



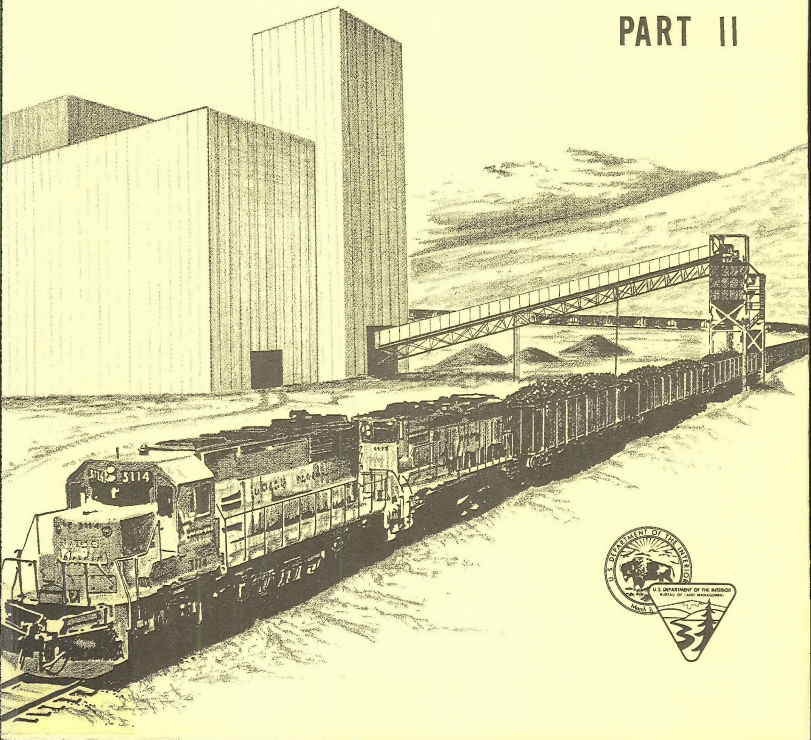
GREEN RIVER- HAMS FORK

DRAFT ENVIRONMENTAL IMPACT STATEMENT

COAL

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

PART II





United States Department of the Interior

IN REPLY REFER TO

BUREAU OF LAND MANAGEMENT

1792 (922)

COLORADO STATE OFFICE
ROOM 700, COLORADO STATE BANK BUILDING
1600 BROADWAY
DENVER, COLORADO 80202

NOTICE

Enclosed is the Draft Green River-Hams Fork Regional Coal Environmental Impact Statement. Your review and comments regarding this Draft Environmental Impact Statement (DEIS) are invited. Please direct your written comments to the EIS Team Leader, Bureau of Land Management, Craig District Office, P.O. Box 248, 455 Emerson Street, Craig, Colorado 81625.

Public hearings will be held in Colorado and Wyoming according to the following schedule:

June 23, 1980
Auditorium
Denver Public Library
1357 Broadway
Denver, Colorado
1:00 p.m. and 7:30 p.m.

June 24, 1980
Auditorium
Moffat County Courthouse
W. Victory Way
Craig, Colorado
7:30 p.m.

June 25, 1980
West Room
Jeffery Center
3rd and Spruce
Rawlins, Wyoming
7:30 p.m.

June 26, 1980
Little America
West of Cheyenne
Cheyenne, Wyoming
7:30 p.m.

Written requests to testify should be submitted to the EIS Team Leader at the above address prior to the close of business on June 18, 1980.

Written comments received by July 8, 1980, and testimony presented at the public hearings will be fully considered and evaluated in preparation of the Final Environmental Impact Statement (FEIS). Those comments that pertain to the adequacy of the impact assessment or present new data, will be addressed in the FEIS.

Please retain your copy of the DEIS. Portions of this document will probably not be reprinted if changes in response to comments on that particular section are minor.



Charles W. Luscher
Charles W. Luscher
Acting State Director

Save Energy and You Serve America!

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CONTENTS

PART II

SITE-SPECIFIC MATRICES	1	APPENDIX A FEDERAL COAL MAN- AGEMENT PROGRAM.....	410
CHINA BUTTE	1	APPENDIX B WATER RESOURCES...	444
MEDICINE BOW	27	APPENDIX C CULTURAL RE- SOURCES.....	464
RED RIM	50	APPENDIX D ECONOMICS	475
ROSEBUD	76	APPENDIX E CONSULTATION WITH THE COLORADO STATE HIS- TORIC PRESERVATION OFFI- CER	491
SEMINOE II	99		
BELL ROCK	122		
EMPIRE	149		
GRASSY CREEK	173		
DANFORTH HILLS #1	199		
DANFORTH HILLS #3	227		
HAYDEN GULCH	256		
LAY	281		
DANFORTH HILLS #2	307		
PINNACLE	332		
ILES MOUNTAIN	360		
WILLIAMS FORK MOUNTAINS.....	385		

Board of Directors
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New York, N.Y. 10001
Telephone: (212) 850-1234

SITE-SPECIFIC MATRICES

CHINA BUTTE

SITE SPECIFIC SUMMARY MATRIX

Tract name or number: China ButteI. COAL DATA
(From Tract Delineation Report)State: Wyoming

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons/yr)	4 million tons/year	Production of approx. 4 MM ton/yr of coal for public power production.	Medium positive	Good	
Estimated mine life (yrs)	30 years	Removal of a total of approx. 139,304,000 tons of coal from known reserves.	Low negative	Good	
Total reserves (tons in place)	139,304,000	The known reserves of coal would be decreased by the tonnage mined/year over a period of 30 years.	Low negative	Good	Represents ~ .004% of known reserves in Wyoming
Recoverable reserves (tons)	118,408,000	This amount of coal would be supplied to public power companies over a 30-year period.	Medium positive	Good	
Recovery rate (%)	85%	Loss of 15% of total coal reserves	Low negative	Good	85% figure represents production using best available technology.
Type of coal (steam/metallurgical)	Steam	Production of power from coal rather than oil, gas, nuclear.	Low positive	Good	
Sulfur content/ton	.56%	Sulfur content good; minor impact on air quality.	Medium positive	Good	
Projected work force (construction)	50 to 70	Provide employment for estimated 2 year construction period.	Medium positive	Good	
Projected work force (mining)	182	Provide 182 permanent jobs for 30 year period.	Medium positive	Good	
Surface ownership (Federal, state, private, etc.)	2,960 acres private 6,030 acres federal 1,280 acres state	Checkerboard pattern prevents development of segments separately.	Private would also be mined	Good	
Status of surface owner consent and/or consultation	None required; no private surface/federal mineral	None; private currently owned by Rocky Mountain Energy	-----	Excellent	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Type of mine (surface/underground)	Surface	Removal of approx. 139 MM tons of coal and destruction of geologic history of area would have minimal effect.	Low	Good	
Coal transportation needs	Approximately 2 trains/day	Affect of 2 trains/day on existing transportation would be minimal.	Low	Good	
Coal access needs	Approx. 5.5 miles of road	5.5 miles of access would have a minimal affect on the environment.	Low	Good	
Coal Markets	Utilities/public power	Provide low sulfur coal to utilities to meet energy production requirements.	Medium	Good	
Other as determined by Regional Coal Team					
Paleontology Chicken Springs Mammoth Kill Site	Significant vertebrate fossils in Fort Union & Lance formation Chicken Springs Mammoth Kill Site	Fossils would be destroyed. Site would be destroyed.	Low significance Low significance	Good Good	N.C. N.C.

Tract name or number: China Butte

SITE SPECIFIC SUMMARY MATRIX

State: Wyoming

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Legal description (T and R or acres and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Air Quality a) particulate matter	Presently in compliance.	Site-specific -- large increase directly downwind of proposed tract.	S.S.-- violations of ambient air standards may occur (a as much as 60 $\mu\text{g}/\text{m}^3$ (annual geometric mean).	Good	--
b) SO ₂ , NO _x , O ₃ , CO, HC	No measurements; probably very small.	Very small	No violations of ambient air standards will occur (Insignificant).	Good	--
c) PSD areas	There are no PSD areas of significance within 40 miles of the coal tract area.	None	No violations of ambient air standards will occur (Insignificant).	Good	--
d) AQMA (Air Quality Maintenance Area)	None within 100 miles.	None	None	Good	--
e) NA Nonattainment Area	There are no attainment areas of significance within 40 miles of the coal tract.	None	No violations of AAS will occur.	Good	--
f) Visibility	Measurements in Rawlins average 26.8 miles (annual average).	Very minor effects would be highly localized; restricted to mine area.	A decrease of visibility will occur within 10 miles of the proposed coal leasing area.	Good	Reduction in visibility will decrease as distance increases from proposed coal leasing area.
g) Sources of Major Pollutants	None	None	None	Good	--

SITE SPECIFIC SUMMARY MATRIX

Tract name or number: _____

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

State: _____

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Climate					
a) Annual Precipitation	10 to 12 inches	None	None	Good	--
b) Growing Season	Approximately 200 days.	None	None	Good	--
c) Airflow Patterns (surface)	Predominant wind direction W, WSW, SW. Average wind speed 12 mph.	None	None	Good	--
d) Peak winds	Longest length of time with winds greater than 9 mph was 62 hours from SSW (Rawlins data).	None	None	Good	--
e) Wind Erosion Potential	Moderate	Moderate to high	Moderate to high (lead to increase in airborne particulate matter).	Good	--
f) Inversions Stability Potential	Frequent during mornings; dissipation by afternoons. (Rawlins Airport data) Unstable--13% of time Neutral--58% of time Stable--29% of time	None	None	Good	--

SITE SPECIFIC SUMMARY MATRIX
 II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: China Butte

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Air Quality					
Geology & Minerals					
Landslide & rockfall	Low potential	Potential would remain low.	Low	Good	
Seismic potential	Low potential	None	None	Good	
Other minerals	No other economic known	Possible use of sand & gravel for construction	Low	Good	
Old or abandoned workings	None known	-----	---	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<p>Soils</p> <p>SEE SOILS TABLE AT END OF MATRIX</p>		<p>Soil would be mixed as a result of development. This disturbance of natural horizons would be detrimental to soil productivity. Soil erosion potential would be higher. Disturbance would destroy existing vegetation on the soil surface, thus exposing the soil to wind and water erosion.</p>	<p>The soils in the project area have moderate to high wind, and water erosion potential. Disturbance would increase erosion potential.</p> <p>Any soil loss due to erosion would lower soil productivity significantly.</p>	<p>Fair; no quantifications for all mapping units.</p>	<p>Increased erodibility can be prevented by immediate seeding and terracing of stockpiles. This would retain soil productivity levels. Soil amendments such as NPK added prior to reclamation would enhance and encourage seeding survival and prevent further erosion.</p> <p>High levels of Na salt in surface and subsurface would severely alter management practices. Sodium-affected soils disperse when wetted forming a seal on the surface, thus destroying natural soil-atmosphere relationships.</p>

