SURVEY  TOWNSHIP- 022 N   RANGE- 014 W
  '   DESCRIPTION     SECTION- 15  SECTION SUBDIVISION- N2NWNE
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- BLM ADMIN
  STATUS- PAST PRODUCER  OPERATION TYPE- UNDERGROUND
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- THE PILLAR NE      TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- UNNAMED MINE
  COMMOD/MOD-   COAL
  USGS 7 1/2 TOPO 1966

14 NAME- MATERIALS PIT                             SEQUENCE NUMBER- 03504S0210
  STATE- NEW MEXICO               COUNTY- SAN JUAN                         ELEV:PREC- 1827M:100M
  LATITUDE-    N 36 08 57         PRECISION-    UNK
  LONGITUDE- W 108 10 37  REFERENCE POINT- ORE BODY
  UTM:  ZONE 12N  NORTHING 4004000  EASTING 754000
  PUBLIC LAND SURVEY  TOWNSHIP- 022 N   RANGE- 013 W
  '   DESCRIPTION     SECTION- 12  SECTION SUBDIVISION- NESE
  RIVER BASIN- 61E   CHACO RIVER                   DOMAIN- INDIAN RES
  STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
  MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
  MAP NAME- TANNER LAKE        TYPE- 7.5 MIN
  1:250,000 MAP NAME- SHIPROCK           MINERAL PROPERTY FILE-
  PRIMARY NAME- MATERIALS PIT
  COMMOD/MOD-   SAND & GRAVEL
  NM STATE HWY DEPT FILES
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14 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450211
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1827M:100M
LATITUDE- N 36 08 57 PRECISION- UNK
LONGITUDE- W 108 10 37 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4004000 EASTING 754000
PUBLIC LAND SURVEY TOWNSHIP- 022 N RANGE- 013 W
DESCRIPTION SECTION- 12 SECTION SUBDIVISION- SWSE
RIVER BASIN- 61E CHACO RIVER DOMAIN- INDIAN RES
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- TANNER LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOD/MOD- SAND & GRAVEL
NM STATEHWY DEPT FILES

16 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450208
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1833M:100M
LATITUDE- N 36 10 00 PRECISION- UNK
LONGITUDE- W 108 09 14 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4006000 EASTING 756000
PUBLIC LAND SURVEY TOWNSHIP- 022 N RANGE- 012 W
DESCRIPTION SECTION- 06 SECTION SUBDIVISION- SWSE
RIVER BASIN- 61E CHACO RIVER DOMAIN- BLM ADMIN
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- TANNER LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOD/MOD- SAND & GRAVEL
NM STATE HWY DEPT FILES

19 NAME- CHACO WASH PIT SEQUENCE NUMBER- 0350450117
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1848M:100M
LATITUDE- N 36 11 41 PRECISION- UNK
LONGITUDE- W 108 11 51 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4009000 EASTING 752000
PUBLIC LAND SURVEY TOWNSHIP- 022 N RANGE- 013 W
DESCRIPTION SECTION- 26 SECTION SUBDIVISION- C
RIVER BASIN- 61E CHACO RIVER DOMAIN- FEDERAL
STATUS- UNKNOWN OPERATION TYPE- SURFACE
MESA ID NO. 29 01697 YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- TANNER LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- CHACO WASH PIT
COMMOD/MOD- SAND & GRAVEL
NEW MINE REGISTRATIONS 1977.STATE MINE INSPECTOR

63 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450176
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1868M:100M
LATITUDE- N 36 31 39 PRECISION- UNK
LONGITUDE- W 108 14 33 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4045800 EASTING 746900
PUBLIC LAND SURVEY TOWNSHIP- 027 N RANGE- 013 W
DESCRIPTION SECTION- 32 SECTION SUBDIVISION- SE
RIVER BASIN- 61D SAN JUAN DOMAIN- INDIAN RES
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- HUGH LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOD/MOD- SAND & GRAVEL
NM STATE HWY DEPT FILES

77 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450177
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1900M:100M
LATITUDE- N 36 36 04 PRECISION- UNK
LONGITUDE- W 108 13 43 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4054000 EASTING 747900
PUBLIC LAND SURVEY TOWNSHIP- 027 N RANGE- 013 W
DESCRIPTION SECTION- 04 SECTION SUBDIVISION- S2
RIVER BASIN- 61D SAN JUAN DOMAIN- INDIAN RES
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- HUGH LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOO/MOD- SAND & GRAVEL
NM STATE HWY DEPT FILES

77 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450179
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1818M:100M
LATITUDE- N 36 35 32 PRECISION- UNK
LONGITUDE- W 108 13 48 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4053000 EASTING 747800
PUBLIC LAND SURVEY TOWNSHIP- 027 N RANGE- 013 W
DESCRIPTION SECTION- 09 SECTION SUBDIVISION- NW
RIVER BASIN- 61D SAN JUAN DOMAIN- INDIAN RES
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- HUGH LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOO/MOD- SAND & GRAVEL
NM STATE HWY DEPT FILES

82 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450187
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1818M:100M
LATITUDE- N 36 39 09 PRECISION- UNK
LONGITUDE- W 108 13 41 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4059700 EASTING 747800
PUBLIC LAND SURVEY TOWNSHIP- 028 N RANGE- 013 W
DESCRIPTION SECTION- 21 SECTION SUBDIVISION- NW
RIVER BASIN- 61D SAN JUAN DOMAIN- INDIAN RES
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- FARMINGTON S TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOD/MOD- SAND & GRAVEL
NM STATE HWY DEPT FILES

94 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450167
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1612M:100M
LATITUDE- N 36 41 20 PRECISION- UNK
LONGITUDE- W 108 07 25 REFERENCE POINT- ORE BODY
UTM: ZONE 12N NORTHING 4064000 EASTING 757000
PUBLIC LAND SURVEY TOWNSHIP- 029 N RANGE- 012 W
DESCRIPTION SECTION- 29 SECTION SUBDIVISION- NESE
RIVER BASIN- 61D SAN JUAN DOMAIN- PRIVATE
STATUS- PAST PRODUCER OPERATION TYPE- SURFACE
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- HORN CANYON TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOD/MOD- SAND & GRAVEL GOLD
NMBM MINES FILE

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99 NAME- LOOKOUT                                    SEQUENCE NUMBER- 0350450012
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1615M:500M
   LATITUDE-   N 36 42 00            PRECISION-   SKM
   LONGITUDE- W 108 27 00  REFERENCE POINT- MAIN ENT
   UTM:  ZONE 12N  NORTHING 4064421  EASTING 727804
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
      DESCRIPTION       SECTION- 00  SECTION SUBDIVISION-
   RIVER BASIN- 61H   SAN JUAN RIVER                DOMAIN- UNKNOWN
   STATUS- PAST PRODUCER  OPERATION TYPE- UNDERGROUND
   MESA ID NO.               YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- FRUITLAND            TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- LOOKOUT
   COMMOD/MOD-   STONE              LIMESTONE DM
   NM BOM CIR 77
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100 NAME- PIT 77-11-S                               SEQUENCE NUMBER- 0350450218
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1606M:100M
   LATITUDE-   N 36 42 04            PRECISION-   UNK
   LONGITUDE- W 108 16 07  REFERENCE POINT- ORE BODY
   UTM:  ZONE 12N  NORTHING 4065000  EASTING 744000
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 014 W
      DESCRIPTION       SECTION- 24  SECTION SUBDIVISION- N2
   RIVER BASIN- 61H   SAN JUAN RIVER                DOMAIN- INDIAN RES
   STATUS- PRODUCER          OPERATION TYPE- SURFACE
   MESA ID NO.               YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- KIRTLAND             TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- PIT 77-11-S
   COMMOD/MOD-   SAND & GRAVEL
   NM STATE HWY DEPT FILES
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101 NAME- MATERIALS PIT                             SEQUENCE NUMBER- 0350450163
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1636M:100M
   LATITUDE-   N 36 42 00            PRECISION-   UNK
   LONGITUDE- W 108 01 49  REFERENCE POINT- ORE BODY
   UTM'  ZONE 12N  NORTHING 4065500  EASTING 765300
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 011 W
      DESCRIPTION       SECTION- 30  SECTION SUBDIVISION- C
   RIVER BASIN- 61D   SAN JUAN                      DOMAIN- PRIVATE
   STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
   MESA ID NO.               YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- HORN CANYON          TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- MATERIALS PIT
   COMMOD/MOD-   SAND & GRAVEL                               GOLD
   NMBM MINES FILE
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103 NAME- RATTLESNAKE NO.6                          SEQUENCE NUMBER- 0350450230
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1700M:500M
   LATITUDE-   N 36 42 30            PRECISION-   UNK
   LONGITUDE- W 109 02 00  REFERENCE POINT- MAIN ENT
   UTM:  ZONE 12N  NORTHING 4064117  EASTING 675666
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 021 W
      DESCRIPTION       SECTION-        SECTION SUBDIVISION-
   RIVER BASIN- 61H   SAN JUAN RIVER                DOMAIN- INDIAN RES
   STATUS- UNKNOWN           OPERATION TYPE- UNKNOWN
   MESA ID NO.               YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- RED ROCK VALLEY      TYPE- 15 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- RATTLESNAKE NO.6
   COMMOD/MOD-   URANIUM              U308 CONTENT
   INACTIVE URANIUM MINES FILE (NM)
   NMBM MINES FILE
   USGS PROF PAPER 603 PLATE 1, P52
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104 NAME- ARCO PIT                                  SEQUENCE NUMBER- 0350450099
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1836M:100M
   LATITUDE-   N 36 42 43            PRECISION-   UNK
   LONGITUDE- W 108 13 53  REFERENCE POINT- ORE BODY
   UTM:  ZONE 12N  NORTHING 4066300  EASTING 747300
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
      DESCRIPTION       SECTION- 20  SECTION SUBDIVISION- C
   RIVER BASIN- 61D   SAN JUAN                      DOMAIN- PRIVATE
   STATUS- UNKNOWN           OPERATION TYPE- SURFACE
   MESA ID NO.               YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- FARMINGTON S.        TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- ARCO PIT
   COMMOD/MOD-   SAND & GRAVEL
   NEW MINE REGISTRATIONS 1978,STATE MINE INSPECTOR
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104 NAME- EATON PIT                                 SEQUENCE NUMBER- 0350450127
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1606M:100M
   LATITUDE-   N 36 43 29            PRECISION-   100M
   LONGITUDE- W 108 14 32  REFERENCE POINT- CLAIM
   UTM:  ZONE 12N  NORTHING 4067400  EASTING 746300
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
      DESCRIPTION       SECTION- 18  SECTION SUBDIVISION-
   RIVER BASIN- 61C   ANIMAS RIVER                  DOMAIN- PRIVATE
   STATUS- UNKNOWN           OPERATION TYPE- SURFACE
   MESA ID NO.               YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- FARMINGTON S         TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- EATON PIT
   COMMOD/MOD-   SAND & GRAVEL
   NEW MINE REGISTRATIONS 1973,STATE MINE INSPECTOR
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106 NAME- ACORA PIT                                 SEQUENCE NUMBER- 0350450092
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1600M:100M
   LATITUDE-   N 36 42 48            PRECISION-   UNK
   LONGITUDE- W 108 12 44  REFERENCE POINT- ORE BODY
   UTM:  ZONE 12N  NORTHING 4066500  EASTING 749000
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
      DESCRIPTION       SECTION- 21  SECTION SUBDIVISION- C
   RIVER BASIN- 61D   SAN JUAN                      DOMAIN- PRIVATE
   STATUS- UNKNOWN           OPERATION TYPE- SURFACE
   MESA ID NO. 29 00443  YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- FARMINGTON S         TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- ACORA PIT
   COMMOD/MOD-   SAND & GRAVEL
   NEW MINE REGISTRATION 1976,STATE MINE INSPECTOR
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108 NAME- RED SHALE MINE                            SEQUENCE NUMBER- 0350450232
   STATE- NEW MEXICO                  COUNTY- SAN JUAN                        ELEV:PREC- 1545M:500M
   LATITUDE-   N 36 43 04            PRECISION-   UNK
   LONGITUDE- W 108 12 03  REFERENCE POINT- ORE BODY
   UTM'  ZONE 12N  NORTHING 4067000  EASTING 750000
   PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
      DESCRIPTION       SECTION-        SECTION SUBDIVISION-
   RIVER BASIN- 61C   ANIMAS RIVER                  DOMAIN- PRIVATE
   STATUS- UNKNOWN           OPERATION TYPE- SURFACE
   MESA ID NO. 29 00786  YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
   MAP NAME- FARMINGTON S         TYPE- 7.5 MIN
   1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
   PRIMARY NAME- RED SHALE MINE
   STATE MINE INSPECTORS RT. 1979
   DEPARTMENT OF LABOR MINE FILE
   CRUSHER LOCATED NEXT TO PIT.MID #2901341
   R20 SHALE
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108 NAME- BOLACK NO 1                                   SEQUENCE NUMBER- 0350450081
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1636M:100M
    LATITUDE-   N 36 42 59          PRECISION-   UNK
    LONGITUDE- W 108 08 46  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 406700 0  EASTING 754900
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 012 W
    '   DESCRIPTION       SECTION- 19  SECTION SUBDIVISION- W2NW
    RIVER BASIN- 610    SAN JUAN                     DOMAIN- MIXED
    STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
    MESA ID NO. 29 01575  YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON S         TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- BOLACK NO 1
    COMMOD/MOD-  SAND & GRAVEL
    NEW MINE REGISTRATIONS 1976.STATE MINE INSPECTOR
    USGS FARMINGTON S.TOPO.1965