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
<u>GROUND WATER</u>					
Type of occurrence	Confined in bedrock with some perching at higher elevations. Unconfined (water table) in alluvium in principal stream valley.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer. Alluvial aquifers probably would not be disturbed.	Would require future wells in mined areas to be 100 to 200 feet deeper with correspondingly higher pumping lifts.	Moderate, but adequate.	If desired, suitable wells for livestock and wildlife could be developed on tract after mining.
Quantity	Total discharge from the tract probably less than 50 gal/min.	Probably insufficient water in pit for mining.	Minor. Supplemental water for mine use (100 to 125 ac-ft/yr) can be obtained from wells 500 to 1,000 feet deep.		Discharge to Fillmore and Muddy Creeks should increase to at least pre-mining rates following reclamation.
Quality	Fair to good, .,000 to 1,500 mg/l dissolved solids in bedrock aquifers; 500-1,000 mg/l dissolved solids in alluvial aquifers.	Leaching of spoils would increase dissolved solids concentrations to 2,000-3,000 mg/l in spoils aquifer.	Would increase salt load to the Colorado River by an estimated 70 tons/yr.	Inferred from similar operations in Wyoming and northwestern Colorado.	See Surface Water for effect on Colorado River.
Importance to livestock and wildlife	One spring and no stock-water wells on tract.	Spring would probably permanently cease flowing.	Loss of permanent water supply for livestock and wildlife (about 5 gal/min) in southwestern part of tract.	Field observations.	Loss of spring could be offset by well about 200 feet deep.
Importance to agriculture	No agricultural activities in or adjacent to the tract.	None	-----	Field observations.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to people (individuals and municipal supplies)	No domestic water supplies developed on tract. Nearest domestic well is at Fillmore Ranch.	None. Well at Fillmore Ranch should not be affected.	-----	Field observations.	
SURFACE WATER Types of occurrence	Chicken Springs Wash is perennial immediately downstream from Chicken Springs. Fillmore Creek is intermittent. All other streams on the tract are ephemeral.	Chicken Springs and the channel downstream would probably cease flowing.	Loss of only permanent source of water (about 5 gal/min) for livestock and wildlife in south-west part of tract.	Inferred from field observation.	Loss of flow could be offset by drilling a well about 200 feet deep.
Quantity	Annual runoff probably does not exceed 20 ac-ft/sq mi or a total of 500 ac-ft from the tract.	Reduce runoff to Fillmore Creek by less than 3 percent and to Muddy Creek by less than 0.4 percent during mining.	Minor; most runoff from the tract is currently dissipated by evapotranspiration as flows move downstream.	Low. Effects of development largely inferred.	Annual runoff would return to approximately premining rates after completion of reclamation.
Quality	Good; probably contains less than 500 mg/l dissolved solids.	Little or none.	Very minor; any impacts should be short term.	Low to moderate. Based on quality of water in reservoirs in the area.	
Salinity of receiving waters	Severe salinity problem in Colorado River which has dissolved solids concentration of about 681 mg/l below Hoover Dam. Fillmore Creek watershed has no salinity problem.	Leaching of spoils would increase salt load to Colorado River by an estimated 70 tons/year. Municipal uses would decrease salt load by estimated 36-37 tons/yr.	Would increase salinity of Colorado River by as much as 0.0034 mg/l (0.0005 percent). Impact would be long term.	Low to moderate. Based in part on inferred population increases.	Any increase in the salinity of the Colorado River is a significant impact.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to livestock and wildlife.	Permanent water furnished by flow downstream from Chicken Spring. Temporary water furnished by intermittent flow in Fillmore Creek and 9 small reservoirs.	Permanent flow would cease in channel downstream from Chicken Spring. Two reservoirs would be removed by mining.	Sedimentation ponds would provide alternative source of water during mine life.	Field observations.	Reservoirs could be rebuilt after mining.
Importance to agriculture	No agriculture activities in or adjacent to tract.	None	None	Field observations.	
Importance to people (individual and municipal supplies)	No use of surface water from this area for domestic or municipal supplies.	None on tract. Consumptive use of North Platte and Upper Colorado River water by increased population would be 95-124 ac-ft/yr.	Water consumed by increased population would no longer be available for other current uses downstream.	Moderate. Based on inferred population increases.	Use of water by increased population would probably be long term.
Erosion and sedimentation	Generally stable north of divide; moderate to severe erosion south of divide. Tract yields an estimated 1.0 ac-ft/sq mi/yr.	Sedimentation ponds would reduce sediment yield from the tract by 1 to 7 ac-ft/yr. This should offset any temporary increase in sediment yield from ancillary facilities.	Long term effect may be to slightly decrease annual sediment yield from affected areas.	Field observations.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION</u>	Approximately 14,273 acres of big sagebrush; 2,175 acres golden-weed; and 32 acres of meadow vegetation.	Destruction of vegetation at rate specified on table 1.1-3.	Complete loss of wildlife and livestock carrying capacity until restored by reclamation. Also affects soil erosion, esthetics, and water qualities. There would be ecological differences between premining and postmining vegetation communities (not predictable). See Wildlife, Land Use, Visual Resources, and Water.	Acceptable	Field studies to determine the success of reclamation are currently in progress.
Reclamation Potential of the Vegetation	Low	Potential for reclamation of a vegetative cover of desirable species to meet the objectives of postmining land use would be moderate assuming a moderate reclamation potential for disturbed soils (see Soils).	Assuming moderate soil reclamation potential, vegetation desirable for postmining land use could be reestablished in ~20 years.	Acceptable-success of current reclamation technology in restoring the premining vegetation types is highly questionable.	Field studies to determine the success of reclamation are currently in progress.
Vegetation Ground Cover & Productivity	36% cover and 600 pounds/acre.	Reduction of both cover and productivity to zero. Preliminary reclamation would result in a gradual increase of both elements until complete recovery in 5 to 10 years.	Same as the significance of vegetation impacts above.	Acceptable	Cover and productivity of vegetation can be restored easily but are not usefull in determining the success of reclamation.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Livestock Grazing	2,085 AUMs on the tract, used by four livestock operations in 3 allotments overlapping the tract. Also about 10 miles of fencing and 14 stockwater reservoirs.	Loss of 55 AUMs in 1987; 125 AUMs by 1990; 229 AUMs by 1995; and a maximum of 435 AUMs by 2011.	Proportionate reductions in the total native range controlled by four livestock operations up to a maximum of 0.26, 0.54, 2.3 and 0.76% in the short term.	Good	Quantifications of significance accurate to nearest percent.
Wild Horses	~0.90 horses per square mile for an average total of 23 head.	No anticipated impacts if horses are removed as planned in the Overland Unit MFP.	N/A	Outstanding	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WILDLIFE HABITAT</u>					
Aquatic	Limited resource - 14 small unreliable reservoirs. Muddy Creek and larger, more reliable ponds.	Destruction or disturbance of approximately 10 stockwater reservoirs (~3 per period) and a reduction in quality of adjacent habitat (see Water Resources).	Minor significance - <1% reduction in carrying capacity of adjacent habitat.	Acceptable	
Terrestrial	14,273 acres of big sagebrush; 2,175 acres goldenweed; 32 acres meadow vegetation.	Same as Vegetation.	Minor significance except for those wildlife categories (see below) that suffer impacts of major significance.	Acceptable	Field studies to determine success of reclamation are currently in progress.
Fisheries	Non-existent	No anticipated impact.	N/A	Outstanding	
Birds					
Nongame (other than raptors)	Minor resource - very numerous.	Loss of the population on 5,073 acres of disturbed habitat.	Relatively minor - estimate <5% reduction in area population.	Acceptable	
Raptors					
a. Golden eagle and prairie falcons	2 golden eagle and 2 prairie falcon nest sites adjacent to tract. One eagle and one prairie falcon nest on tract.	Reduction in nesting success of 1/3 of area population and loss of hunting habitat.	Minor significance more than 5% reduction in nesting success. About 1/3 of area population would be affected.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
b. Ferruginous hawks	14 nests on or immediately adjacent to the tract.	Up to 8 nests destroyed. Abandonment of adjacent nests.	Major significance up to 20% reduction of area populations.	Acceptable	
c. Other raptors	6 red-tailed, one kestrel and one great-horned owl nest sites adjacent to tract. One red-tailed nest on tract.	Loss of hunting habitat and reduced nesting success.	Minor significance; <5% reduction of area populations.	Acceptable	
Game birds	Major resource; 3 sage grouse strutting grounds 18 per square mile.	Complete destruction of 2 sage grouse strutting grounds and disturbance of a third ground. Disturbance of one or more grouse wintering areas. Losses of 12 grouse in 1987; 28 by 1990; 51 by 1995; and 145 to 1,560 by end of mine life.	Mourning doves - minor, sage grouse - major. Grouse losses would be up to 35% of area populations.	Acceptable	Losses of grouse habitat may be long term duration.
Mammals					
Furbearing	Wessels, badgers, foxes, coyotes, skunks and bobcats; no density estimates.	Loss of the population on 5,073 acres of disturbed habitat.	Minor - <5% of area population lost.	Acceptable	
Nongame	High densities of rodents and jackrabbits.	Loss of the population on 5,073 acres of disturbed habitat.	Loss would be <1% of area populations.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Game mammals					
a. Cottontails	295 per square mile.	Losses of 200 rabbits in 1987; 450 rabbits by 1990; 835 by 1995; and 2,400 by end of mine life.	Minor - <5% decrease in unit population.	Good	
b. Pronghorn	9 per square mile.	Losses of 6 head of pronghorn in 1987; 14 head by 1990; 25 head by 1995; and 72 head by end of mine life.	Losses >5% in area populations. Loss of crucial winter range may result in long term depressions in big game populations.	Acceptable	
c. Mule Deer	7 per square mile.	Losses of 5 head of mule deer in 1987; 11 deer by 1990; 20 deer by 1995; and 56 deer by end of mine life.			
Reptiles and Amphibians					
General	Minor tract resource. No estimates on densities.	Loss of the population on 5,073 acres of disturbed habitat.	Minor - loss would be <1% of area populations.	Acceptable	
Sensitive Wildlife Species (other than raptors)	Non-existent resource.	No anticipated impact.	N/A	Acceptable	
Threatened or Endangered Wildlife	No known resource.	No anticipated impact.	N/A	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECREATION VALUES</u>					
<u>INCLUDING VRM</u>					
VRM	100% Class III.	Change to Class V.	Moderate to high	Moderate	Will be restored to class III.
Hunting	Primarily antelope and small game.	Reduced about 12 percent.	Low to moderate	Low	Will resume at end of mine life.
ORV	Mostly related to hunting.	Not allowed in mining area.	Low	Low	Will resume at end of mine life.
Sightseeing	Does occur to some degree.	Natural landscape will be altered by mining activity.	Low	Low	Will resume at end of mine life.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>LAND USE</u>					
Recreation	See Recreation Section.				
Other minerals	See Other minerals under Minerals section.				
Pipeline	25 foot right-of-way, 1 mile long.	Relocation of pipeline.	Low	Good	
Oil and gas lease	10 leases; Cu 5400 ac.	Curtailed during mine life.	Low	Good	
Fence lines	10 miles	Removed or relocated.	Low	Good	
<u>TRANSPORTATION</u>					
Employee Transportation	I-80, U.S. 30 & 287, S.H. 789.	1. 6% increase in traffic accidents. 2. Increased road maintenance.	1. Low 2. Low	1. 90% probability 2. 80% probability	
Product Transportation	Union Pacific railroad	Increase in grade crossing hazard rating; .04 accidents per 5 years.	Low	90% probability	
Net Energy Analysis		Total output to input 10.9:1.			

SITE SPECIFIC SUMMARY MATRIX
 III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: China Butte

State: _____

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Population	Every community in the region, with the exceptions of Dixon and Rock River, has experienced steady population growth during the last decade.	Under the baseline, every community would experience significant population growth between 1978 and 1990. In absolute terms, Rawlins would experience the most significant population impacts as a result of the proposed action (674 additional people by 1990), while in proportional terms, the impacts on Creston Junction would be the greatest (59.4 percent of the projected 1990 population would be attributable to the proposed action).	Increased demand for public services and facilities. Increasing size and heterogeneity of community would affect cultural and social values of inhabitants.		
Economics	The three most important sources of employment in the regional economy are government, mining and trade respectively. Government and mining are similarly the two most important sources of incomes, although trade ranks fifth behind construction and TCU.	The proposed action would generate an additional 973 jobs over baseline levels by 1987 (786 by 1990). Additional income attributable to the proposed action would be \$13.9 million by 1987 and \$13.0 million by 1990.	The proposed action would generate additional employment equal to 2.4 percent of baseline employment in 1987 and 1.9 percent in 1990. Incremental income attributable to the proposed action would equal 1.9 percent of baseline income in 1987 and 1.8 percent in 1990. However, the proposed actions would have little impact on the overall situation.	Due to apparent differences in the data bases used, employment and income projections do not appear to be completely compatible with published historical data.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Public Finance	Local communities vary widely in their fiscal condition, i.e., expenditures, revenue base and total indebtedness.	Public finance impacts not projected in this study.	N/A	N/A	
Infrastructure	Housing in every community is currently in short supply and expensive. School capacity, except in Rock River is adequate. The hospital in Carbon County has a low occupancy rate. Sewage facilities in Baggs, Encampment, Rawlins and Saratoga are overloaded. In Hanna, the facilities are about at capacity and in Dixon the facility does not meet EPA standards. Water facilities are adequate in Dixon, Medicine Bow and Saratoga. In Hanna, the facility is about at capacity. Only Baggs has an adequate solid waste disposal site with additional years of use available.	The proposed action would generate the need for 332 additional housing units in Carbon County. No new school facilities would be required although additional school personnel would be needed. The number of hospital beds in Carbon County would remain adequate. Additional sewage and water capacity would be needed. No solid waste sites, not otherwise needed, would be required.	Given the current housing situation, housing would be expected to remain scarce and expensive. Additional need for school personnel would be small - seven teachers and one administrator in Carbon County School District #1 in 1987 and six teachers and one administrator in Carbon County School District #2 in 1987 and five teachers in 1990. The maximum additional need for sewage facilities due to this tract would be 0.121 mgd and for water facilities, 0.324 mgd.		Because population projections did not differentiate among households headed by employees in different occupations, it was not possible to project a changing mix of housing preference patterns. In addition, the assumed household size may be too large.

Element	Present Situation	Anticipated Effect of Leasing/Development .	Significance of Anticipated Impact	Data Reliability	Comments
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Agriculture

Native Americans and Other Minority Groups Not addressed in this study. N/A

N/A

N/A

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: China Butte

State: Wyoming

Legal Description (T and R or metes and bounds): See Chapter 1, table 1.1-1 for complete legal description (data valid to 7/31/79).

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
1. Federal land systems	No	N/A	No	All of review area is classified as acceptable with no likely problems.
2. Rights-of-way and easements	No	N/A	No	All areas reviewed are classified as acceptable with no likely problems.
3. Buffer zones	No	N/A	No	All of area is acceptable with no likely problems.
4. Wilderness study areas	No	No	No	Review area is within checkerboard land pattern; therefore, no wilderness areas exist. All area is acceptable with no likely problems.
5. Scenic areas	No	No	No	All areas determined acceptable with no likely problems.
6. Land used for scientific studies	No	No	No	All area is acceptable with no likely problems.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Page 2 of 4
10/9/79

Tract name or number: China Butte (continued)

State: _____

Legal Description (T and R or metes and bounds): _____

23

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
7. Historic lands and sites	Yes; 620 acres along and around the Overland stage route and the Washakie stage station are unsuitable (1/8 mile buffer zone).	Exception was applied; area remains unsuitable.	Archeological report submitted in 1977 shows some discrepancies. Further work recommended.	Buffer zone reduced to 1/8 mile for protection of site as requested by RME, Wyo. Rec. Com. awaiting future studies before granting cultural clearance. Need consultation with Adv. Council & SHPO.
8. Natural Area	No	No	No	All areas reviewed and found to be acceptable with no likely problems.
9. Federally listed endangered species	Yes; surveys done in 1978 and spring 1979 for black-footed ferrets, prairie dogs, peregrine falcons.	Exception not applied in areas where FWS conducted surveys.	Final formal consultation with FWS is needed.	All of area is acceptable with no likely problems. Need final consultation with FWS.
10. State listed endangered species	Criterion was not applied since Wyoming has no list.	N/A	N/A	Criterion was not applied since Wyoming has no list.
11. Eagle nests	Yes; 523 acres unsuitable; 4,442 acres acceptable pending study; 35,735 acres acceptable with no likely problems.	Exception not applied pending formal consultation with FWS.	Continued wildlife survey necessary.	Final consultation with FWS and Wyoming Game & Fish necessary.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: China Butte (continued)

State: _____

Legal Description (T and R or metes and bounds): _____

24

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
12. Eagle roosts and concentration areas.	Yes; no acres were found unsuitable; 40,700 acres are acceptable with inventory needs.	Exception was not applied.	More inventory data is needed.	All of review area is acceptable with inventory need pending final consultation with FWS.
13. Falcon cliff-nesting sites	Yes; 119 acres are unsuitable; 5,670 acres are acceptable pending study; and 34,911 acres are acceptable with no likely problems.	Exception was not applied.	Further studies and FWS consultation necessary.	Final consultation with FWS necessary for final determination.
14. Migratory birds	Yes; 20,817 acres are acceptable pending study, 2,748 acres are acceptable with inventory needs; 17,135 acres are acceptable with no likely problems.	Exception was not applied.	Further studies necessary to determine final size of buffer zones.	Final consultation with FWS necessary for final determination.
15. State resident fish & wildlife	Yes; 20,134 acres are acceptable pending study and 20,566 acres are acceptable with inventory needs.	N/A	More consultation for final determinations needed with Wyoming Game and Fish.	Final determinations are awaiting the regional environmental impact statement.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: China Butte (continued)

State: _____

Legal Description (T and R or metes and bounds): _____

NG

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
16. Flood plains	Yes; 3,530 acres are unsuitable; 1,216 acres are acceptable pending study; and 35,954 acres are acceptable with no likely problems.	Exception was not applied.	Final consultation with GS necessary for final determination.	Need final consultation with GS; WRD necessary for final determinations.
17. Municipal watersheds	No; all areas are acceptable with no likely problems.	N/A	Need consultation with municipalities involved and responsible governmental unit.	Need consultation with municipalities involved and responsible governmental units.
18. National resource waters	No; all of area is acceptable with no likely problems.	N/A	None	None
19. Alluvial valley floors	Yes; 12,759 acres are acceptable pending study and 27,941 acres are acceptable with no likely problems.	Exception was not applied.	Need information on what to consider an alluvial valley floor.	Need formal consultation with OSM and Wyoming DEQ on the final determination of an alluvial valley floor.
20. State proposed criteria	There are no state proposed criteria; therefore, criterion was not applied.			

SOILS TABLE FOR MATRIX
(China Butte)

Mapping Unit	Depth	Texture	% Slope	Where Found	Salinity	Alkalinity	Toxic Elements	Erosion Tons/acre/yr.	Reclamation Potential
1	12-20	L	10-30	Upland slopes	--	H	0	1-2	P
2	60	L	0-6	Flood plains	--	--	0	1-3	G
3	34-60	CL, L	2-30	Uplands	--	--	0	1-2	F-G
4	30-36	CL, L	6-30	Uplands	--	--	0	1-2	P
5	60	CL, L	2-30	Uplands	--	--	0	1-2	F-G
6	44-50	SL, L	0-40	Level upland slopes	--	--	0	1-3	F
7	18-50	SL, L	3-20	Level upland slopes	--	H	0	1-3	P
9	-0-	-0-	Varies	Level upland slopes	--	--	0	Unquantifiable	None
11	60	SCL, CL, L	3-20	Upland slopes	H	H	0	1-2	G
16	0-10	L, SL, FSL	Varies	Upland slopes	M	H	0	1-2	P
22	20+	S	Varies	Dunes	--	--	0	3-5	P
25	20-40	S, SL	6-20	Uplands	--	--	0	2-5	P
26	10	S, SL	3-15	Side slopes	--	--	0	2-5	P
44	3-40	S, SL	Varies	Side slopes	--	--	0	2-5	P
L	40+	L, SL	0-2	Lakebed	H	H	0	Unquantifiable	P

26

C -- Clay
L -- Loam
S -- Sandy
CL -- Clay loam
SL -- Sandy loam
FSL -- Fine sandy loam
SCL -- Sandy clay loam

F -- Fair
G -- Good
H -- High
M -- Medium
P -- Poor

SITE-SPECIFIC MATRICES

MEDICINE BOW

SITE SPECIFIC SUMMARY MATRIX

I. COAL DATA
(From Tract Delineation Report)

Trac name or number: Medicine Bow

State: Wyoming

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons/yr)	Case I: 2.7 million tons Case II: 2.6 million tons	Case I: extend mine life approximately 30 yrs. Case II: new mine, life of approximately 10 yrs.	Medium positive	Good	
Estimated mine life (yrs)	Case I: 30 yrs. Case II: 10 yrs.	Case I: extend mine life keep present employment levels. Case II: new employment ~134	Medium positive	Good	
Total reserves (tons in place)	Case I: 118,724,057 Case II: 30,075,105 (fed. only)	Both cases: removal of coal from known reserves.	Low negative	Good	
Recoverable reserves (tons)	Case I: 94,940,000 Case II: 25,563,839 (fed. only)	Both cases: loss of approximately 15% of total reserves to 10:1 mining ratio.	Low negative	Good	85% recovery rate due to present limits of technology.
Recovery rate (%)	Both cases: 85	Case I: loss of 14,241,357 tons of coal. Case II: loss of 4,511,266 tons of coal	Low negative	Good	
Type of coal (steam/metallurgical)	Subbituminous (steam)	Production of coal for power production.	Medium positive	Good	
Sulfur content/ton	~.55% - .60%	Production of low sulfur coal for power uses.	Medium positive	Good	
Projected work force (mining)	Case I: 0 Case II: 55	Case I: none; Case II: employment for ~2 yrs of construction force.	Medium positive	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (mining)	Case I: 0 ; Case II: 134	Case I: extended mine life employment for additional 30 yrs for present work force Case II: additional employment 134.	High positive	Good	
Surface ownership (federal, state, private, etc.)	Case I: 6,880 federal; 640 state; 8,050 private. Case II: 4,960 federal	Case I: development of federal, state, and private. Case II: development of federal only.	Medium positive	Good	
Status of surface owner consent	None required; no federal surface/private mineral	Private mineral rights currently leased.	None	Good	
Type of mine (surface/under-	Case I: Surface Case II: none	Case I: continue present operation; Case II: new mine	Medium positive	Good	
Coal transportation needs	To be supplied by WSO				
Coal access needs	Case I: no new access Case II: approximately 32 acres (2.6 miles)	Case I: none	Low	Good	
Coal markets	Utilities/public power	Both cases: production of coal for utilities.	Medium positive	Good	

- NOTES: 1. Case I is where the existing operator within the LMU leases the remaining federal coal and thus all the reserves in the LMU are mined as an extension of the existing mine.
2. Case II is where a new operator leases the unleased federal coal within the LMU. Reserves and production are based on only presently unleased federal reserves, assuming the existing operator mines the rest of the LMU reserves concurrently with the new operator.

SITE SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: _____

State: _____

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
a. TSP	Ambient air sampling indicates A.G.M. <30 µg/m ³	Large increases directly downwind of tract.	Violations of NAAQS and WAAQS might occur.	Good	If tract were developed concurrently with present mine, increased incidences of WAAQS and NAAQS violations would occur.
b. SO ₂ , NO ₂ , HC, O ₃ , CO	No measurements; probably very small.	Very small	Insignificant (no violation of standards).	Good	None
c. PSD Areas Class I Class II Class III	None Entire region None	None	Insignificant	Good	None
d. NA, AQMA	None	None	Insignificant	Good	None
e. Visibility	Annual average at Rawlins Airport is 26.8 miles.	Decreased visibility immediately downwind of tract.	Insignificant	Good	None
f. Sources of criteria pollutants	Several coal mines in near proximity to tract.	Increases in TSP concentrations might result because of proximity to tract.	Violations of NAAQS and WAAQS would occur more frequently	Good	None

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CLIMATE</u>					
a. Annual Precipitation	10-12 inches	None	None	None	None
b. Growing Season	200 days	None	None	None	None
c. Airflow Patterns	Predominate wind direction, W, WSW, SW; Average wind speed, 12 mph (Rawlins Airport data).	None	None	None	None
d. Peak winds	Longest length of time with winds greater than 9 mph was 62 hours from SSW - Rawlins Airport data.	None	None	None	None
e. Wind erosion Potential	Moderate	Increase in potential from moderate to high.	None	None	None
f. Inversions stability potential	Frequent during cool mornings; dissipated by afternoon. Rawlins Airport data: Unstable 13%; Neutral, 58%; Stable, 29%.	None	None	None	None
<u>NOISE</u>	20 db	Levels would increase to 130 db near some mining activities.	Significant (violations of standards).	Good	Impact of higher levels would be minimized by mandated controls.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>GEOLOGY AND MINERALS</u>					
Landslide & Rockfall	Low potential	Potential would remain low.	Low	Good	
Seismic Potential	Low potential	Potential would remain low.	Low	Good	
Other minerals	No other economic minerals are known.	Possible use of sand and gravel for construction; increased difficulty of geophysical exploration.	Low	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development		Significance of Anticipated Impact	Data Reliability	Comments
<u>SOILS</u>						
<u>Mapping Units</u>						
		<u>Water Erosion</u> ton/acre/year	<u>Wind Erosion</u> tons/acre/yr.			
39 Glendive-Havre Assoc.	Ustic Torrifluvents 40"+ deep, 0-6% slope	2	1-2	Significant loss in productivity due to accelerated erosion for all mapping units.	Good	Alkalinity; flood plain location.
52 Ustic Torriorthens Rock Outcrop Assoc.	10-20" deep, 6-40% slope	2-3	2-3		Good	Excessive slope; low soil fertility.
53 Mining areas	Disturbed land variable depth, 20-40% slope.	2-3	2-3		Good	High erosion; low soil fertility.
60 Borollic Haplargids	Subgroup 20"+ depth 3-6% slope	1-2	1-2		Good	Alkalinity
	Data on present wind and water erosion on all mapping units not known.					