108 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450168
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1636M:100M
    LATITUDE-   N 36 42 59          PRECISION-   UNK
    LONGITUDE- W 108 08 50  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 406700 0  EASTING 754800
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 012 W
    '   DESCRIPTION       SECTION- 19  SECTION SUBDIVISION- C NW
    RIVER BASIN- 610    SAN JUAN                     DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON S         TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    NEW MINE REGISTRATIONS 1976.STATE MINE INSPECTOR

111 NAME- GRAVEL PIT                                    SEQUENCE NUMBER- 0350450135
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1600M:100M
    LATITUDE-   N 36 43 42          PRECISION-   UNK
    LONGITUDE- W 108 23 43  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 406770 0  EASTING 732600
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
    '   DESCRIPTION       SECTION- 15  SECTION SUBDIVISION- C
    RIVER BASIN- 61H    SAN JUAN RIVER               DOMAIN- FEDERAL
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FRUITLAND            TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- GRAVEL PIT
    COMMOD/MOD-  SAND & GRAVEL
    NEW MINE REGISTRATIONS 1978.STATE MINE INSPECTOR

111 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450169
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1600M:100M
    LATITUDE-   N 36 43 43          PRECISION-   UNK
    LONGITUDE- W 108 24 20  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 406770 0  EASTING 731700
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
    '   DESCRIPTION       SECTION- 15  SECTION SUBDIVISION- C
    RIVER BASIN- 61H    SAN JUAN RIVER               DOMAIN- FEDERAL
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FRUITLAND            TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    SMIR NEW REGISTRATIONS 1977

111 NAME- RICHEY PIT                                    SEQUENCE NUMBER- 0350450234
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1600M:100M
    LATITUDE-   N 36 43 43          PRECISION-   UNK
    LONGITUDE- W 108 24 20  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 406770 0  EASTING 731700
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
    '   DESCRIPTION       SECTION- 15  SECTION SUBDIVISION- C
    RIVER BASIN- 61H    SAN JUAN RIVER               DOMAIN- FEDERAL
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FRUITLAND            TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- RICHEY PIT
    COMMOD/MOD-  SAND & GRAVEL
    NEW MINE REGISTRATIONS 1978.STATE MINE INSPECTOR

111 NAME- SAN JUAN PIT                                  SEQUENCE NUMBER- 0350450003
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1637M:500M
    LATITUDE-   N 36 43 30          PRECISION-   500M
    LONGITUDE- W 108 24 15  REFERENCE POINT- TRENCH
    UTM:  ZONE 12N  NORTHING 406730 5  EASTING 731825
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
    '   DESCRIPTION       SECTION- 15  SECTION SUBDIVISION-
    RIVER BASIN- 61E    CHACO RIVER                  DOMAIN- PRIVATE
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO. 29 011GB  YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FRUITLAND            TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- SAN JUAN PIT
    COMMOD/MOD-  COAL
    OWN/OP:UTAH INTERNATIONAL INC.
    12.5 FT THICK

112 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450164
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1593M:100M
    LATITUDE-   N 36 43 46          PRECISION-   100M
    LONGITUDE- W 108 32 08  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 406750 0  EASTING 720080
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 016 W
    '   DESCRIPTION       SECTION- 16  SECTION SUBDIVISION- NESWNW
    RIVER BASIN- 61E    CHACO RIVER                  DOMAIN- BLM ADMIN
    STATUS- UNKNOWN          OPERATION TYPE- UNDERGROUND
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- THE HOGBACK N        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS 7 1/2 TOPO 1966

112 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450165
    STATE- NEW MEXICO             COUNTY- SAN JUAN                        ELEV:PREC- 1575M:100M
    LATITUDE-   N 36 43 29          PRECISION-   100M
    LONGITUDE- W 108 31 31  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 406700 0  EASTING 721000
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 016 W
    '   DESCRIPTION       SECTION- 16  SECTION SUBDIVISION- SE
    RIVER BASIN- 61H    SAN JUAN RIVER               DOMAIN- BLM ADMIN
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- THE HOGBACK N        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK               MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS 7 1/2 TOPO 1966
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112 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450166
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1593M:100M
    LATITUDE-   N 36 43 33         PRECISION-  100M
    LONGITUDE- W 108 31 31  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4067100  EASTING 721000
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 016 W
    '   DESCRIPTION     SECTION- 16  SECTION SUBDIVISION- SWNWNW
    RIVER BASIN- 61E   CHACO RIVER                DOMAIN- BLM ADMIN
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- THE HOGBACK N       TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS 7 1/2 TOPO 1966
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112 NAME- WHEELER PIT                                   SEQUENCE NUMBER- 0350450289
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1545M:100M
    LATITUDE-   N 36 44 12         PRECISION-  100M
    LONGITUDE- W 108 32 06  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4068300  EASTING 720100
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 016 W
    '   DESCRIPTION     SECTION- 09  SECTION SUBDIVISION- NESWSW
    RIVER BASIN- 61H   SAN JUAN RIVER             DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO. '           YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- THE HOGBACK N       TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- WHEELER PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS 7 1/2 TOPO 1966
    NEW MINE REGISTRATIONS 1979.STATE INSPECTOR OF MINES
    NMBM BULLETIN 44
    STOKES, W. L., GEOLOGICAL SOCIETY OF AMERICA BULLETIN, V61 N
      PP91-98,1951
    USGS PROF PAPER 603 P52
    THIS LOCATION HAS FIVE PROSPECTS
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116 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450180
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1666M:100M
    LATITUDE-   N 36 43 53         PRECISION-  100M
    LONGITUDE- W 108 09 30  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4068640  EASTING 753760
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION     SECTION- 13  SECTION SUBDIVISION- C N2
    RIVER BASIN- 61C   ANIMAS RIVER               DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON S        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS FARMINGTON S.TOPO MAP,1965
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118 NAME- HARPER HILL PIT                               SEQUENCE NUMBER- 0350450136
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1575M:100M
    LATITUDE-   N 36 44 29         PRECISION-  UNK
    LONGITUDE- W 108 22 05  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 4069200  EASTING 735000
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
    '   DESCRIPTION     SECTION- 12  SECTION SUBDIVISION- C
    RIVER BASIN- 61H   SAN JUAN RIVER             DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- KIRKLAND            TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- HARPER HILL PIT
    COMMOD/MOD-  SAND & GRAVEL
    NEW MINE REGISTRATIONS 1978.STATE MINE INSPECTOR
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119 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450171
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1630M:100M
    LATITUDE-   N 36 44 44         PRECISION-  100M
    LONGITUDE- W 108 14 35  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4070000  EASTING 746160
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION     SECTION- 07  SECTION SUBDIVISION- NE
    RIVER BASIN- 61C   ANIMAS RIVER               DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON S        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS    7.5 MIN QUAD 1965
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119 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450173
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1624M:100M
    LATITUDE-   N 36 44 44         PRECISION-  100M
    LONGITUDE- W 108 14 25  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4070000  EASTING 746400
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION     SECTION- 07  SECTION SUBDIVISION- NE
    RIVER BASIN- 61C   ANIMAS RIVER               DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO. '           YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON S        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS FARMINGTON S.TOPO MAP.1965
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123 NAME- MATERIALS PIT                                 SEQUENCE NUMBER- 0350450170
    STATE- NEW MEXICO              COUNTY- SAN JUAN                              ELEV:PREC- 1636M:100M
    LATITUDE-   N 36 44 56         PRECISION-  100M
    LONGITUDE- W 108 13 05  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4070420  EASTING 748380
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION     SECTION- 04  SECTION SUBDIVISION- SWSWSW
    RIVER BASIN- 61C   ANIMAS RIVER               DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON S        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK             MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS 7.5 MIN QUAD 1965
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ABBREVIATED DESCRIPTION OF DATA BASE ENTRIES