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION</u>	Approximately 12,922 acres of big sagebrush; 1,618 acres birdfoot sagewort; 1,300 acres greasewood big sagebrush.	Destruction of vegetation at rates specified on table 1.1-3.	Loss of wildlife and livestock carrying capacity until restored by reclamation. There would be ecological differences between premining and postmining vegetation communities (not predictable).	Acceptable	Field studies to determine the success of reclamation are currently in progress.
Reclamation Potential of the Vegetation	Low	Potential for reclamation of a vegetative cover of desirable species to meet the objectives of postmining land use would be moderate assuming a moderate reclamation potential for disturbed soils (see Soils). The <u>Alternatives</u> create no difference in effect on potential.	Assuming moderate soil reclamation potential, vegetation desirable for postmining land use could be reestablished in ~20 years.	Acceptable-success of current reclamation technology in restoring the premining vegetation types is highly questionable.	Field studies to determine the success of reclamation are currently in progress.
Vegetation Cover and Productivity	26% cover and 500 lbs per acre.	Reduction of both cover and productivity to zero. Preliminary reclamation would result in a gradual increase of both elements until complete recovery in 5 to 10 years.	Same as the significance of vegetation impacts.	Acceptable	Cover and productivity of vegetation can be restored easily but are not useful in determining the success of reclamation.
Livestock Grazing	2,426 AUMs on tract used by one livestock operation.	Forage losses of 43 AUMs by 1990; 145 AUMs by 1995 under case 1. Losses of 55 AUMs in 1987; 98 AUMs by 1990; 189 AUMs by 1995 under case 2. A maximum loss of 433 AUMs for either case.	Reduction of approximately 1.2% maximum in the potential size of 1 livestock operation.	Good	Quantifications are estimates.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WILD HORSES</u>	Non-existent resource	N/A	N/A	Outstanding	
<u>WILDLIFE</u>					
Aquatic	Non-existent on tract, high quality resource within 1 mile of tract.	Minor reduction in quality of adjacent resource (see Water Resources).	See Water Resources	Acceptable	
Terrestrial	Same as Vegetation	Destroyed at same rates as specified for vegetation types in Vegetation section.	Minor significance except for those wild-life species (see below) which suffer impacts of major significance.	Acceptable	Field studies to determine success of reclamation are currently in progress.
Fisheries	Non-existent on tract. High quality fishery within 1 mile of tract.	No anticipated impact.	N/A	Good	
Birds					
Nongame (other than raptors)	Minor resource-very numerous).	Loss of population on 3,837 acres of disturbed habitat.	Relatively minor estimate <5% reduction in area populations.	Acceptable	
Raptors					
a. Golden eagles	3 nests on tract and 2 adjacent to it.	Reduction in nesting success.	Major significance. More than 5% reduction in nesting success of 15% of the area breeding population.	Acceptable	
b. Ferruginous hawks	2 nests on tract.	Destruction of both nests.	Minor significance. <5% reduction in area populations.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
c. Burrowing owls	1 known nesting burrow; possible unknown nests; four sightings of owls.	Reduction of burrowing owl habitat up to 30 percent in the area with a corresponding reduction in the area population.	Major significance; up to 30% reduction of area owl population.	Acceptable	
Game birds	Major resource - 1 grouse strutting/nesting complex on and one adjacent to tract. Grouse winter concentration area overlaps 1/3 of the tract. 6 to 7 grouse per square mile in the area.	Complete destruction of 1 grouse strutting/nesting complex and a portion of a possible grouse winter concentration area. Losses of 4 grouse in 1987; 6 to 7 by 1990; 12 to 13 by 1995; and up to 540 by EOML. Insignificant effect on doves.	Major significance for sage grouse. More than 5% reductions in area population. Mourning doves - minor.	Acceptable	
Mammals					
Furbearing	Minor resource - badgers, weasels, coyotes, skunks. No density estimates.	Loss of population on a maximum of 4,208 acres of disturbed habitat.	Minor significance; losses of no more than 1% of the area population.	Acceptable	
Nongame	Minor resource - high rodent densities. Prairie dogs are major resource.	Loss of population on a maximum of 4,208 acres of disturbed habitat.	Minor significance; losses of no more than 1% of area population.	Acceptable	
Game					
a. Cottontails	Minor resource - ~275 per square mile.	Standing crop losses of ~155 rabbits in 1987; 275 rabbits by 1990; 530 rabbits by 1995; and 1,650 rabbits by EOML.	Minor; <5% decrease in area population.	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
b. Pronghorn	Approximately 7 head per square mile. Winter concentration area over most of the tract.	Loss of up to 25% of a winter concentration area. Standing crop losses of more than 4 head in 1987; 7 head by 1990; 13 head by 1995; 42 head by EOML.	Major - >5% decrease in area population.	Acceptable	
c. Mule deer	Approximately 1 to 2 head per square mile.	Standing crop losses of <1 head in 1987; 1 head by 1990; 2 head by 1995; and 6 head by end of mine life.	Minor significance - <1% reduction of area population.	Acceptable	
Reptiles and Amphibians	Minor tract resource. No estimates on densities.	Loss of population of 3,837 acres of disturbed habitat.	Minor - <1% reduction of area population.	Acceptable	
Sensitive Wildlife Species	None are known to exist. (see raptors)	No anticipated impact.	N/A	Acceptable	
Threatened or Endangered Wildlife Species					
Black-footed ferrets	Possible existence; ferret skull found on tract.	If present, loss of portion of ferret population and prairie dog prey base.	Insufficient data for assessment of impact.	Unsatisfactory	Formal section 7 consultation as required by Endangered Species Act has been requested.
Bald eagle	Use tract as hunting habitat in winter.	Loss of minor hunting habitat.	Insufficient data on which to assess, but would probably be insignificant.	Acceptable	Same as above.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECREATION VALUES</u>					
<u>INCLUDING VRM</u>					
VRM	Approximately one-half class III and one-half class IV	Change to Class V.	Low to Moderate		County scenic corridor around Seminole Reservoir.
Hunting	Antelope and small game	Negligible reduction (less than 2%)	Low		
ORV	Mostly incidental to hunting.	Not allowed			

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>					
Archeological	Class II cultural surveys have been conducted on 16,640 acres. Nine sites were located and 3 have been recommended for further work.	Surface and buried sites on uninventoried portions of the tract could be destroyed.	Unknown	Good	Cultural surveys on uninventoried portions of the tract will be undertaken prior to mining.
Historical	No historical resources have been discovered.	Destruction of unknown sites could occur.	Unknown	Good	106 compliance will be conducted on any sites found eligible for National Register of Historic Places.
Paleontology	Little or no occurrence of significant paleontology sites in LMU.	None	None	Good	No comment

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>LAND USE</u>					
Oil and gas lease	5 leases, 1,600 ac	Curtailed activity during mine life.	Low	Good	--
Roads	3 miles	Removed or relocated.	Low	Good	--
Railroads	4 miles	Removed or relocated.	Low	Good	--
Telephone lines	2 miles	Removed or relocated.	Low	Good	--
Power lines	2 miles	Removed or relocated.	Low	Good	--
Withdrawal North Platte River	1480 ac				
Kedrick Reclamation Protect	80 ac				
Recreation	See Recreation section.				
Other mineral	See Other minerals under Minerals section.				
<u>TRANSPORTATION</u>					
Employee Transportation	I-80 and U.S. 30	(1) 3 percent increase in accidents. (2) increased road maintenance.	1. Moderate 2. Low	1. 90% probability 2. 80% probability	
Product Transportation	U.P. railroad	Increase in hazard ratings at grade crossings by .04 accidents per 5 years.	Low	90% probability	
Net Energy Analysis	Total energy output to input 14.2:1. As mine extension 14.8:1.				

SITE SPECIFIC SUMMARY MAP
 III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: Medicine Bow

State: _____

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
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SOCIAL AND ECONOMIC CONDI- TIONS

Population

Every community in the region, with the exceptions of Rock River and Dixon, has experienced steady population growth in the last decade.

Case 1: While the proposed mining action would result in rates of population growth slightly below those forecast under the baseline, all communities would still experience substantial population growth between 1978 and 1990.

Case 2: Under the baseline, every community would experience significant growth between 1978 and 1990. In absolute terms Rawlins would experience the most significant population impacts as a result of the proposed action (386 additional people by 1990), while in proportional terms the impacts on Walcott Junction would be the greatest (19 percent of the projected 1990 population would be attributable to the proposed action).

Case 1: The decline in population growth rates below the baseline forecast would be too small to have any significant implications for public services and facilities or community-held cultural and social values.

Case 2: Increased demand for public services and facilities. Increasing size and heterogeneity of community would affect cultural and social values of inhabitants.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Economics	<p>The three most important sources of employment in the regional economy are government, mining and trade respectively. Government and mining are similarly the most important sources of income, although trade ranks fifth behind construction and TCU as a source of income.</p>	<p>Case 1: The proposed mining action would result in slightly lower rates of population growth than the baseline forecast: 55 fewer jobs by 1990 (0.1 percent below the baseline) and \$977,000 less income (0.1 percent below the baseline forecast).</p> <p>Case 2: The proposed action would generate an additional 466 jobs over baseline levels by 1987 (\$11 by 1990). Additional income attributable to the proposed action would be \$6.6 million by 1987 and \$8.5 million by 1990.</p>	<p>Case 1: No significant impacts on the income and employment structure of the local economy.</p> <p>Case 2: The proposed action would generate additional employment equal to 1.1 percent of baseline employment in 1987 and 1.2 percent in 1990. Incremental income attributable to the proposed action would equal 0.9 percent of baseline income in 1987 and 1.2 percent in 1990. However, the proposed actions would have little impact on the overall situation.</p>	<p>Due to apparent differences in the data bases used, income and employment projections are not completely comparable with published historical data.</p>	
Public finance	<p>Local communities vary widely in their fiscal condition, i.e., expenditures, revenue base and total indebtedness.</p>	<p>Public finance impacts not</p>	<p>N/A</p>	<p>N/A</p>	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Infrastructure	<p>Housing in every community is currently in short supply and expensive. School capacity is adequate except in Rock River. The hospital in Carbon County has a low occupancy rate. Sewage facilities are overloaded in Baggs, Encampment, Rawlins and Saratoga. In Hanna, sewage facilities are at about capacity. The facilities in Dixon do not meet EPA standards. Water facilities are adequate in Dixon, Elk Mountain, Medicine Bow, and Saratoga. In Hanna, water facilities are about at capacity. Only the solid waste disposal site in Baggs is adequate and has additional years of use available.</p>	<p>Case 1: The proposed action would generate the need for 11 fewer units than without tract development. No new school facilities would be needed. Fewer teachers and administrators would be needed for the schools. The hospital in Carbon County would remain adequate. No additional capacity in sewage and water facilities would be needed. Case 2: The proposed action would generate the need for an additional 215 housing units in Carbon County, 3 percent above 1978 supply. No new school facilities would be expected due to tract development. Additional teachers and administrators would, however, be needed. The number of beds in Carbon County hospital would remain adequate. Additional capacity would be needed in the sewage and water facilities of the communities in the region due to this proposed action. No additional solid waste facilities not otherwise needed would be required.</p>	<p>Case 1: The difference in need for housing, health facilities, schools, sewer and water facilities and solid waste site with and without tract development is minimal. Case 2: Given the current housing situation, housing would be expected to remain scarce and expensive. Additional school personnel needs due to this proposed action would be small - five teachers for Carbon County School District #1 and no administrators in 1987 and four teachers and one administrator in 1990; three teachers and one administrator for Carbon County School District #2 in 1987 and three teachers and no administrators in 1990. The need for additional sewage capacity would be a maximum of 0.064 mgd and 0.174 mgd for water facilities.</p>	<p>Because population projections did not differentiate among households headed by employees in different occupations, it was not possible to project a changing mix of housing types based on housing preference patterns. In addition, the assumed household size may be too large.</p>	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Social Services and Public Safety	<p>There is a current shortage of doctors, nurses, and mental health workers in Carbon County. Pumping capacity for fire-fighting is inadequate in Dixon, Elk Mountain, Elmo/Hanna, Medicine Bow, and Saratoga. Police services are adequate in only Rock River, Baggs, Saratoga, and Wamsutter. The caseload of the social services agency in Carbon County is currently high. Recreation and leisure facilities are not addressed.</p>	<p>Case 1: No additional health professionals, pumping capacity or full time policemen would be required due to this proposed mine.</p> <p>Case 2: This proposed action would generate the need for additional nurses and one additional doctor. No additional mental health workers would, however, be needed.</p> <p>No additional pumping capacity would be needed due to this proposed mine.</p> <p>Additional police officers due to this proposed action would be one officer working half time or less.</p> <p>Caseloads of the social services agency would be expected to increase but specific impacts of the mine are not addressed in this study.</p>	<p>Case 2: The additional need for health professionals due to this action would be small - two nurses in 1987 and one doctor and three nurses in 1990. The impacts on police and fire services would be insignificant.</p>		
Culture and Well Being	Not addressed in this study.	N/A	N/A	N/A	
Agriculture					