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123 NAME- MATERIALS PIT                           SEQUENCE NUMBER- 0350450186
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1666M:100M
    LATITUDE-   N 36 45 05          PRECISION-  100M
    LONGITUDE- W 108 13 33  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4070680  EASTING 747660
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION      SECTION- 05  SECTION SUBDIVISION- SWSE
    RIVER BASIN- 61C    ANIMAS RIVER              DOMAIN- PRIVATE
    STATUS- UNKNOWN           OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON N          TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-   SAND & GRAVEL
    USGS FARMINGTON N.TOPO.1963
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125 NAME- PIT 77-17-S                             SEQUENCE NUMBER- 0350450214
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1545M:100M
    LATITUDE-   N 36 45 07          PRECISION-   UNK
    LONGITUDE- W 108 32 08  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 4070000  EASTING 720000
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 016 W
    '   DESCRIPTION      SECTION- 04  SECTION SUBDIVISION- N2
    RIVER BASIN- 61H    SAN JUAN RIVER            DOMAIN- PRIVATE
    STATUS- PRODUCER          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- CHIMNEY ROCK          TYPE- 15 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- PIT 77-17-S
    COMMOD/MOD-   SAND & GRAVEL
    NM STATE HWY DEPT FILES
    NEW MINE REGISTRATIONS.1979.STATE MINE INSPECTOR
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125 NAME- PIT 78-28-S                             SEQUENCE NUMBER- 0350450219
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1515M:100M
    LATITUDE-   N 36 45 07          PRECISION-   UNK
    LONGITUDE- W 108 32 08  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 4070000  EASTING 720000
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 017 W
    '   DESCRIPTION      SECTION- 05  SECTION SUBDIVISION- C
    RIVER BASIN- 61E    CHACO RIVER               DOMAIN- INDIAN RES
    STATUS- PRODUCER          OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- CHIMNEY ROCK          TYPE- 15 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- PIT 78-28-S
    COMMOD/MOD-   SAND & GRAVEL
    NM STATE HWY DEPT FILES
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126 NAME- MATERIALS PIT                           SEQUENCE NUMBER- 0350450184
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1672M:100M
    LATITUDE-   N 36 45 01          PRECISION-  100M
    LONGITUDE- W 108 07 02  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4070840  EASTING 757360
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 012 W
    '   DESCRIPTION      SECTION- 05  SECTION SUBDIVISION- SWSW
    RIVER BASIN- 610    SAN JUAN                  DOMAIN- UNKNOWN
    STATUS- UNKNOWN           OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON N          TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-   SAND & GRAVEL
    USGS FARMINGTON N.TOPO MAP.1963
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129 NAME- PIT NO 72-10-N                          SEQUENCE NUMBER- 0350450216
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1636M:100M
    LATITUDE-   N 36 45 20          PRECISION-   UNK
    LONGITUDE- W 108 16 41  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 4071000  EASTING 743000
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 014 W
    '   DESCRIPTION      SECTION- 02  SECTION SUBDIVISION- C
    RIVER BASIN- 61H    SAN JUAN RIVER            DOMAIN- BLM ADMIN
    STATUS- UNKNOWN           OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- YOUNGS LAKE           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- PIT NO 72-10-N
    COMMOD/MOD-   SAND & GRAVEL
    NEW MINE REGISTRATIONS 1974,STATE MINE INSPECTOR
    ALSO LIES IN SECTION 10
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130 NAME- MATERIALS PIT                           SEQUENCE NUMBER- 0350450185
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1696M:100M
    LATITUDE-   N 36 45 23          PRECISION-  100M
    LONGITUDE- W 108 11 49  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4071300  EASTING 750240
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION      SECTION- 03  SECTION SUBDIVISION- NW
    RIVER BASIN- 61C    ANIMAS RIVER              DOMAIN- PRIVATE
    STATUS- UNKNOWN           OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON N          TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-   SAND & GRAVEL
    USGS FARMINGTON N. TOPO MAP 1963
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131 NAME- WATERFLOW PIT                           SEQUENCE NUMBER- 0350450288
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1533M:100M
    LATITUDE-   N 36 45 45          PRECISION-  100M
    LONGITUDE- W 108 27 53  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4071320  EASTING 726300
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 015 W
    '   DESCRIPTION      SECTION- 06  SECTION SUBDIVISION- NWNWNW
    RIVER BASIN- 61E    CHACO RIVER               DOMAIN- BLM ADMIN
    STATUS- UNKNOWN           OPERATION TYPE- SURFACE
    MESA ID NO. 29 01258    YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- WATERFLOW             TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- WATERFLOW PIT
    COMMOD/MOD-   SAND & GRAVEL
    USGS 7 1/2 TOPO 1963
    NEW MINE REGISTRATIONS 1974.STATE MINE INSPECTOR
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133 NAME- NECA PIT                                SEQUENCE NUMBER- 0350450225
    STATE- NEW MEXICO              COUNTY- SAN JUAN                  ELEV:PREC- 1515M:100M
    LATITUDE-   N 36 46 00          PRECISION-   UNK
    LONGITUDE- W 108 41 00  REFERENCE POINT- ORE BODY
    UTM:  ZONE 12N  NORTHING 4071288  EASTING 706777
    PUBLIC LAND SURVEY  TOWNSHIP- 030 N   RANGE- 018 W
    '   DESCRIPTION      SECTION- 36  SECTION SUBDIVISION- C
    RIVER BASIN- 61H    SAN JUAN RIVER            DOMAIN- INDIAN RES
    STATUS- UNKNOWN           OPERATION TYPE- SURFACE
    MESA ID NO.             YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- CHIMNEY ROCK          TYPE- 15 MIN
    1:250,000 MAP NAME- SHIPROCK                MINERAL PROPERTY FILE-
    PRIMARY NAME- NECA PIT
    COMMOD/MOD-   SAND & GRAVEL
    NEW MINE REGISTRATIONS 1979,STATE MINE INSPECTOR
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134 NAME- MARCELLIUS MINE SEQUENCE NUMBER- 0350450160
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1575M:100M
LATITUOE- N 36 46 55 PRECISION- 100M
LONGITUOE- W 108 25 32 REFERENCE POINT- CLAIM
UTM: ZONE 12N NORTHING 4073560 EASTING 729740
PUBLIC LANO SURVEY TOWNSHIP- 030 N RANGE- 015 W
DESCRIPTION SECTION- 28 SECTION SUBOIVISION- SESW
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- BLM AOMIN
STATUS- PAST PROOUCER OPERATION TYPE- UNOERGROUND
MESA IO NO. YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- FARMINGTON SOUTH TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MARCELLIUS MINE
OTHER NAMES- OELBERT CAUOELL
CAUOELL MINE
COMMOO/MOO- SANO & GRAVEL
USBM TECHNICAL PAPER 569 P97
NMBM MINES FILE

134 NAME- UNNAMED PIT SEQUENCE NUMBER- 0350450275
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1557M:100M
LATITUDE- N 36 46 28 PRECISION- 100M
LONGITUDE- W 108 25 24 REFERENCE POINT- CLAIM
UTM: ZONE 12N NORTHING 4072740 EASTING 729960
PUBLIC LAND SURVEY TOWNSHIP- 030 N RANGE- 015 W
DESCRIPTION SECTION- 33 SECTION SUBOIVISION- C E2NW
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- BLM AOMIN
STATUS- PAST PROOUCER OPERATION TYPE- UNOERGROUNO
MESA IO NO. YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- WATERFLOW TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- UNNAMEO PIT
COMMOO/MOO- SANO & GRAVEL
USGS 7 1/2 TOPO 1963

139 NAME- PIT NO 71-21-S SEQUENCE NUMBER- 0350450220
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1542M:100M
LATITUOE- N 36 47 00 PRECISION- UNK
LONGITUOE- W 108 36 00 REFERENCE POINT- ORE BOOY
UTM: ZONE 12N NORTHING 4073321 EASTING 714170
PUBLIC LANO SURVEY TOWNSHIP- 030 N RANGE- 017 W
DESCRIPTION SECTION- 26 SECTION SUBOIVISION- C
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- FEOERAL
STATUS- UNKNOWN OPERATION TYPE- SURFACE
MESA IO NO. YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- CHIMNEY ROCK TYPE- 15 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- PIT NO 71-21-S
COMMOO/MOO- SANO & GRAVEL
NEW MINE REGISTRATIONS 1977,STATE MINE INSPECTOR
ALSO LIES IN SECTION 27.34.35

140 NAME- SHIPROCK PIT SEQUENCE NUMBER- 0350450020
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1554M:500M
LATITUOE- N 36 47 05 PRECISION- >10KM
LONGITUOE- W 108 40 57 REFERENCE POINT- APPROX
UTM: ZONE 12N NORTHING 4073293 EASTING 706803
PUBLIC LAND SURVEY TOWNSHIP- 030 N RANGE- 017 W
DESCRIPTION SECTION- 25 SECTION SUBOIVISION-
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- PRIVATE
STATUS- PRODUCER OPERATION TYPE- SURFACE
MESA IO NO. 29 00817 YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- SHIPROCK TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- SHIPROCK PIT
COMMOO/MOO- SANO & GRAVEL
OWN/OP:SHIPROCK GRAVEL CO..INC.