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Native Americans and Other Minority Groups	Not addressed in this study.	N/A	N/A	N/A	

SITE SPECIFIC SUMMARY MATRIX

Page 1 of 4
10/15/79

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Medicine Bow LMUState: WyomingLegal description (T and R or metes and bounds): See Chapter 1 (table 1.1-1) for complete legal description (data as of 8/11/79)

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
1. Federal land systems	No; all of LMU is acceptable with no likely problems.	N/A	N/A	All of LMU is considered acceptable with no likely problems.
2. Rights-of-way and easements	Yes; all LMU are acceptable with no likely problems.	Exception was applied.	None	All areas became acceptable with no likely problems after exception was applied.
3. Buffer zones	No; all of LMU is acceptable with no likely problems.	Exception was applied.	None	All of LMU determined to be acceptable with no likely problems.
4. Wilderness study areas	No; the LMU lies within the checkerboard; therefore, no wilderness can exist by definition	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
5. Scenic areas	No; there are no Class I areas within the LMU.	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
6. Land used for scientific studies	Yes; 5 acres are unsuitable around GS stream-gauging station located in T. 23 N., R. 83 W., sec. 30.	Exception was applied.	None	5 acres are unsuitable around GS stream-gauging station necessary to continue gathering data for correlation of previously gathered data in T. 23 N., R. 83 W., sec. 30.

10

SITE SPECIFIC SUMMARY MATRIX

Page 2 of 4
10/15/79

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Medicine Bow LMUState: Wyoming

Legal description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
7. Historic lands and sites	Yes; 40 acres in SW $\frac{1}{4}$ SW $\frac{1}{4}$, sec. 26, T. 23 N., R. 84 W., are unsuitable.	Exception was applied.	More intensive (Class I or II) inventories are necessary throughout or before mining commences.	Formal consultation with State Historic Preservation Officer (SHPO) and Wyoming Recreation Commission are necessary. All of LMU is determined to be acceptable with inventory needs.
8. Natural Areas	No; there are no natural areas within the LMU.	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
9. Federally listed endangered species	Yes; 6,569 acres are acceptable pending study; 36,009 acres are acceptable with inventory needs; 4,252 acres are acceptable with no likely problem before exception.	Exception was not applied pending final consultation with FWS.	Yes; more inventories for black-footed ferrets, peregrine falcons and eagle winter areas.	Final consultation with FWS necessary for final determinations.
10. State listed endangered species	STATE DOES NOT HAVE A LIST; THEREFORE, CRITERION WAS NOT APPLIED.			
11. Eagle nests	Yes; 282 acres unsuitable; 5,321 acres acceptable pending study; 15,722 acres acceptable with inventory needs and 25,505 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	Yes; more inventories for location of bald and golden eagle nests throughout the area.	Final consultation with FWS necessary to make final determinations.

SITE SPECIFIC SUMMARY MATRIX

Page 3 of 4
10/15/79

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Medicine Bow LMUState: Wyoming

Legal description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
12. Eagle roosts and concentration areas	Yes; 6,394 acres are acceptable pending study and 40,436 are acceptable with inventory needs.	Exception was not applied pending final consultation with FWS.	More inventories are necessary to locate eagle roost/concentration areas.	Final consultation with FWS necessary to make final determinations.
13. Falcon cliff-nesting sites	Yes; 134 acres are unsuitable pending study; 18,072 acres are acceptable with inventory needs; 24,528 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	More inventories are necessary to locate additional falcon nesting sites.	Final consultation with FWS necessary to make final determinations
14. Migratory birds	Yes; 8,611 acres are acceptable pending study; 23,964 acres are acceptable with inventory needs; 4,252 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	More inventories are necessary	Final consultation with FWS necessary to make final determination
15. State resident fish & wildlife	Yes; 30,136 acres are acceptable pending study; 16,694 acres are acceptable with no likely problems.	N/A	More inventories are necessary.	Final determinations are awaiting the regional environmental impact statement.
16. Flood plains	Yes; 5,077 acres are unsuitable; 1,704 acres are acceptable pending study; 40,346 acres were acceptable with no likely problems before exception was applied.	Exception was applied, but no acreage figures were available for final tabulation.	More studies necessary for final determination of flood plains; also field exams and peak flow data is necessary.	Final consultation with GS necessary for determinations of flood plains and hazards involved.

SITE SPECIFIC SUMMARY MATRIX

Page 4 of 4
10/15/79

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Medicine Bow LMUState: Wyoming

Legal description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
17. Municipal watersheds	No; all of LMU is acceptable with no likely problems.	Exception was not applied.	None needed	All findings based on Hanna URA and MFP.
18. National resource waters	No; none of Wyoming Class I waters or proposed Class I waters are within the area. All of area within LMU is acceptable with no likely problems.	Exception was not applied.	None needed	Data obtained from Wyoming Water Quality Rules and Regulations, chapter 1, Quality Standards for Wyoming Surface Waters.
19. Alluvial valley floors	Yes; 18,463 acres are acceptable pending study; 28,187 acres are acceptable with no likely problems.	Exception was not applied as Wyoming BLM developed own criteria to follow.	Need accurate definition of alluvial valley floors and studies to determine possibilities of damage to surface and underground hydrology.	Need Wyoming concurrence on alluvial valley floors criterion; need final consultation with OSM and Wyoming DEQ
20. State proposed criteria	STATE HAS PROPOSED NO CRITERIA; THEREFORE, THIS CRITERION WAS NOT APPLIED.			

SITE-SPECIFIC MATRICES

RED RIM

SITE SPECIFIC SUMMARY MATRIX

10/27/79

I. COAL DATA

(From Tract Delineation Report)

Tract name or number: Red RimState: Wyoming

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons/yr)	-0-	New mine 4.7 million tons per year for 30 years.	Medium positive	Good	
Estimated mine life (years)	30 years	New mine, employment and production for 30 years.	Medium positive	Good	
Total reserves (tons in place)	58,341,080	Removal of coal from reserves.	Low negative	Good	
Recoverable reserves (tons)	49,589,916	Recovery of 85% of reserves.	Low negative	Good	
Recovery rate (%)	85	Loss of 15% of reserves.	Low negative	Good	Recovery rate dependent on present technology.
Type of coal (steam/metallurgical)	Subbituminous (steam)	Production of coal for power uses.	Medium positive	Good	
Sulfur content/ton	.45%	Production of low sulfur coal for power production.	Medium positive	Good	
Projected work force (construction)	50 to 60	Employment of 50 to 60 for construction period.	High positive	Good	
Projected work force (mining)	125	Employment of 125 for life of mine.	High positive	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Surface ownership (federal, state, private, etc.)	Federal: 10,320 Private: 10,160 State: 0	Development of federal and private reserves.	Medium positive	Good	
Status of surface owner consent and/or consultation	Not required. No federal surface/private minerals.	Development of coal reserves.	Medium positive		
Type of mine (surface/ underground)	None existing	Development of surface mine.	Medium positive	Good	
Coal transportation needs	TO BE SUPPLIED BY THE COLORADO STATE OFFICE				
Coal access needs	None	New access road, rail spur.	Low		
Coal markets	Utilities/public power	Production of coal for utilities.	Medium positive	Good	
Other as determined by Regional Coal Team					

SITE SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: Red Rim

State: Wyoming

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
TSP	Ambient air sampling indicates A.G.M. <30 $\mu\text{g}/\text{m}^3$.	Large increases directly downwind of tract.	Violations of NAAQS and WAAQS may occur.	Good	None
SO ₂ , NO ₂ , HC, O ₃ , CO	No measurements; probably very small.	Very small	Insignificant (no violation of standards)	Good	None
PSD Areas					
Class I	None	None	Insignificant	Good	None
Class II	Entire region				
Class III	None				
NA, AQMA	None	None	Insignificant	Good	None
Visibility	Annual average at Rawlins Airport is 26.8 miles.	Decreased visibility immediately downwind of tract.	Insignificant	Good	None
Sources of Criteria Pollutants	None	None	None	None	None