141 NAME- SHIPROCK GRAVEL PIT SEQUENCE NUMBER- 0350450247
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1575M:500M
LATITUOE- N 36 47 30 PRECISION- UNK
LONGITUOE- W 108 40 00 REFERENCE POINT- ORE BOOY
UTM: ZONE 12N NORTHING 4074098 EASTING 708197
PUBLIC LANO SURVEY TOWNSHIP- 030 N RANGE- 017 W
DESCRIPTION SECTION- 19 SECTION SUBOIVISION- C
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- FEOERAL
STATUS- UNKNOWN OPERATION TYPE- SURFACE
MESA IO NO. 29 00817 YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- CHIMNEY HOCK TYPE- 15 MIN
1:250.000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- SHIPRUCK GRAVEL PIT
COMMOO/MOO- SANO & GRAVEL
NEW MINE REGISTRATIONS 1976.ST.MINE INSPECTOR

145 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450189
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1515M:100M
LATITUOE- N 36 47 36 PRECISION- UNK
LONGITUOE- W 108 07 53 REFERENCE POINT- ORE BOOY
UTM: ZONE 12N NORTHING 4075800 EASTING 763400
PUBLIC LAND SURVEY TOWNSHIP- 030 N RANGE- 012 W
DESCRIPTION SECTION- 24 SECTION SUBOIVISION- SWSE
RIVER BASIN- 61C ANIMAS RIVER OOMAIN- PRIVATE
STATUS- PAST PROOUCER OPERATION TYPE- SURFACE
MESA IO NO. YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- FLORA VISTA TYPE- 7.5 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOO/MOO- SANO & GRAVEL
NMBM MINES FILE

148 NAME- MATERIALS PIT SEQUENCE NUMBER- 0350450183
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1575M:100M
LATITUOE- N 36 48 00 PRECISION- UNK
LONGITUOE- W 108 46 00 REFERENCE POINT- ORE BOOY
UTM: ZONE 12N NORTHING 4074810 EASTING 699251
PUBLIC LANO SURVEY TOWNSHIP- 030 N RANGE- 018 W
DESCRIPTION SECTION- 30 SECTION SUBOIVISION- C
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- INOIAN RES
STATUS- UNKNOWN OPERATION TYPE- SURFACE
MESA IO NO. YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- RATTLESNAKE TYPE- 15 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- MATERIALS PIT
COMMOO/MOO- SANO & GRAVEL
NEW MINE REGISTRATIONS 1971.STATE MINE INSPECTOR

151 NAME- SHIPROCK GRAVEL PIT SEQUENCE NUMBER- 0350450248
STATE- NEW MEXICO COUNTY- SAN JUAN ELEV:PREC- 1527M:100M
LATITUDE- N 36 48 30 PRECISION- UNK
LONGITUDE- W 108 41 00 REFERENCE POINT- ORE BOOY
UTM: ZONE 12N NORTHING 4075911 EASTING 706665
PUBLIC LAND SURVEY TOWNSHIP- 030 N RANGE- 018 W
DESCRIPTION SECTION- 13 SECTION SUBOIVISION- C
RIVER BASIN- 61H SAN JUAN RIVER OOMAIN- INDIAN RES
STATUS- UNKNOWN OPERATION TYPE- SURFACE
MESA IO NO. 29 00817 YEAR FIELO CHECKEO- MAP REPOSITORY- FOC
MAP NAME- CHIMNEY ROCK TYPE- 15 MIN
1:250,000 MAP NAME- SHIPROCK MINERAL PROPERTY FILE-
PRIMARY NAME- SHIPROCK GRAVEL PIT
COMMOO/MOO- SANO & GRAVEL
NEW MINE REGISTRATIONS 1974,STATE MINE INSPECTOR

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154 NAME- MATERIALS PIT                                  SEQUENCE NUMBER- 0350450162
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1721M:100M
    LATITUDE-   N 36 49 10        PRECISION-  100M
    LONGITUDE- W 108 06 01   REFERENCE POINT- CLAIM
    UTM:   ZONE 12N  NORTHING 4078560  EASTING 758660
    PUBLIC LAND SURVEY  TOWNSHIP- 030 N    RANGE- 012 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION- NWNENE
    RIVER BASIN- 61C    ANIMAS RIVER              DOMAIN- PRIVATE
    STATUS- UNKNOWN          OPERATION TYPE- SURFACE
    MESA ID NO.              YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
    MAP NAME- FLORA VISTA          TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS FLORA VISTA TOPO 7.5 MIN TOPO, 1963
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158 NAME- ALLSTATE PIT                                   SEQUENCE NUMBER- 0350450025
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN-
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO.              YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- ALLSTATE PIT
    COMMOD/MOD-  SAND & GRAVEL
    MESA FILE
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156 NAME- DOBEY MEDINA                                   SEQUENCE NUMBER- 0350450021
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN- INDIAN RES
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO.              YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- DOBEY MEDINA
    COMMOD/MOD-  SAND & GRAVEL
    MESA FILE
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158 NAME- KUTZ PIT                                       SEQUENCE NUMBER- 0350450026
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN- INDIAN RES
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO.              YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- KUTZ PIT
    COMMOD/MOD-  SAND & GRAVEL
    MESA FILE
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158 NAME- LOWER SAN JUAN PIT                             SEQUENCE NUMBER- 0350450027
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN- BLM ADMIN
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO.              YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- LOWER SAN JUAN PIT
    COMMOD/MOD-  SAND & GRAVEL
    MESA LIST
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156 NAME- PIT 364                                        SEQUENCE NUMBER- 0350450022
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN- INDIAN RES
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO.              YEAR FIELD CHECKED-       MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- PIT 364
    COMMOD/MOD-  SAND & GRAVEL
    MESA FILE
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156 NAME- PIT 72-10-5                                    SEQUENCE NUMBER- 0350450028
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN- INDIAN RES
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO. 29 01343  YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON           TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- PIT 72-10-5
    COMMOD/MOD-  SAND & GRAVEL
    OWN/OP:BROWN CONSTRUCTION CO.
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168 NAME- SAN JUAN PIT                                   SEQUENCE NUMBER- 0350450029
    STATE- NEW MEXICO              COUNTY- SAN JUAN                          ELEV:PREC- 1678M:500M
    LATITUDE-   N 36 49 23        PRECISION- >10KM
    LONGITUDE- W 108 12 02   REFERENCE POINT- APPROX
    UTM:   ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N    RANGE- 013 W
    '    DESCRIPTION       SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                  DOMAIN- INDIAN RES
    STATUS- PRODUCER         OPERATION TYPE- SURFACE
    MESA ID NO. 29 00485  YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON SOUTH     TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK              MINERAL PROPERTY FILE-
    PRIMARY NAME- SAN JUAN PIT
    COMMOD/MOD-  SAND & GRAVEL
    OWN/OP:SAN JUAN CONCRETE CO.
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156 NAME- TANNER MINE                              SEQUENCE NUMBER- 0350450023
    STATE- NEW MEXICO            COUNTY- SAN JUAN                    ELEV:PREC- 1676M:500M
    LATITUDE-   N 36 49 23         PRECISION- >10KM
    LONGITUDE- W 108 12 02  REFERENCE POINT- APPROX
    UTM:  ZONE 12N  NORTHING 4078697  EASTING 749694
    PUBLIC LAND SURVEY  TOWNSHIP- 029 N   RANGE- 013 W
    '   DESCRIPTION     SECTION- 16  SECTION SUBDIVISION-
    RIVER BASIN- 61D    SAN JUAN                 DOMAIN- INDIAN RES
    STATUS- PRODUCER       OPERATION TYPE- SURFACE
    MESA ID NO. 29 01429  YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FARMINGTON SOUTH   TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK            MINERAL PROPERTY FILE-
    PRIMARY NAME- TANNER MINE
    COMMOD/MOD-  SAND & GRAVEL
    OWN/OP:BROWN CONSTRUCTION CO.

159 NAME- AIRPORT PIT                              SEQUENCE NUMBER- 0350450095
    STATE- NEW MEXICO            COUNTY- SAN JUAN                    ELEV:PREC- 1709M:100M
    LATITUDE-   N 36 49 39         PRECISION-  100M
    LONGITUDE- W 108 00 59  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4079700  EASTING 766120
    PUBLIC LAND SURVEY  TOWNSHIP- 030 N   RANGE- 011 W
    '   DESCRIPTION     SECTION- 08  SECTION SUBDIVISION-
    RIVER BASIN- 61C    ANIMAS RIVER             DOMAIN- PRIVATE
    STATUS- UNKNOWN        OPERATION TYPE- SURFACE
    MESA ID NO.           YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FLORA VISTA        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK            MINERAL PROPERTY FILE-
    PRIMARY NAME- AIRPORT PIT
    COMMOD/MOD-  SAND & GRAVEL
    NEW MINE REGISTRATIONS 1977,STATE MINE INSPECTOR

160 NAME- MATERIALS PIT                            SEQUENCE NUMBER- 0350450161
    STATE- NEW MEXICO            COUNTY- SAN JUAN                    ELEV:PREC- 1751M:100M
    LATITUDE-   N 36 49 48         PRECISION-  100M
    LONGITUDE- W 108 02 56  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4079880  EASTING 763200
    PUBLIC LAND SURVEY  TOWNSHIP- 030 N   RANGE- 012 W
    '   DESCRIPTION     SECTION- 12  SECTION SUBDIVISION- NESWNE
    RIVER BASIN- 61C    ANIMAS RIVER             DOMAIN- PRIVATE
    STATUS- UNKNOWN        OPERATION TYPE- SURFACE
    MESA ID NO.           YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FLORA VISTA        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK            MINERAL PROPERTY FILE-
    PRIMARY NAME- MATERIALS PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS FLORA VISTA TOPO MAP 1963

160 NAME- SPENCERVILLE PIT                         SEQUENCE NUMBER- 0350450250
    STATE- NEW MEXICO            COUNTY- SAN JUAN                    ELEV:PREC- 1690M:100M
    LATITUDE-   N 36 49 39         PRECISION-  100M
    LONGITUDE- W 108 03 42  REFERENCE POINT- CLAIM
    UTM:  ZONE 12N  NORTHING 4079560  EASTING 762060
    PUBLIC LAND SURVEY  TOWNSHIP- 030 N   RANGE- 012 W
    '   DESCRIPTION     SECTION- 11  SECTION SUBDIVISION- C NESE
    RIVER BASIN- 61C    ANIMAS RIVER             DOMAIN- PRIVATE
    STATUS- UNKNOWN        OPERATION TYPE- SURFACE
    MESA ID NO.           YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- FLORA VISTA        TYPE- 7.5 MIN
    1:250,000 MAP NAME- SHIPROCK            MINERAL PROPERTY FILE-
    PRIMARY NAME- SPENCERVILLE PIT
    COMMOD/MOD-  SAND & GRAVEL
    USGS 7 1/2 TOPO 1963
    NEW MINE REGISTRATIONS 1976,STATE MINE INSPECTOR
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Appendix B

U.S. Bureau of Mines MILS Data:
Mines and Mineral Deposits,
Albuquerque 1° x 2° Quadrangle

ABBREVIATED DESCRIPTION OF DATA BASE ENTRIES

156 NAME- SECTION 24 PROSPECTS SEQUENCE NUMBER- 0350430355
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1951M: 10M
LATITUDE- N 35 15 26 PRECISION- 500M
LONGITUDE- W 107 12 30 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3903600 EASTING 299100
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 004 W
DESCRIPTION SECTION- 24 SECTION SUBDIVISION- E2W2
RIVER BASIN- 57E RIO PUERCO DOMAIN- FEDERAL
STATUS- EXP PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- SECTION 24 PROSPECTS
USGS 7.5 MINUTE TOPO MAP
INCLUDES FIVE CLAIMS.
PROBABLY KERR MCGEE NUCLEAR INC., URANIUM PROSPECTS.

156 NAME- UNNAMED URANIUM DEPOSIT SEQUENCE NUMBER- 0350610293
STATE- NEW MEXICO COUNTY- VALENCIA ELEV:PREC- 2000M:100M
LATITUDE- N 35 15 22 PRECISION- 500M
LONGITUDE- W 107 13 28 REFERENCE POINT- ORE BODY
UTM: ZONE 13N NORTHING 3903520 EASTING 297640
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 004 W
DESCRIPTION SECTION- 23 SECTION SUBDIVISION- C E2
RIVER BASIN- 57D SAN JOSE RIVER DOMAIN- PRIVATE
STATUS- UNKNOWN OPERATION TYPE- UNKNOWN
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- UNNAMED URANIUM DEPOSIT
COMMOD/MOD- URANIUM
USGS PROF.PAPER 603. LOWELL S.HILPERT,1969,P57

161 NAME- B. AND G. PROSPECT SEQUENCE NUMBER- 0350430107
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1982M:100M
LATITUDE- N 35 15 56 PRECISION- 500M
LONGITUDE- W 107 08 37 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3904400 EASTING 305000
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 003 W
DESCRIPTION SECTION- 15 SECTION SUBDIVISION- SW
RIVER BASIN- 57E RIO PUERCO DOMAIN- FEDERAL
STATUS- RAW PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- B. AND G. PROSPECT
COMMOD/MOD- URANIUM U308 CONTENT
USGS PROF. PAPER 603. P. 48

161 NAME- BROOKHAVEN PROSPECT SEQUENCE NUMBER- 0350430124
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1951M: 10M
LATITUDE- N 35 15 47 PRECISION- 10M
LONGITUDE- W 107 09 30 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3904140 EASTING 303650
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 003 W
DESCRIPTION SECTION- 16 SECTION SUBDIVISION- SESESW
RIVER BASIN- 57E RIO PUERCO DOMAIN- STATE
STATUS- RAW PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- BROOKHAVEN PROSPECT
COMMOD/MOD- URANIUM U308 CONTENT
USGS PROF. PAPER 603. P. 48
USGS 7.5 MINUTE TOPO MAP

161 NAME- SECTION 15 PROSPECTS SEQUENCE NUMBER- 0350430346
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1890M:100M
LATITUDE- N 35 16 16 PRECISION- 500M
LONGITUDE- W 107 07 53 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3905000 EASTING 306140
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 003 W
DESCRIPTION SECTION- 15 SECTION SUBDIVISION- E2E2
RIVER BASIN- 57E RIO PUERCO DOMAIN- FEDERAL
STATUS- EXP PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- SECTION 15 PROSPECTS
USGS 7.5 MINUTE TOPO MAP
INCLUDES SEVEN PROSPECTS, ONE OF WHICH EXTENDS INTO SECTION 10.
PROBABLY KERR MCGEE NUCLEAR INC., URANIUM PROSPECTS.

161 NAME- SECTION 21 PROSPECTS SEQUENCE NUMBER- 0350430354
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1951M:100M
LATITUDE- N 35 15 26 PRECISION- 1KM
LONGITUDE- W 107 09 28 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3903500 EASTING 303700
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 003 W
DESCRIPTION SECTION- 21 SECTION SUBDIVISION-
RIVER BASIN- 57E RIO PUERCO DOMAIN- FEDERAL
STATUS- EXP PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- SECTION 21 PROSPECTS
USGS 7.5 MINUTE TOPO MAP
INCLUDES TEN PROSPECTS.
PROBABLY KERR MCGEE NUCLEAR INC., URANIUM PROSPECTS.

165 NAME- BETTY MINE SEQUENCE NUMBER- 0350430110
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1951M:100M
LATITUDE- N 35 16 13 PRECISION- 1KM
LONGITUDE- W 107 10 36 REFERENCE POINT- CLAIM
UTM: ZONE 13N NORTHING 3905000 EASTING 302000
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 003 W
DESCRIPTION SECTION- 17 SECTION SUBDIVISION-
RIVER BASIN- 57E RIO PUERCO DOMAIN- FEDERAL
STATUS- DEVEL DEPOSIT OPERATION TYPE- UNDERGROUND
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- BETTY MINE
COMMOD/MOD- URANIUM U308 CONTENT
NMBMMR ABANDONED URANIUM MINES FILES

165 NAME- SECTION 17 PROSPECTS SEQUENCE NUMBER- 0350430348
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1951M:100M
LATITUDE- N 35 16 13 PRECISION- 1KM
LONGITUDE- W 107 10 36 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3905000 EASTING 302000
PUBLIC LAND SURVEY TOWNSHIP- 012 N RANGE- 003 W
DESCRIPTION SECTION- 17 SECTION SUBDIVISION-
RIVER BASIN- 57E RIO PUERCO DOMAIN- FEDERAL
STATUS- EXP PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- LA GOTERA TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- SECTION 17 PROSPECTS
COMMOD/MOD- URANIUM U308 CONTENT
NMBMMR GEOLOGIC MAP NO. 31, 1979
USGS 7.5 MINUTE TOPO MAP
INCLUDES 26 PROSPECTS IN SECTION 17 AND 3 PROSPECTS WHICH EXTEND INTO SECTION 8.

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165 NAME- SECTION 18 PROSPECTS                    SEQUENCE NUMBER- 0350430350
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1951M:100M
    LATITUDE-   N 35 16 12             PRECISION-   1KM
    LONGITUDE- W 107 11 36  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3905000  EASTING 300500
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 003 W
       DESCRIPTION      SECTION- 18  SECTION SUBDIVISION-
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- SECTION 18 PROSPECTS
    COMMOD/MOD-   URANIUM            U3O8 CONTENT
    USGS 7.5 MINUTE TOPO MAP
    NMBMMR GEOLOGIC MAP NO. 31, 1979
    INCLUDES SIX PROSPECTS
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165 NAME- SECTION 20 PROSPECTS                    SEQUENCE NUMBER- 0350430353
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1982M:100M
    LATITUDE-   N 35 15 25             PRECISION-   1KM
    LONGITUDE- W 107 10 35  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3903500  EASTING 302000
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 003 W
       DESCRIPTION      SECTION- 20  SECTION SUBDIVISION-
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- SECTION 20 PROSPECTS
    USGS 7.5 MINUTE TOPO MAP
    INCLUDES THIRTEEN PROSPECTS.
    PROBABLY KERR MCGEE NUCLEAR INC., URANIUM PROSPECTS.
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170 NAME- SECTION 12 PROSPECTS                    SEQUENCE NUMBER- 0350430343
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1921M: 10M
    LATITUDE-   N 35 16 41             PRECISION-   500M
    LONGITUDE- W 107 12 16  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3905900  EASTING 299500
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 004 W
       DESCRIPTION      SECTION- 12  SECTION SUBDIVISION- S2S2SE
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- SECTION 12 PROSPECTS
    USGS 7.5 MINUTE TOPO MAP
    INCLUDES TWO PROSPECTS.
    PROBABLY KERR MCGEE NUCLEAR INC., URANIUM PROSPECTS.
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170 NAME- UNNAMED URANIUM PROSPECT                SEQUENCE NUMBER- 0350430431
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1921M:100M
    LATITUDE-   N 35 16 28             PRECISION-   500M
    LONGITUDE- W 107 12 24  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3905500  EASTING 299300
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 004 W
       DESCRIPTION      SECTION- 13  SECTION SUBDIVISION- NE
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- PRIVATE
    STATUS- RAW PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED URANIUM PROSPECT
    COMMOD/MOD-   URANIUM            U3O8 CONTENT
    USGS PROF. PAPER 603. P. 48
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170 NAME- UNNAMED URANIUM PROSPECT                SEQUENCE NUMBER- 0350430432
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1951M:100M
    LATITUDE-   N 35 16 56             PRECISION-   1KM
    LONGITUDE- W 107 12 52  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3906400  EASTING 298600
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 004 W
       DESCRIPTION      SECTION- 12  SECTION SUBDIVISION- C W2
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- PRIVATE
    STATUS- RAW PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED URANIUM PROSPECT
    COMMOD/MOD-   URANIUM            U3O8 CONTENT
    USGS PROF. PAPER 603. P. 48
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178 NAME- DOREY MINE                              SEQUENCE NUMBER- 0350430165
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1921M:100M
    LATITUDE-   N 35 17 28             PRECISION-   100M
    LONGITUDE- W 107 10 38  REFERENCE POINT- MAIN ENT
    UTM:  ZONE 13N  NORTHING 3907300  EASTING 302000
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 003 W
       DESCRIPTION      SECTION- 08  SECTION SUBDIVISION- N2
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- PRIVATE
    STATUS- DEVEL DEPOSIT  OPERATION TYPE- UNDERGROUND
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- DOREY MINE
    COMMOD/MOD-   URANIUM            U3O8 CONTENT
    USGS PROF. PAPER 603. P. 48
    USGS 7.5 MINUTE TOPO MAP
    DOREY MINE INCLUDES TWO PROSPECTS IN SECTION 8.
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178 NAME- UNNAMED PROSPECT                        SEQUENCE NUMBER- 0350430404
    STATE- NEW MEXICO              COUNTY- SANDOVAL              ELEV:PREC- 1890M:100M
    LATITUDE-   N 35 17 06             PRECISION-   10M
    LONGITUDE- W 107 10 57  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3906640  EASTING 301520
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 003 W
       DESCRIPTION      SECTION- 08  SECTION SUBDIVISION- SWSWNW
    RIVER BASIN- 57E   RIO PUERCO                 DOMAIN- PRIVATE
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- LA GOTERA           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED PROSPECT
    USGS 7.5 MINUTE TOPO MAP
    PROBABLY KERR MCGEE NUCLEAR INC., URANIUM PROSPECTS.
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179 NAME- CHRISTMAS DAY GROUP                     SEQUENCE NUMBER- 0350610127
    STATE- NEW MEXICO              COUNTY- VALENCIA              ELEV:PREC- 2130M:100M
    LATITUUE-   N 35 17 56             PRECISION-   100M
    LONGITUDE- W 107 47 06  REFERENCE POINT- ORE BODY
    UTM:  ZONE 13N  NORTHING 3909540  EASTING 246760
    PUBLIC LAND SURVEY  TOWNSHIP- 012 N   RANGE- 009 W
       DESCRIPTION      SECTION- 04  SECTION SUBDIVISION- NE
    RIVER BASIN- 570   SAN JOSE RIVER             DOMAIN- PRIVATE
    STATUS- UNKNOWN        OPERATION TYPE- MINERAL LOC
    MESA ID NO.          YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- DOS LOMAS           TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- CHRISTMAS DAY GROUP
    NMBM FILES
    CONSISTS OF FOUR CLAIMS. CHRISTMAS DAY #S 1.2.3.&4
    UNPATENDED CLAIMS
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193 NAME- MARQUEZ CANYON MINE SEQUENCE NUMBER- 0350310342
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2134M:100M
LATITUDE- N 35 18 52 PRECISION- 100M
LONGITUDE- W 107 19 11 REFERENCE POINT- MAIN ENT
UTM: ZONE 13N NORTHING 3910200 EASTING 289100
PUBLIC LAND SURVEY TOWNSHIP- 013 N RANGE- 005 W
DESCRIPTION SECTION- 36 SECTION SUBDIVISION- NWNW
RIVER BASIN- 57E RIO PUERCO DOMAIN- STATE
STATUS- PRODUCER OPERATION TYPE- UNDERGROUND
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- MARQUEZ TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- MARQUEZ CANYON MINE
COMMOD/MOD- URANIUM U3O8 CONTENT
GEOLOGIC MAP OF GRANTS URAN REGION. 1979. NMBMMR GEOLOGIC
MAP 31
STATE MINE INSPECTOR. DIRECTORY OF ACTIVE MINES. 1978
NMSMIR 1976