U
W

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CLIMATE</u>					
Annual Precipitation	10 to 12 inches	None	None	None	None
Growing Season	200 days	None	None	None	None
Airflow pattern	Predominant wind direction W, WSW, SW. Average wind speed is 12 mph (Rawlins Airport data).	None	None	None	None
Peak winds	Longest length of time with winds greater than 9 mph was 62 hours from SSW (Rawlins Airport data).	None	None	None	None
Wind erosion potential	Moderate	Increase in potential from moderate to high.	None	None	None
Inversions stability potential	Frequent during cool mornings; dissipated by afternoons. Rawlins Airport data: Unstable: 13% Neutral: 58% Stable: 29%	None	None	None	None
<u>NOISE</u>	20 db	Levels will increase to 130 db near some mining activities.	Significant (violation of standards).	Good	Impact of higher levels will be minimized by mandated controls.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>GEOLOGY AND MINERALS</u>					
Landslide & Rockfall	Low potential	Potential would remain low.	Low	Good	
Seismic Potential	Low potential	Potential would remain low.	Low	Good	
Other minerals	No other economic minerals are known.	Possible use of sand and gravel for construction purposes; increased difficulty of geophysical exploration.	Low	Good	
Old or abandoned workings.	None known	None	None	None	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
<u>GROUND WATER</u>					
Type of occurrence	Confined (artesian) conditions in bedrock formations. Depth to water more than 200 feet in eastern part of tract. Deeper wells in Separation Creek Valley flow at surface. Unconfined (water table) conditions in alluvium bottoming Separation Creek Valley.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer. Alluvial aquifer in Separation Creek Valley probably would not be disturbed.	Would require future wells in mined area to be 50 to 100 feet deeper with correspondingly higher pumping lifts.	Inferred from field observations, geology, and topography of tract.	
Quantity	Total discharge from the tract is probably less than 30 gal/min.	Probably insufficient inflow to the pit for mining operations.	Minor. Supplemental water for mine use (25-50 ac-ft/yr) can be obtained from wells 500-1,000 feet deep with little or no impact on existing wells in the area.	No quantitative data available. Inferred from field observations and geology of tract.	Discharge to Fillmore and Separation Creeks would return to at least premining rates following reclamation.
Quality	Water in bedrock contains 200 to 2,500 mg/l dissolved solids with no dominant water type. Water in alluvium contains 1,000 mg/l dissolved solids, increasing downstream to 10,000 mg/l. Manganese and sulfate concentrations increase downstream.	Leaching of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 3,000 mg/l.	No significant impact on use of water by livestock and wildlife. Increased salt load to Separation Creek is not significant because water downstream is already unsuable.	Inferred from other ongoing mines in Wyoming and from field measurements of specific conductance of water samples.	Leaching presents no serious impacts downstream because runoff from the watershed is into a closed depression.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to livestock and wildlife	Five stockwater wells and no springs on the tract.	Four of the stockwater wells would be physically destroyed by mining. The remaining well would probably cease flowing.	Minor in as much as new wells could be completed within the reclaimed mine area.	Field observations	Slightly deeper wells and increased pumping lifts would present minor impact if windmills were used as power source.
Importance to agriculture	No agricultural activities on the tract. Hay meadow on bottom of Separation Creek Valley just northwest of tract is irrigated primarily by surface water.	No significant impact on nearby hay meadow because ground water in alluvium underlying the field currently contains 10,000 mg/l dissolved solids.	Very minor	Field observations	
Importance to people (individual and municipal supplies).	Ground water on or discharging from the tract is not used for any domestic supplies.	None	None	Field observations	
SURFACE WATER Types of occurrence	Separation Creek is intermittent. All other streams on the tract are ephemeral.	All stream channels disturbed by mining would be reconstructed.	Very minor. No significant problems are anticipated.	Field observations	All disturbed channels would be reconstructed as required by OSM regulations.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity	Annual runoff probably does not greatly exceed 15 ac-ft/sq mi or a total of about 480 ac-ft from the tract.	Would reduce runoff to Fillmore Creek by less than 1 percent and runoff to Separation Creek by less than 5 percent during mining.	Minor. Most runoff from the tract is currently dissipated by evapotranspiration as flows move downstream.	Low. Effects of development are largely inferred.	Annual runoff should return to approximately premining rates after completion of reclamation.
Quality	Fair. Contains 500-2,000 mg/l dissolved solids depending on flow event. Magnesium and sulfate concentrations increased downstream.	Little or none	Very minor; any impacts would be short term.	High. Based on GS sampling and analyses of stream flow.	
Salinity of receiving waters	Both surface and subsurface drainage is largely to Separation Lake which contains more than 10,000 mg/l dissolved solids.	Leaching of spoils aquifer would increase salt load to Separation Creek. Increased salinity in North Platte River would be only 0.003 percent.	Very minor. Ground water in lower reaches of Separation Creek Valley already contains 10,000 mg/l dissolved solids and is virtually unusable.	Based on available water quality data and inferred effects of population increases.	No salinity problem exists on the North Platte River.
Importance of livestock and wildlife	Six small reservoirs on the tract provide seasonal water for wildlife.	Four reservoirs would be removed by mining.	Very minor. Sedimentation reservoirs would provide additional water during mining.	Field observations.	Reservoirs could be replaced after reclamation if desired.
Importance to agriculture	No agricultural activities on the tract. Runoff in Separation Creek flood irrigates hay meadow just northwest of tract near Daley Ranch headquarters.	Runoff to hay meadow would be reduced as much as 5 percent (100 ac-ft/yr) during period of maximum disturbance.	Probable decrease in productivity of hay meadow by about 5 percent during most years.	Field observations	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to people (individual and municipal supplies)	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of North Platte River water by increased population would be 69 to 98 ac-ft/yr.	Water consumed by increased population would no longer be available for other current uses downstream.	Moderate. Based on inferred population increases.	Use of water by increase population would probably be long term.
Erosion and sedimentation	Active erosion on steeper slopes with deposition downslope. Channels largely stable. Estimated sediment yield is 0.1-0.2 ac-ft/sq mi/yr. or total of no more than 6.4 ac-ft/yr from tract.	Sedimentation ponds would reduce sediment yield from tract by 1-6 ac-ft/yr. This would offset any temporary increase in sediment yield from ancillary facilities.	Long term effect may be to slightly decrease annual sediment yield from affected areas.	Field observations	

Element	Present Situation		Anticipated Effect of Leasing/Development		Significance of Anticipated Impact	Data Reliability	Comments
<u>SOILS</u>							
<u>Mapping Unit</u>	<u>Depth (inches)</u>	<u>Slope (%)</u>	<u>Wind Erosion (tons/acre/yr.)</u>	<u>Water Erosion (tons/acre/yr.)</u>			<u>Reclamation Potential</u>
3 Cushool-Ryan Park-Satanka Association	34-60	2-30	1-2	2	Increased erosion causes loss in productivity and fertility.	Good	Fair-Good: slope hazards and shallow surface horizons.
5 Rock River-Diamondville-Tasselman-Ryark Association	60	2-30	1-2	1-2		Good	Fair-Good: Slope hazards.
6 Forelle-Monte-Havre Association	44-50	0-40	1-2	2		Good	Fair: Slope hazard.
7 Blazon-Seaverson Association	18-50	3-20	2	2		Good	Poor: Alkalinity and shallow depth.
9 Rockland land type	0	Varies	Not quantifiable			Good	None
11 Rockriver-Satanka Association.	60	3-20	Not quantifiable			Good	Good: Slope hazard.
16 Typic Natragids	Varies	0-10	Not quantifiable			Good	Poor: Climatic stress, alkalinity.
22 Xeropsaments	20+	Varies	1-3	1-3		Good	Poor: Low water-holding capacity; high erosion potential
44 Ustic Torriorthents, Lithic Torriorthents Rock Outcrop Association.	Varies	3-40	1-2	1-2			Poor: Shallow depth; high erosion potential; low soil fertility.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION</u>	15,890 acres big sagebrush; 1,880 acres greasewood; 1,680 acres saltbush; 580 acres mountain shrub; 450 acres barren.	5,856 acres of native vegetation would be destroyed and 5,643 acres would be reclaimed at rates specified on table 1.1-3.	Major significance. Complete loss of wildlife and livestock carrying capacity until restored by reclamation. There would also be ecological differences between premining and postmining vegetation types. Also affects soil erosion, esthetics, and water qualities. See Wildlife, Land Use, Visual Resources, and Water Quality.	Good	
19 Reclamation Potential of Vegetation	Low	Potential for reclamation of a vegetative cover of desirable species to meet objectives of postmining land use would be moderate, assuming moderate potential for soil reclamation.	Assuming moderate soil reclamation potential, vegetation desirable for postmining land use could be reestablished in approximately 20 years.	Acceptable-success of reclamation is highly questionable.	Field studies to determine the success of reclamation are currently in progress.
Vegetative Cover and Productivity	26% and 550 lbs/acre	Reduction of both cover and productivity to zero on disturbed acreage at rate specified on table 1.1-3. Preliminary reclamation would result in a gradual increase of both elements until complete recovery in 5 to 10 years.	Same as Vegetation above.	Acceptable	Cover and productivity can be restored easily but are not useful in determining the success of reclamation.
Livestock Grazing	2,432 AUMs produced annually used by 5 livestock operations in 14 allotments.	Loss of 74 AUMs in 1987; 169 AUMs by 1990; 264 AUMs by 1995; and a maximum of 302 AUMs by 2011.	Maximum reduction of the total native range available to 5 livestock operations by 0.04, 0.96, 0.28, 0.28, and 0.14 percent.	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WILDLIFE HABITAT</u>					
Aquatic	6 small reservoirs providing limited waterfowl/shorebird nesting habitat and 3 to 4 miles of intermittent stream - Separation Creek.	Destruction of 4 reservoirs and 1 to 2 miles of Separation Creek habitat.	Minor significance. <1% reduction in carrying capacity of area aquatic habitat.	Acceptable	
Terrestrial	Same as Vegetation.	Destroyed at rates specified on table 1.1-3.	Minor significance except for those wildlife categories (see below) which suffer impacts of major significance.	Acceptable	Field studies to determine success of reclamation are currently in progress.
2 Fisheries	Non-existent	No anticipated impact.	N/A	Outstanding	
Birds					
Nongame (other than raptors)	Minor resource - very numerous.	Loss of population on 5,856 acres of disturbed habitat.	Relatively minor estimate <5% reduction in area populations.	Good	
Raptors					
a. Golden eagles & Prairie falcons	Several nests on and adjacent to tract.	Reduction of nesting success.	Nesting success reduced more than 5%. About 15% of area breeding population is affected.	Acceptable	
b. Ferruginous hawks	Approximately 29 nests sites on the tract and numerous others off the tract.	Up to 27 nests destroyed and abandonment of adjacent nests.	Reduction of area breeding population and habitat.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Other raptors	Red-tailed hawks, great-horned owls, and kestrels nest on and adjacent to tract.	Loss of hunting habitat and reduced nesting success.	Minor significance - <5% reduction of area populations.	Acceptable	
Game birds	About 20% of a grouse winter concentration area on tract. High quality brood-rearing habitat long Separation Creek; 18 grouse per square mile.	Standing crop loss of 18 grouse in 1987; 40 grouse by 1990; 62 grouse by 1995; and 165 grouse by end of mine life. Loss of 10% to 20% grouse winter concentration area and 10% of high quality brood-rearing habitat.	Major - area grouse populations would be reduced more than 5%. Insignificant loss of doves.	Acceptable	
Mammals					
Furbearing	Coyotes, foxes, badgers, weasels and skunks.	Loss of population on 5,856 acres of disturbed habitat.	Minor - <1% reduction of area populations.	Acceptable	
Nongame	Minor resource - rodents and jackrabbits.	Loss of population on 5,856 acres of disturbed habitat.	Minor - <5% reduction in area populations.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Game Mammals Cottontails	295 per square mile.	Standing crop losses of approximately 290 in 1987; 660 by 1990; 1,000 by 1995; and 2,700 by end of mine life.	Minor - cumulative losses over life of mine would be less than 1% of area populations.	Acceptable	
Pronghorn	18 per square mile. Crucial pronghorn winter range overlaps tract.	Standing crop losses of 18 in 1987; 40 by 1990; 60 by 1995; and 750 to 1,200 by end of mine life. Loss of 50% to 80% of crucial winter range.	Major - cumulative losses over the life of the mine would be >5% of area populations because of destruction of crucial habitat.	Acceptable	Losses would be greater than indicated because of crucial winter range loss.
Mule deer	1 per square mile.	Standing crop losses of one deer by 1987; 2 deer by 1990; 3 deer by 1995; and 9 deer by end of mine life.	Minor - cumulative losses over the life of the mine would be <1% of area population.	Acceptable	
Sensitive species	Non-existent resource.	No anticipated impact.	N/A	Acceptable	
Threatened or Endangered Species	Non-existent resource.	No anticipated impact.	N/A	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL HISTORIC VALUES</u>					
Archeological	Class III survey conducted on about 10,880 acres; 27 sites were located with 19 recommended for testing.	Surface and buried sites on uninventoried portions on the tract could be destroyed.	Unknown	Good	Cultural surveys on uninventoried portions of the tract will be undertaken prior to mining.
Historical	No historical resources have been discovered.	Destruction on unknown sites could occur.	Unknown	Good	106 Compliance will be developed on any sites found eligible for National Register of Historic Places.
Paleontology	Significant vertebrate fossils exist in the Ft. Union and possibly the Lance formations.	Some loss of significant vertebrate fossils would occur.	The significance of loss of fossils is unknown.	Good	Class III paleontological survey and possible salvage of same is necessary. Periodic on site inspections are necessary.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECREATION VALUES</u>					
<u>INCLUDING VRM</u>					
VRM	Class III	Change to Class V	Low	High	Returned to Class III.
Hunting	Antelope and small game.	Hunt area reduced by 31%.	Moderate	Low	
ORV	Mostly incidental to hunting.	Not allowed in mining area.	Low	Low	No data
Sightseeing	Does occur.	Change from natural landscape to mining operation.	Unknown	Low	No data

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>LAND USE</u>					
Oil and gas	20 leases; about 9240 ac	Curtailed activity	Low	High	N/C
Public water use	120 ac				
Railroad	8 miles	Incorporated into mining activity.	Low	High	
Power line	5 miles	Relocated	Low	High	
Pipe line	4 miles	Relocated	Moderate	High	Utility corridor
Telephone/telegraph	4 miles	Relocated	Moderate	High	Utility corridor
Windmill	2	Removed	Low	High	
<u>TRANSPORTATION</u>					
Product Transportation	U.P. railroad	Increase in hazard ratings by .02 accidents/5 years.	Low	90% probability	
Net Energy Analysis		Total energy output to input 10.4:1.			