238 NAME- URAN DEPOSIT SEQUENCE NUMBER- 0350310600
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2200M:100M
LATITUDE- N 35 23 01 PRECISION- 1KM
LONGITUDE- W 107 43 29 REFERENCE POINT- ORE BODY
UTM: ZONE 13N NORTHING 3918800 EASTING 252500
PUBLIC LAND SURVEY TOWNSHIP- 013 N RANGE- 008 W
DESCRIPTION SECTION- 06 SECTION SUBDIVISION-
RIVER BASIN- 570 SAN JOSE RIVER DOMAIN- FEDERAL
STATUS- UNKNOWN OPERATION TYPE- UNKNOWN
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- SAN LUCAS DAM TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- URAN DEPOSIT
COMMOD/MOD- URANIUM U3O8 CONTENT
HILPERT. 1969. USGS PP 603. P 33

249 NAME- MELRICH GROUP SEQUENCE NUMBER- 0350310348
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2300M:100M
LATITUDE- N 35 23 41 PRECISION- 100M
LONGITUDE- W 107 42 31 REFERENCE POINT- CLAIM
UTM: ZONE 13N NORTHING 3920000 EASTING 254000
PUBLIC LAND SURVEY TOWNSHIP- 014 N RANGE- 008 W
DESCRIPTION SECTION- 32 SECTION SUBDIVISION- E2SW
RIVER BASIN- 570 SAN JOSE RIVER DOMAIN- NAT FOREST
STATUS- UNKNOWN OPERATION TYPE- MINERAL LOC
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- SAN LUCAS DAM TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- MELRICH GROUP
OTHER NAMES- YUCCA
SECTION 32
COMMOD/MOD- URANIUM U3O8 CONTENT
HILPERT. 1969. USGS PP 603. P 37
NMBMMR MAP FILES
INCLUDES MELRICH NOS. 2.3.4.9.10.& 11 CLAIMS
MIN SUR NO. 2262

249 NAME- URAN DEPOSIT SEQUENCE NUMBER- 0350310601
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2250M:100M
LATITUDE- N 35 23 02 PRECISION- 500M
LONGITUDE- W 107 42 37 REFERENCE POINT- ORE BODY
UTM: ZONE 13N NORTHING 3918800 EASTING 253800
PUBLIC LAND SURVEY TOWNSHIP- 013 N RANGE- 008 W
DESCRIPTION SECTION- 05 SECTION SUBDIVISION- W2
RIVER BASIN- 570 SAN JOSE RIVER DOMAIN- NAT FOREST
STATUS- UNKNOWN OPERATION TYPE- UNKNOWN
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- SAN LUCAS DAM TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- URAN DEPOSIT
COMMOD/MOD- URANIUM U3O8 CONTENT
HILPERT. L.S.. 1969. USGS PP 603. P33

251 NAME- SECTION 31 URAN DEPOSIT SEQUENCE NUMBER- 0350310505
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2225M:100M
LATITUDE- N 35 23 53 PRECISION- 500M
LONGITUDE- W 107 43 46 REFERENCE POINT- ORE BODY
UTM: ZONE 13N NORTHING 3920400 EASTING 252100
PUBLIC LAND SURVEY TOWNSHIP- 014 N RANGE- 008 W
DESCRIPTION SECTION- 31 SECTION SUBDIVISION- C W2
RIVER BASIN- 570 SAN JOSE RIVER DOMAIN- NAT FOREST
STATUS- UNKNOWN OPERATION TYPE- UNKNOWN
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- SAN LUCAS DAM TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- SECTION 31 URAN DEPOSIT
COMMOD/MOD- URANIUM U3O8 CONTENT
HILPERT. 1969. USGS PP 603. P 37
EXTENSION OF DEPOSIT IN EASTERN PART OF SEC 36 T14N R9W

272 NAME- CANYON MULATIO URAN DEPOSIT SEQUENCE NUMBER- 0350310173
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2435M:100M
LATITUDE- N 35 25 55 PRECISION- 500M
LONGITUDE- W 107 44 48 REFERENCE POINT- ORE BODY
UTM: ZONE 13N NORTHING 3924200 EASTING 250650
PUBLIC LAND SURVEY TOWNSHIP- 014 N RANGE- 009 W
DESCRIPTION SECTION- 24 SECTION SUBDIVISION- NW
RIVER BASIN- 570 SAN JOSE RIVER DOMAIN- NAT FOREST
STATUS- UNKNOWN OPERATION TYPE- UNKNOWN
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- SAN LUCAS DAM TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- CANYON MULATTO URAN DEPOSIT
COMMOD/MOD- URANIUM U3O8 CONTENT
HILPERT. 1969. USGS PP 603. P 38

291 NAME- GREEN PICK 20 URAN DEPOSIT SEQUENCE NUMBER- 0350310298
STATE- NEW MEXICO COUNTY- MCKINLEY ELEV:PREC- 2320M:100M
LATITUDE- N 35 28 15 PRECISION- 500M
LONGITUDE- W 107 47 39 REFERENCE POINT- ORE BODY
UTM: ZONE 13N NORTHING 3928650 EASTING 246450
PUBLIC LAND SURVEY TOWNSHIP- 014 N RANGE- 009 W
DESCRIPTION SECTION- 04 SECTION SUBDIVISION-
RIVER BASIN- 57D SAN JOSE RIVER DOMAIN- FEDERAL
STATUS- UNKNOWN OPERATION TYPE- UNKNOWN
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- AMBROSIA LAKE TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- GREEN PICK 20 URAN DEPOSIT
COMMOD/MOD- URANIUM U3O8 CONTENT
HILPERT. 1969. USGS PP 603. P 37

296 NAME- UNNAMED PROSPECTS SEQUENCE NUMBER- 0350430418
STATE- NEW MEXICO COUNTY- SANDOVAL ELEV:PREC- 1860M:100M
LATITUDE- N 35 29 15 PRECISION- 500M
LONGITUDE- W 106 55 03 REFERENCE POINT- TRENCH
UTM: ZONE 13N NORTHING 3928600 EASTING 326050
PUBLIC LAND SURVEY TOWNSHIP- 015 N RANGE- 001 W
DESCRIPTION SECTION- 35 SECTION SUBDIVISION- W2W2
RIVER BASIN- 57A JEMEZ RIVER DOMAIN- FEDERAL
STATUS- EXP PROSPECT OPERATION TYPE- PROSPECT
MESA ID NO. YEAR FIELD CHECKED- MAP REPOSITORY- FOC
MAP NAME- SKY VILLAGE N. W. TYPE- 7.5 MIN
1:250,000 MAP NAME- ALBUQUERQUE MINERAL PROPERTY FILE-
PRIMARY NAME- UNNAMED PROSPECTS
USGS 7.5 MINUTE TOPO MAP
INCLUDES FOUR PROSPECTS
PROBABLY URANIUM PROSPECTS