STATE DEPARTMENT OF REVENUE
III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: Red Rim

State: _____

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
68 Population	Every community in the region, with the exceptions of Dixon and Rock River, has experienced steady population growth during the last decade.	Under the baseline, every community would experience significant population growth between 1978 and 1990. In absolute terms, Rawlins would experience the most significant population impacts as a result of the proposed action (472 additional people by 1990), while in proportional terms the impacts on Creston Junction would be the greatest (25.9 percent of the projected 1990 population would be attributable to the proposed action).	Increased demands for public services and facilities. Increasing size and heterogeneity of community would affect cultural and social values of inhabitants.		
Economics	The three most important sources of employment in the regional economy are government, mining and trade respectively. Government and mining are similarly the two most important sources of income, although trade ranks fifth behind construction and TCU.	The proposed action would generate an additional 411 jobs over baseline levels by 1987 (335 by 1990). Additional income attributable to the proposed action would be \$5.8 million by 1987 and \$5.5 million by 1990.	The proposed action would generate additional employment equal to 1.0 percent of baseline employment in 1987 and 0.8 percent in 1990. Incremental incomes attributable to the proposed action would equal 0.8 percent of baseline income in 1987 and 0.8 percent in 1990. However, the proposed actions would have little impact on the overall situation.	Due to apparent differences in the data bases used, employment and income projections do not appear to be completely compatible with published historical data.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Public Finance	Local communities vary widely in their fiscal condition, i.e., expenditures, revenue base and total indebtedness.	Public finance impacts not projected in this study.	N/A	N/A	
Infrastructure	Housing in every community is currently scarce and expensive. School capacity is adequate except in Rock River. The hospital in Carbon County has a low occupancy rate. Sewage facilities are overloaded in Baggs, Encampment, Rawlins, and Saratoga. In Dixon, sewage facilities do not meet EPA standards. In Hanna, the facilities are about at capacity. Water facilities are adequate in Elk Mtn., Dixon, Medicine Bow, and Saratoga. In Hanna, water facilities are about at capacity. Only Baggs has an adequate solid waste site with additional years of use available.	The proposed action would generate the need for an additional 188 housing units in Carbon County. No new school facilities would be needed but additional school personnel would be required. The number of hospital beds in Carbon County would remain adequate. Additional capacity in the sewage and water facilities would be needed due to this proposed action. No additional solid waste facilities, not otherwise needed, would be required.	Given the current housing situation, housing would be expected to remain scarce and expensive. Additional need for school personnel due to this mine would be small - four teachers in Carbon County School District #1 in 1987 and four teachers and one administrator in 1990; three teachers and one administrator in Carbon County School District #2 in 1987 and three teachers in 1990.		Because population projections did not differentiate among households headed by employees in different occupations, it was not possible to project a changing mix of housing preference patterns. In addition, the assumed household size may be too large.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Social Services and Public Safety	<p>There is a current shortage of doctors, nurses and mental health workers in Carbon County. Pumping capacity of fire fighting is adequate in only Baggs, Encampment, Rawlins, and Wamsutter. Police services are adequate in Rock River, Baggs, Saratoga and Wamsutter. The caseload of employees of the services agency in Carbon County is currently high. Recreation and leisure facilities are not addressed.</p>	<p>The proposed action would generate the need for additional nurses and one doctor. No additional pumping capacity or full time policemen would be needed due to the tract.</p> <p>Caseloads of the social services agency would be expected to increase but specific impacts of the mine are not addressed in this study.</p>	Impacts are minimal.		
	Not addressed in this study.	N/A	N/A	N/A	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Agriculture					

71

Native Americans and other Minority Groups	Not addressed in this study.	N/A	N/A	N/A	
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SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Red Rim LMU

State: Wyoming

Legal Description (T and R or metes and bounds): See Chapter 1, table 1.1-2 for a complete legal description (data valid to 7/31/79)

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
1. Federal land systems	No	N/A	No	All of review area is acceptable with no likely problems.
2. Rights-of-way and easements	No	N/A	No	All of area is classified as acceptable with no likely problems.
3. Buffer zones	Yes; 100 foot buffer zone along Interstate 80 (46 acres are unsuitable).	Exception was applied; buffer zone still unsuitable.	No	46 acres along buffer zone for Interstate 80 is unsuitable; remainder of area is acceptable with no likely problems
4. Wilderness study areas	No	No	No	Area is within the checkerboard land pattern; therefore no wilderness areas exist. All area is acceptable with no likely problems.
5. Scenic areas	No	No	No	All of area is acceptable with no likely problems.
6. Land used for scientific studies	Yes; GS stream gauging station in T. 20 N., R. 90 W., sec. 32; NE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ is unsuitable (10 acres).	Exception was applied; area remains unsuitable.	No	10 acres unsuitable; remainder of area is acceptable with no likely problems

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Red Rim LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
7. Federal land systems	No	No	No	All of area is acceptable with no likely problems. Need consultation with Advisory Council & State Historic Preservation Office.
8. Natural areas	No	No	No	All of area is acceptable with no likely problems.
9. Federally listed endangered species	Yes; surveys done in 1978 and 1979 for black-footed ferrets, prairie dogs, peregrine falcons and bald eagles by FWS. No endangered plants were found.	Exception not applied in areas surveyed by FWS.	Final formal consultation with FWS is needed.	All of area is acceptable with no likely problems. Need final consultation with FWS
10. State listed endangered species	Criterion was not applied as Wyoming has no list.	N/A	N/A	Criterion was not applied since Wyoming has no list.
11. Eagle nests	Yes; 523 acres unsuitable; 4,442 acres acceptable pending study; 35,735 acres acceptable with no likely problems.	Exception not applied pending formal consultation with FWS.	Continued wildlife survey necessary.	Final consultation with FWS and Wyoming Game & Fish necessary
12. Eagle roosts and concentration areas	Yes; there are no unsuitable acres; 40,700 acres are acceptable with inventory needs.	Exception was not applied.	More inventory data is necessary.	All of area is acceptable with inventory needs pending final consultation with FWS.

SITE SPECIFIC SUMMARY MATRIX
 IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Red Rim LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
13. Falcon cliff-nesting sites	Yes; 119 acres are unsuitable, 5,670 acres are acceptable pending study; and 34,911 acres are acceptable with no likely problems.	Exception was not applied	Further studies needed along with FWS consultation necessary.	Final consultation with FWS is necessary for final determinations.
14. Migratory birds	Yes; 20,817 acres are acceptable pending study; 2,748 acres are acceptable with inventory needs; 17,135 acres are acceptable with no likely problems.	Exception was not applied.	Further studies necessary to determine final size of buffer zones.	Final consultation with FWS necessary for final determinations.
15. State resident fish and wildlife	Yes; 20,134 acres are acceptable pending study and 20,566 acres are acceptable with inventory needs.		More consultation for final determinations needed with Wyoming Game and Fish.	Final determinations are awaiting the regional environmental impact statement.
16. Flood plains	Yes; 3,530 acres are unsuitable; 1,216 acres are acceptable pending study; and 35,954 acres are acceptable with no likely problems.	Exception was not applied.	Final consultation with GS necessary for final determination.	Need final consultation with GS; WRD necessary for final determination.
17. Municipal watersheds	No; all areas are acceptable with no likely problems	N/A	Need consultation with municipalities and responsible governmental units involved.	Need concurrence with municipalities and responsible governmental units involved.

74

SITE SPECIFIC SUMMARY MATRIX
 IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Red Rim LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
18. National resource waters	No; all area is acceptable with no likely problems.	N/A	None	None
19. Alluvial valley floors	Yes; 12,759 acres are acceptable pending study and 27,941 acres are acceptable with no likely problems.	Exception was not applied.	Need information from GS, OSM and Wyoming DEQ as to what to consider an alluvial valley floor.	Need final determination to be made as to what criteria is to be used to determine what an alluvial valley floor is.
20. State proposed criteria	There are no state proposed criteria; therefore, criterion was not applied.			

SITE-SPECIFIC MATRICES

ROSEBUD

SITE SPECIFIC SUMMARY MATRIX

I. COAL DATA
(From Tract Delineation Report)

Tract name or number: Rosebud

State: Wyoming

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rates (tons/yr.)	1 million	Produce approximately 1 million tons of coal per year.	Medium positive	Good	
Estimated mine life (yrs)	18 years	New mine employment and production.	Medium positive	Good	
Total reserves (tons in place)	30,440,000	Removal of 30,440,000 tons from reserves.	Low negative	Good	30,440,000 tons represents less than 1% of known reserves in state.
Recoverable reserves (tons)	18,264,000	Recovery of 18,264,000 tons of coal (60% of reserves).	Medium positive	Good	
Recovery rate (%)	60	Recovery of 60% of reserves; loss of 40%	Low negative	Good	Recovery rate dependent on current technology.
Type of coal (steam/metallurgical)	Subbituminous (steam)	Production of coal for power production	Medium positive	Good	
Sulfur content/ton	≤ .8%	Production of low sulfur coal.	Medium positive	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	100	Employment of 100 new employees.	High positive	Good	
Projected work force (mining)	100	Continued employment of 100 hired for construction.	High positive	Good	100 employees <u>not</u> new carried over from construction.
Surface ownership (federal, state, private, etc.)	Federal: 3,040 State: 0 Private: 1,920	Development of federal coal; private reserves.	Medium positive	Good	
Status of surface owner consent and/or consultation	None required. No private surface/federal mineral.	Development of coal.	Medium positive	Good	
Type of mine (surface/underground)	No existing mine	Development of new surface.	Medium positive	Good	
Coal transportation needs	TO BE SUPPLIED BY WYOMING STATE OFFICE				
Coal access needs	None existing	Approximately 2 miles of rail spur.	Low negative	Good	
Coal markets	Utilities/public power	Probably same markets.	Medium positive	Good	

Other as determined by the regional coal team

SITE SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: _____

State: _____

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
TSP	Ambient air sampling indicates A.G.M. <30 ug/m ³ .	Large increases directly downwind of tract.	Violations of NAAQS and WAAQS may occur.	Good	None
SO ₂ , NO ₂ , HC, O ₃ , CO	No measurements; probably very small	Very small	Insignificant (no violation of standards)	Good	None
PSD areas					
Class I	None	None	Insignificant	Good	None
Class II	Entire region				
Class III	None				
NA, AQMA	None	None	Insignificant	Good	None
Visibility	Annual average at Rawlins Airport is 26.8 miles	Decreased visibility immediately downwind of tract.	Insignificant	Good	None
Sources of Criteria Pollutants	Several coal mines in near proximity to tract.	Increases in TSP concentrations may result because of proximity to tract.	Violations of NAAQS and WAAQS will occur more frequently.	Good	None

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CLIMATE</u>					
Annual Precipitation	10 to 12 inches	None	None	None	None
Growing Season	200 days	None	None	None	None
Airflow Patterns	Predominate wind direction W, WSW, SW. Average wind speed is 12 mph (Rawlins Airport data).	None	None	None	None
Peak winds	Longest length of time with winds greater than 9 mph was 62 hours from SSW - Rawlins Airport data.	None	None	None	None
Wind erosion Potential	Moderate	Increase in potential from moderate to high.	None	None	None
Inversion Stability Potential	Frequent during cool mornings; dissipated by afternoon. Rawlins Airport data: Unstable 13% Neutral 58% Stable 29%	None	None	None	None
<u>NOISE</u>	20 db	Levels will increase to 130 db near some mining activities.	Significant (violations of standards)	Good	Impact of higher levels will be minimized by mandated controls.