ABBREVIATED DESCRIPTION OF DATA BASE ENTRIES

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300 NAME- TWO UNNAMED PROSPECTS                   SEQUENCE NUMBER- 0350430419
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1799M:100M
    LATITUDE-    N 35 29 15           PRECISION-  500M
    LONGITUDE- W 106 55 29  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3928600  EASTING 325400
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 34  SECTION SUBDIVISION- E2
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- SKY VILLAGE N. W.   TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- TWO UNNAMED PROSPECTS
    USGS 7.5 MINUTE TOPO MAP
    INCLUDES FOUR PROSPECTS
    PROBABLY URANIUM PROSPECTS
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300 NAMF- UNNAMED PROSPECT                        SEQUENCE NUMBER- 0350430403
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1860M:100M
    LATITUDE-    N 35 29 52           PRECISION-   10M
    LONGITUDE- W 106 56 07  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3929760  EASTING 324460
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 27  SECTION SUBDIVISION- SENWSW
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- SKY VILLAGE N. W.   TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED PROSPECT
    USGS 7.5 MINUTE TOPO MAP
    PROBABLY URANIUM PROSPECT.
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300 NAME- UNNAMED PROSPECT                        SEQUENCE NUMBER- 0350430405
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1799M:100M
    LATITUDE-    N 35 29 23           PRECISION-   10M
    LONGITUDE- W 106 56 33  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3928900  EASTING 323780
    PUBLIC LAND SURVEY . TOWNSHIP- 015 N   RANGE- 001 W
        DESCRIPTION      SECTION- 33  SECTION SUBDIVISION- NWSWNE
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- SKY VILLAGE N. W.   TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED PROSPECT
    USGS 7.5 MINUTE TOPO MAP
    PROBABLY URANIUM PROSPECT
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306 NAME- UNNAMED URANIUM PROSPECT                SEQUENCE NUMBER- 0350430438
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1799M:100M
    LATITUDE-    N 35 30 45           PRECISION-  500M
    LONGITUDE- W 106 56 31  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3931400  EASTING 323900
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 21  SECTION SUBDIVISION- SE
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- RAW PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- OJITO SPRING        TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED URANIUM PROSPECT
    COMMOD/MOD-  URANIUM         U308 CONTENT
    USGS PROF. PAPER 603. P. 48
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307 NAME- UNNAMED URANIUM PROSPECT                SEQUENCE NUMBER- 0350430436
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1768M:100M
    LATITUDE-    N 35 30 46           PRECISION-  500M
    LONGITUDE- W 106 55 27  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3931400  EASTING 325500
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 22  SECTION SUBDIVISION- SE
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- RAW PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- OJITO SPRING        TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED URANIUM PROSPECT
    COMMOD/MOD-  URANIUM         U308 CONTENT
    USGS PROF. PAPER 603. P. 48
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307 NAME- UNNAMED URANIUM PROSPECT                SEQUENCE NUMBER- 0350430437
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1737M:100M
    LATITUDE-    N 35 30 46           PRECISION-  500M
    LONGITUDE- W 106 54 28  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3931400  EASTING 327000
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 23  SECTION SUBDIVISION- SE
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- RAW PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- OJITO SPRING        TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- UNNAMED URANIUM PROSPECT
    COMMOD/MOD-  URANIUM         U308 CONTENT
    USGS PROF. PAPER 603. P. 48
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311 NAME- POLKA DOT URANIUM GROUP                 SEQUENCE NUMBER- 0350430314
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1799M:100M
    LATITUDE-    N 35 31 37           PRECISION-  500M
    LONGITUDE- W 106 55 48  REFERENCE POINT- ORE BODY
    UTM:  ZONE 13N  NORTHING 3933000  EASTING 325000
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 15  SECTION SUBDIVISION-
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- MINERAL LOC
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- OJITO SPRING        TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- POLKA DOT URANIUM GROUP
    COMMOD/MOD-  URANIUM         U308 CONTENT
    NMBMMR MAP FILES
    GROUP INCLUDES POLKA DOT CLAIMS 1 - 126.
    GROUP COVERS SECTIONS 8. 9. 10. 11. 14. 15. 22. AND 23.
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311 NAME- RATTLESNAKE GROUP                       SEQUENCE NUMBER- 0350430327
    STATE- NEW MEXICO            COUNTY- SANDOVAL                   ELEV:PREC- 1799M:100M
    LATITUDE-    N 35 31 38           PRECISION-  500M
    LONGITUDE- W 106 55 09  REFERENCE POINT- TRENCH
    UTM:  ZONE 13N  NORTHING 3933000  EASTING 326000
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    .   DESCRIPTION      SECTION- 14  SECTION SUBDIVISION-
    RIVER BASIN- 57A   JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.                YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- OJITO SPRING        TYPE- 7.5 MIN
    1:250.000 MAP NAME- ALBUQUERQUE          MINERAL PROPERTY FILE-
    PRIMARY NAME- RATTLESNAKE GROUP
    COMMOD/MOD-  URANIUM         U308 CONTENT
    NMBMMR MAP FILES
    GROUP INCLUDES RATTLESNAKE CLAIMS 1 - 14.
    GROUP ALSO EXTENDS INTO PORTIONS OF SECTIONS 15. 22. AND 23.
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ABBREVIATED DESCRIPTION OF DATA BASE ENTRIES

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311 NAME- YELLOW CLIFFS GROUP                     SEQUENCE NUMBER- 03504 30457
    STATE- NEW MEXICO            COUNTY- SANDOVAL                  ELEV:PREC- 1799M:100M
    LATITUDE-   N 35 31 12          PRECISION-   100M
    LONGITUDE- W 106 56 41   REFERENCE POINT- CLAIM
    UTM:  ZONE 13N  NORTHING 3932240  EASTING 323660
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 W
    '   DESCRIPTION      SECTION- 21   SECTION SUBDIVISION-  C NWNE
    RIVER BASIN- 57A    JAMEZ RIVER                 DOMAIN- FEDERAL
    STATUS- EXP PROSPECT   OPERATION TYPE- PROSPECT
    MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- OJITO SPRING          TYPE- 7.5 MIN
    1:250,000 MAP NAME- ALBUQUERQUE             MINERAL PROPERTY FILE-
    PRIMARY NAME- YELLOW CLIFFS GROUP
    COMMOD/MOD-  URANIUM              U3O8 CONTENT
    NMBMMR MAP FILES
    GROUP INCLUDES YELLOW CLIFF CLAIMS 1 - 11.
    GROUP ALSO EXTENDS PARTIALLY INTO SECTIONS 20 AND 22.
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312 NAME- BLUE SKY                                SEQUENCE NUMBER- 03504 30114
    STATE- NEW MEXICO            COUNTY- SANDOVAL                  ELEV:PREC- 1768M:100M
    LATITUDE-   N 35 31 42          PRECISION-    1KM
    LONGITUDE- W 106 50 31   REFERENCE POINT- ORE BODY
    UTM:  ZONE 13N  NORTHING 3933000  EASTING 333000
    PUBLIC LAND SURVEY  TOWNSHIP- 015 N   RANGE- 001 E
    '   DESCRIPTION      SECTION- 16   SECTION SUBDIVISION-
    RIVER BASIN- 57A    JAMEZ RIVER                 DOMAIN- STATE
    STATUS- PAST PRODUCER  OPERATION TYPE- SURFACE
    MESA ID NO.            YEAR FIELD CHECKED-      MAP REPOSITORY-  FOC
    MAP NAME- SAN YSIDRO            TYPE- 7.5 MIN
    1:250,000 MAP NAME- ALBUQUERQUE             MINERAL PROPERTY FILE-
    PRIMARY NAME- BLUE SKY
    COMMOD/MOD-  GYPSUM
    NMBMMR MINES FILES
    ALSO LIES IN SECTION 21.
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GLOSSARY

Acre-foot - the volume of water that would cover 1 acre to a depth of 1 foot, equivalent to 43,560 cubic feet. One cubic foot per second (cfs), flowing for 24 hours, is equivalent to 1.983 acre-feet.

Active pit - the elongate trench or opening in a surface mine from which coal is actually being extracted.

Alluvium - clay, silt, sand, and gravel or other rock material transported by flowing water and deposited as sorted or semisorted sediments.

Andesitic - like andesite, a dark-colored, fine-grained extrusive igneous rock.

Aquifer - one or more formations that contain sufficient permeable material to yield significant quantities of water to wells and springs.

Arenaceous - said of a sediment or sedimentary rock consisting wholly or in part of sand-size fragments or having a sandy texture or the appearance of sand.

Argillaceous - pertaining to, largely composed of, or containing clay-size particles or clay minerals.

Arkosic sandstone - a sandstone with considerable feldspar.

Arroyo - small, deep, flat-floored channel or gully of an ephemeral or intermittent stream, usually with vertical or steeply cut banks of unconsolidated material.

Artesian - refers to ground water under sufficient hydrostatic head to rise above the aquifer containing it.

Backfill - earth that is replaced after a construction excavation.

Badlands - a region nearly devoid of vegetation where erosion, instead of carving hills and valleys of the ordinary type, has cut the land into an intricate maze of hollow ravines and sharp crests and pinnacles.

Basin (struc. geol) - a syncline that is circular or elliptical in plan, i.e., the outcrop of each formation is essentially circular or elliptical and the beds dip inwards.

Bedrock - a general term for the rock, usually solid, that underlies soil or other consolidated, superficial material.

Blade (verb) - smooth-out ground surface with blade of bulldozer or grader.

Borrow area - area from which earth material is obtained for use elsewhere.

Calcarenite - a limestone consisting predominantly (more than 50%) of detrital calcite particles of sand size.

Calcareous - said of a substance that contains calcium carbonate.

Carbonaceous - said of a sediment containing organic matter.

Cathodically protected - protected against corrosion by means of a weak electric current applied to the pipeline to offset the galvanic action causing metal corrosion.

Clastic - consisting of fragments of rocks or of organic structures that have been moved individually from their places of origin.

Claystone - an indurated clay having the texture and composition of shale but lacking its fine lamination or fissility.

Coal gasification - the process of coal mining and the subsequent chemical conversion to a high-Btu, clean-burning, sulfur-free, substitute natural gas (SNG).

Coal reserve - that portion of the identified coal resource that can be economically mined at the time of determination. The reserve is derived by applying a recovery factor so that components of the identified coal resource are designated as the reserve base.

Coal resource - concentrations of coal in such forms that economic extraction is currently or may become feasible.

Colluvium - loose, unconsolidated clay, silt, sand, and gravel at the foot of a slope, brought there chiefly by gravity.

Conductance (or specific conductance) - a measure of the ability of water to conduct an electrical current, expressed in micromhos per centimeter at 25°C. Conductance serves as an index to the concentration of dissolved solids in water.

Confined ground water - is under pressure significantly greater than atmospheric, and its upper limit is the bottom of a bed of distinctly lower hydraulic conductivity than that of the material in which the confined water occurs.

Confining bed - a body of "impermeable" material stratigraphically adjacent to one or more aquifers.

Conformable - strata characterized by an unbroken sequence in which the layers are formed in parallel order by regular uninterrupted disposition under the same general conditions, also the contacts between such strata.

Contact - a plane or irregular surface between two types or ages of rock.

Continental divide - a drainage divide that separates streams flowing toward opposite sides of a continent.

Cretaceous - the final period of the Mesozoic era thought to have covered the span of time between 135 and 65 million years ago.

Cut-and-fill - excavation and grading operation entailing achievement of uniform grade by moving excess material from hills into valleys.

Decommissioning - the act of taking a power generating or industrial facility out of service, sometimes referred to as mothballing.

Deposition - the constructive process of laying, placing, or throwing down of any kind of rock material.

Dike - berm or embankment designed to contain a body of water.

Dip - the angle that a structural surface makes with the horizontal, measured in the vertical plane.

Displacement - a general term for the relative movement of two sides of a fault, measured in a chosen direction.

Dissected plateaus - a plateau in which a large part of the original surface has been deeply cut by streams.

Dome - an uplift or anticlinal structure in which rocks dip away in all directions.

Drainage - the pattern and manner in which the waters of an area pass or flow off by surface streams or subsurface conduits.

Dune - a low mound, ridge, or hill of wind blown granular material.

Effluent - the mixture of substances, gases, liquids, and suspended matter discharged into the atmosphere (or ground, river, ocean) as the result of a given process.

Emission - a substance, whether gaseous or particulate, released by human activity into the air or water.

Eolian - erosion and deposition performed by wind action.

Epeiric - applied to shallow seas that cover or have covered large parts of continents without being disconnected from the ocean.

Ephemeral stream - a stream or reach of a stream that flows briefly only in direct response to precipitation in the immediate locality and whose channel is at all times above the water table.

Epoch - a geologic-time unit longer than an age and shorter than a period during which the rocks of the corresponding series were formed.

Erosion - the general process or processes whereby rock material is loosened, dissolved, or worn away, and simultaneously moved from one place to another by natural agencies.

Extrusive - igneous rock that has been erupted on the surface of the earth; includes lava and pyroclastic rock.

Facies - the aspect belonging to a geologic unit of sedimentation, including mineral composition, type of bedding, fossil content, etc.; also, a stratigraphic body as distinguished from other bodies of differing appearance or composition.

Fault trace - the surface expression of a fault plane.

Floodplain - lands that are periodically covered by flood waters.

Fluvial - produced by the action of a stream or river.

Formation - a persistent body of rock having easily recognizable boundaries that can be traced in the field.

Friable - a rock or mineral that crumbles naturally or is easily broken, pulverized, or reduced to powder.

Gamma-ray log - a bore-hole measurement of gamma rays originating from the rock formation to a detector shielded from the source. The amount of scattering is proportional to electron density and thus proportional to mass concentration so that the measurement, after certain corrections, yields a density log of the formation penetrated.

Geologic unit - a recognizable rock unit based either on its lithologic (mappable) or its time-stratigraphic characteristics; a discrete body of rock recognizable by unique characteristics.

Ground water - that part of the subsurface water that is the zone of saturation, supplies water to wells, and provides water that sustains the low flow of perennial streams.

Grouting - injection of soil or rock with chemicals, cement, or other materials to improve the strength or reduce the permeability.

Gypsum - widely distributed mineral, hydrous calcium sulfate $CaSO_4$ $2H_2O$, associated with evaporites.

Holocene - an epoch of the Quaternary period covering the span of time from 8 thousand years ago to the present.

Hydraulic conductivity - the volume of water that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

Hydraulic gradient - the change in static head per unit of distance in a given direction.

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 1 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.

Intrusive - an igneous rock solidified, never having been extruded onto the earth's surface.

Joint - a surface of fracture or parting on which no displacement has occurred. The surface is usually a plane, and generally occurs with parallel joints to form a joint set.

Jurassic - the second period of the Mesozoic era thought to have covered the time span between 190 and 135 million years ago (see Table G-1).

Lacustrine - pertaining to, produced by, or formed in a lake or lakes.

Landslide - a general term covering a wide range of landforms and processes involving the downslope, under gravitational influence, of soil and rock material en masse.

Table G-1. GEOLOGIC TIME CHART

Era	Period	Epoch	Beginning of interval. Approximate number of years before present.	Approximate length of interval in years.
Cenozoic	Quaternary	Holocene	11,000	11,000
		Pleistocene	1.8 million	1.8 million
	Tertiary	Pliocene	7 million	5.2 million
		Miocene	26 million	19 million
		Oligocene	38 million	13 million
		Eocene	54 million	16 million
		Paleocene	65 million	11 million
Mesozoic	Cretaceous		136 million	71 million
	Jurassic		195 million	59 million
	Triassic		225 million	30 million
Paleozoic			570 million	345 million

*Adapted from "Major Stratigraphic and Time Divisions," Geologic Names Committee, U.S. Geological Survey, 1972.

Liquefaction - the transformation of a solid to a liquid state as a result of increased pore pressure and reduced effective stress.

Lithologies - the physical character of rocks including color, mineralogic composition, and grain size.

Littoral beach deposit - the gravel, sand, and other material dropped on a shoreline between the high- and low-water lines.

Mesa - a very broad, flat topped, usually isolated hill or mountain of moderate height bounded on at least one side by a steep cliff or slope and representing an erosional remnant.

Mesozoic - an era of geologic time, spanning the time period between about 225 to 65 million years ago (see Table G-1).

Mineral reserve - that portion of the identified resource from which a usable mineral or energy commodity can be economically and legally extracted at the time of determination.

Mineral resource - a concentration of naturally occurring solid, liquid, or gaseous materials in or on the earth's crust in such form that economic extraction of a commodity is currently or potentially feasible.

Modified Mercalli Scale - an earthquake intensity scale with twelve divisions, ranging from I (not felt by people) to XII (damage nearly total).

Monocline - a local steeping in an otherwise gentle uniform dip.

Mudstone - an indurated mud having the texture and composition of shale, but lacking its fissility or fine lamination.

Neck - a vertical, pipe-like intrusion that represents a former volcanic vent. This term generally refers to the form as an erosional remnant.

Normal fault - a fault in which the hanging wall appears to have moved down in relation to the foot wall.

Overburden - the earth, rock, and other materials that lie above a mineral deposit.

Paleocene - an epoch of the early Tertiary period and the corresponding worldwide series of rock (see Table G-1).

Paleontology - a science that deals with the life of past geological periods and is based on the study of fossil remains of plants and animals.

Percolation - slow movement of water through small openings within porous material such as sandstone.

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.

pH - a number that represents the negative logarithm, base 10, of the hydrogen-ion activity of a solution. A pH less than 7 indicates an acid solution; a pH greater than 7 indicates an alkaline solution.

Plateau - a comparatively flat area of great extent and elevation commonly limited on at least one side by an abrupt descent.

Pleistocene - an epoch of the Quaternary period and the corresponding series of rock between 2-3 million and 8 thousand years ago.

Pliocene - an epoch of the Tertiary period and the corresponding series of rock (see Table G-1).

Porosity - the property of a rock or soil of containing interstices or voids and may be expressed as the ratio of the volume of its interstices to its total volume.

Potentiometric surface - the surface which represents the static head of water. The levels to which water will rise in tightly cased wells. Water table is a particular potentiometric surface.

Quaternary - the second period of the Cenozoic era as well as the corresponding system of rocks. It began two to three million years ago and extends to the present (see Table G-1).

Regressive - pertaining to a retreat or contraction of the sea from land areas.

Relief - the elevations or differences in elevation, considered collectively, of a land surface.

Reserve - that portion of the identified coal resource that can be economically mined at the time of determination.

Reservoir - a subsurface volume of rock that has sufficient porosity and permeability to permit the accumulation of crude oil or natural gas under adequate trap conditions (petroleum).
An artificial or natural storage place for water, such as a lake or pond, from which water may be withdrawn (water).

Resistivity - that factor of the resistance of a conductor (depending on the material and its physical condition) to an electrical current traversing it longitudinally.

Riparian - of, on, or pertaining to the bank of a river or stream, or a pond or lake.

Riprap - a foundation or sustaining wall of stones (as on an embankment slope) to prevent erosion.

Rockfall - the relatively rapid free falling movement of rock from a cliff or other steep slope.

Runoff - that part of precipitation appearing in surface streams.

Saline - a general term of the naturally occurring soluble salts, such as common salt, sodium carbonate, sodium nitrate, potassium salts, and borax.

Sandstone - any clastic sedimentary rock containing individual particles that are visible to the unaided eye or slightly larger.

Saturated zone - the zone of saturation; a subsurface zone below which all rock pore space is filled with water.

Sediment - solid fragmental material that originates from the weathering of rocks.

Sedimentation - the process of forming or accumulating sediment in layers.

Sedimentary - rocks that are formed by the deposition of a sediment.

Seismicity - measure of frequency of earthquakes.

Semi-arid - characterized by light rainfall and high evaporation: having from about 10 to 20 inches of annual precipitation.

Shale - a fine-grained sedimentary rock formed by the consolidation of clay silt or mud. It is characterized by a finely laminated structure which imparts fissility parallel to bedding.

Siltation - the deposition or accumulation of silt that is suspended throughout a body of standing water.

Siltstone - an indurated silt having the texture and composition of shale but lacking its fine lamination or fissility.

Slope angle - the angle that a sloping surface makes with the horizontal, measured in the vertical plane.

Slope stability - the resistance of a natural or artificial slope or other inclined surface to failure by landsliding.

Sludge - a semifluid, slushy, murky mass of sediment resulting from treatment of water, sewage, or industrial and mining wastes.

Soil (engineering geology) - all unconsolidated materials above bedrock; (soil geology) the natural medium for growth of land plants.

Specific capacity - the rate of discharge of a well divided by the drawdown of water level within the well.

Specific yield - the volume of water which a rock or soil, after being saturated, will yield by gravity divided by the volume of the rock or soil. The definition implies that gravity drainage is complete.

Spoil (coal) - debris or waste material from a coal mine.

Strata - layers of sedimentary rock visually separable from other layers above and below.

Stratigraphic trap - a trap for oil or gas that is the result of lithologic changes rather than structural deformation.

Stratigraphy - the branch of geology that studies the arrangement of strata, especially as applied to geographic position and chronologic order or sequence.

Strike - the course or bearing of the outcrop of an inclined bed or structure on a level surface; the direction or bearing of a horizontal line in the plane of an inclined stratum, joint, fault, cleavage plane, or other structural plane. It is perpendicular to the direction of the dip.

Structural trap - a trap for oil and gas that is the result of folding, faulting, or other deformation.

Subbituminous coal - a black coal intermediate in rank between lignite and bituminous coals.

Subsidence - movement in which surface material is displaced vertically downward.

Substrate - soil, organic, and/or rock materials found on the bottom of aquatic habitat.

Syncline - a fold that is generally concave upward, of which the core contains the stratigraphically younger rocks.

Tectonic - a branch of geology dealing with the regional assembling of structural or deformational features; a study of their mutual relations, origin, and historical evolution.

Tertiary - the first period of the Cenozoic era, thought to have covered the time span between 65 and 3 to 2 million years ago (see Table G-1).

Topography - the general configuration of a land surface or any part of the earth's surface, including its relief and the position of its natural and man-made features.

Total dissolved solids (TDS) - an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts and are dissolved in water. High TDS values can adversely affect humans, animals, and plants. TDS is often used as a measure of salinity.

Trace element - a chemical element found in small quantities (less than 1 percent) in a mineral or compound.

Transgressive - pertaining to a spread of extension of the sea over land areas.

Transmissivity - the rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Unconfined ground water - water in an aquifer that has a water table.

Unsaturated zone - a subsurface zone in which not all rock pore space is filled with water.

Uplift - a structurally high area in the crust, produced by positive movements that raise or upthrust the rocks.

Vent - the opening at the earth's surface through which volcanic materials are extruded.

Vuggy - applied to rocks or mineral deposits abounding in cavities (sometimes lined with mineral deposits of different composition than those surrounding the vug).

Wash - a term applied to the broad, gravelly, normally dry bed of an intermittent stream, often situated at the bottom of a canyon.

Water table - that surface in a ground-water body at which the water pressure is atmospheric. It is defined by the levels at which water stands in wells that penetrate the water body just far enough to hold standing water.

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