Element	Present Situation		Anticipated Effect of Leasing/Development		Significance of Anticipated Impact	Data Reliability	Comments
<u>SOILS</u>							
<u>Mapping Unit</u>	<u>% Slope</u>	<u>Depth (inches)</u>	<u>Wind Erosion (tons/acre/yr)</u>	<u>Water Erosion (tons/acre/yr)</u>			<u>Reclamation</u>
3 Cushool-Ryan Park Satanka Association	2-30	34-60	2-3	2-3	Loss in soil productivity will occur as a result of disturbance.	Good	<u>Fair-Good</u> : slope hazards shallow surface horizon.
4 Cushool-Worfman Blanyon Assoc.	6-30	30-60	2-3	2-3		Good	<u>Poor</u> : steep slopes
5 Rock River - Diamondville - Tasselman - Ryark Assoc.	2-30	60	1-3	1-3		Good	<u>Fair-Good</u> : slope hazards
16 Typic Natragids	0-10	Varies	1-3	1-3		Good	<u>Poor</u> : climatic stress, alkalinity.
21 Typic Haplargids	3-10	20+	1-2	1-2		Good	<u>Fair</u> : lack of organic matter, low H ₂ O holding capacity.
41 Ustic Torri-fluvents	0-6	40+	1	1		Good	<u>Fair</u> : flood plain location, low soil fertility.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
Ground water	Confined in bedrock fms. Unconfirmed (water table) in alluvium along Hanna Draw.	Bedrock aquifers in mined area would be replaced by more permeable spoils aquifer. Alluvial aquifer probably would not be disturbed.	Would require future wells in mined areas to be 100-200 feet deeper with corresponding higher pumping lifts.	Moderate, but adequate.	If desired, suitable wells for livestock and wildlife could be developed after mining.
Type of occurrence					
Quantity	Total discharge from tract probably is less than 15 gal/min.	Probably insufficient water in pit for mining.	Minor. Supplemental water for mine use (31 ac-ft/yr) can be obtained from wells 400-1,500 feet deep.	Do.	Discharge to Hanna Draw and North Platte River should increase slightly following reclamation.
Quality	Fair to poor; contains 950 to 3,600 mg/l of dissolved solids.	Leaching of spoils would increase dissolved solids concentrations up to 7,000 mg/l in spoils aquifer.	Minor, but should be long term. Would increase salt load to North Platte River by 3 tons/yr.	Inferred from similar operations in Wyoming and northwestern Colorado.	See surface water for effect on North Platte River.
Importance to livestock and wildlife	No stockwells or springs on tract.	None.	None.	Field observations.	--
Importance to agriculture	No agricultural activities in or adjacent to tract.	None.	None.	Field observations.	--
Importance to people (Individual and municipal supplies)	No domestic water supplies developed on tract or within 5 miles of tract.	None.	None.	Field observations.	--

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
Surface Water	All streams are ephemeral.	Little or none.	Minor.	Inferred from field observations.	Stream channels would be reconstructed as required by OSM regulations.
Types of occurrence					
Quantity	Estimated runoff is about 0.5 inch (150 ac-ft/yr).	Runoff may be reduced by up to 50 ac-ft/yr during mining, but should return to approximately premining rates after mining.	Minor, much runoff from the tract is currently dissipated by evapotranspiration as flows move downstream.	Low. Effects largely inferred.	--
Quality	Good, probably contains less than 400 mg/l dissolved solids.	Little or none.	Minor. No significant impacts on North Platte River or Hanna Draw.	Low. Based on quality of water in reservoirs in the general area.	--
Salinity of receiving waters	Minor salinity problem along North Platte River.	Mining would increase salinity of North Platte River by 31 tons/yr.	Would increase salinity of North Platte River by as much as 0.04 mg/l (0.01 percent). Impacts would be long term.	Minor. Based in part on inferred population increases.	--
Importance to livestock and wildlife	No reservoirs on tract. Two ephemeral lakes in internally drained depression.	Minor.	Sedimentation reservoirs should temporarily increase water supplies to livestock and wildlife.	Field observations.	--
Importance to agriculture	No agricultural activities in or adjacent to tract.	None.	None.	Field observations.	--
Importance to people (individual and municipal supplies)	No use of surface water from this area for domestic or municipal supplies.	None on tract. Consumptive use of North Platte River water by increased population would be 65-96 ac-ft/yr.	Water consumed by increased population would no longer be available for other current uses downstream.	Moderate. Based on inferred population increases.	Use of water by increased population would probably be long term.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Erosion and Sedimentation	Low erosion. Tract yields an estimated 0.45 ac-ft/sq. mi/yr of sediment. Steep slopes near Hanna Draw estimated to yield 0.8 ac-ft/sq. mi/yr of sediment.	Changes in sediment yield as a result of mining would be less than 3.0 ac-ft/yr.	Minor. Long term effect may be to slightly decrease sediment yield from affected areas.	Field observations.	---

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION</u>	2,460 acres big sagebrush, 2,500 acres birdfoot sagewort	1,676 acres of native vegetation would be destroyed and 1,675 would be reclaimed at rates specified in table 1.1-3.	Major significance. Complete loss of wildlife and livestock carrying capacity until it is restored by reclamation. There would be ecological differences between pre- and post-mining vegetation types. Also affects soil erosion, esthetics, and water qualities. See Wildlife, Land Use, Visual Resources, and Water Quality.	Good	
81 Reclamation Potential of the Vegetation	Low	Potential for reclamation of a vegetative cover of desirable species to meet objectives of post mining land use would be moderate assuming moderate potential for soil reclamation.	Assuming moderate soil reclamation potential, vegetation desirable for postmining land use could be reestablish in approx. 20 years.	Acceptable success of reclamation is highly questionable.	Field studies to determine the success of reclamation are currently under progress.
Vegetative ground cover and productivity	26% and 500 lbs/acre	Reduction of both cover and productivity to zero on disturbed acreage at rate specified in table 1.1-3. Preliminary reclamation would result in a gradual increase of both elements until complete recovery in 5 to 10 years.	Same as Vegetation	Acceptable	Cover and productivity can be restored easily but are not useful in determining the success of reclamation.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Livestock Grazing	856 AUMs produced annually used by 3 livestock operations in 2 allotments.	Loss of 68 AUMs in 1987, 99 AUMs by 1990, 136 AUMs by 1995, and a maximum of 212 AUMs by end of mine life.	Maximum reduction of 0.35% in size of operation using one allotment. and 2.7 and 0.5 reductions in the size of the two operations using the other allotment.	Outstanding	Quantifications are approximate.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WILDLIFE HABITAT</u>					
Aquatic	3 small reservoirs providing limited water-fowl/shorebird nesting habitat.	Destruction of 2-3 reservoirs Possible reduction in quality of adjacent habitat on Medicine Bow river.	Minor significance <1% reduction in carrying capacity of area aquatic habitat.	Good	
Terrestrial	Same as Vegetation	Destroyed at rates specified in table 1.1-3	Minor significance except for those wildlife categories (see below) which suffer impacts of major significance.	Good	Field studies to determine success of reclamation are currently under progress.
Fisheries	Non-existent	No anticipated impact	N/A	Acceptable	
Birds					
a. Nongame (other than raptors)	Minor resource-very numerous	Loss of population on 1,676 acres of disturbed habitat.	Relatively minor-estimate <5% reductions in area populations.	Acceptable	
b. Raptors					
(1) Golden eagles	2 eagle nests	Reduction of nesting success	Major - more than 5% reduction in nesting success for 6% of area population.	Acceptable	
(2) Ferruginous hawks	10 ferruginous nests	Destruction of at least 8 nest sites.	Major significance 10 to 20% reduction of area nesting habitat and reproductive effort.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
(3) Burrowing owls	4 confirmed sightings by Fish and Wildlife Service, one new burrow.	Loss of 25 to 50% of essential owl habitat.	Major significance 25 to 50% reduction in area populations.	Unsatisfactory	
(4) Other Raptors	At least one red-tailed hawk, one marsh hawk, and one green horned owl nest.	Loss of these nests.	Minor significance <5% reduction of area population.	Acceptable	
Game Birds	18 grouse per square mile, one permanent grouse strutting/nesting ground.	Stand crop losses of ~5 grouse in 1987, 8 grouse by 1990, 11 grouse by 1995, and 96 grouse by end of mine life. Destruction of 1 grouse strutting/nesting complex.	Reduction of <10 percent of area strutting/nesting habitat and <5% of area grouse populations. Insignificant loss of mourning doves.	Acceptable	
Mammals					
Furbearing	Coyotes, foxes, bobcats, badgers, weasels, and skunks.	Loss of population on 1,676 acres of disturbed habitat.	Minor <1% reductions of area populations.	Acceptable	
Nongame	Minor resource - rodents and jackrabbits	Loss of population on 1,676 acres of disturbed habitat.	Minor <1% reductions in area populations.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Game Mammals					
Cottontails	275 per square mile	Standing crop losses of ~230 in 1987, 335 by 1990, 460 by 1995, and 700 by end of mine life.	Minor - cumulative losses over life of mine would be less than 1% of area populations.	Acceptable	
Pronghorn	7 per mile ²	Standing crop losses of ~6 head in 1987, 9 head by 1990, 12 head by 1995, and 18 by end of mine life.	Minor - cumulative losses over the life of the mine would be less than 5% of area populations.	Acceptable	
Mule Deer	3 to 4 per mile ²	Standing crop losses of ~3 deer in 1987, 4 deer by 1990, and 6 deer by 1995, and 9 deer by end of mine life.	Minor - cumulative losses over the life of the mine would be less than 5% of area population.	Acceptable	
Sensitive Species	Non-existent resource	No anticipated impact	N/A	Good	
Threatened or Endangered					
a. Black-footed ferret	Possible presence of black-footed ferret.	Loss of possible ferret habitat at rate specified in table 1.1-3.	Insufficient data	Unsatisfactory	Formal section 7 consultation with the Fish and Wildlife Service as required by the Endangered Species Act has been requested.
b. Bald eagles	Tract serves as hunting habitat for bald eagles.	Loss of 1,676 acres of hunting habitat for bald eagles.	Insignificant, because habitat of similar quality is abundant throughout the area.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>					
Paleontology	No; none of LMU is considered to have any significant paleontological sites.	None	None	Good	It is unlikely that significant fossils will be affected.
Archeological	Class II archeological surveys conducted on 7,920 acres and Class III survey conducted on 1,280. Seven sites located.	Surface and buried sites on uninventoried portions of the tract could be destroyed.	Unknown	Good	Cultural surveys on uninventoried portions of the tract will be undertaken prior to mining.
Historical	No historical resources have been discovered.	Destruction of unknown sites could occur.	Unknown	Good	106 Compliance will be undertaken on any sites found eligible for National Register of Historic Places.
<u>RECREATION VALUES INCLUDING VRM</u>					
VRM	All Class IV	Change to Class V	Low	High	
Hunting	Primarily antelope and small game.	Hunt area reduced less than 1%.	Low	Low	
ORV	Mostly incidental to hunting.	None allowed in mining area.	Low	Low	No data available.
Sightseeing	Visible from unimproved dirt roads.	Change in scenic nature.	Low	Low	No data available.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>LAND USE</u>					
Oil and gas lease	4 leases, 3000 AC	Curtailed during mine life.	Low	Good	No comment.
Fence lines	4½ miles	Removed or relocated.	Low	Good	No comment
Recreation	see Recreation				
Other minerals	see Other minerals				
<u>TRANSPORTATION</u>					
Employee transportation	I-80, U.S. 30 & 287 and S.H. 130	A 3% increase in traffic accidents (10 total accidents)	Low	90% probability	
		Increased maintenance costs for the effected highways.	Low	80% probability	
Product transportation	U.P. railroad	No direct impacts on the transportation system.		90% probability	

SITE SPECIFIC SUMMARY MATRIX
 III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: Rosebud

State: _____

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Populations	Every community in the region, with the exception of Dixon and Rock River, has experienced steady population growth during the last decade.	Under the baseline, every community would experience significant population growth between 1978 and 1990. In absolute terms, Rawlins would experience the most significant population impacts as a result of the proposed action (176 additional people by 1990), while in proportional terms the impacts on Walcott Junction would be the greatest (13.5 percent of the projected 1990 population) would be attributable to the projected action.	Increased demand for public services and facilities. Increasing size and heterogeneity of community would affect cultural and social values of inhabitants.		
Economics	The three most important sources of employment in the regional economy are government, mining and trade respectively. Government and mining are similarly the two most important sources of incomes, although trade ranks fifth behind construction and TCU.	The proposed action would generate an additional 177 jobs over baseline levels by 1987 (197 by 1990). Additional incomes attributable to the proposed action would be \$2.5 million by 1987 and \$3.3 million by 1990.	The proposed action would generate additional employment equal to 0.4 percent of baseline employment in 1987 and 0.5 percent in 1990. Incremental income attributable to the proposed action would equal 0.3 percent of baseline income in 1987 and 0.5 percent in 1990. However, the proposed actions would have little impact on the overall situation.	Due to apparent differences in the data bases used, employment and income projections. Do not appear to be completely compatible with published historical data.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Public Finance	Local communities vary widely in their fiscal conditions, i. e., expenditures, revenue base, and total indebtedness.	Public finance impacts not projected in this study.			
Infrastructure	Housing in every community is currently in short supply and expensive. School capacity, on the other hand, is adequate. The hospital in Carbon County has a low occupancy rate. Sewage facilities are overloaded in Baggs, Encampment, Rawlins, and Saratoga. Sewage facilities in Hanna are about at capacity. The facilities in Dixon do not meet LPP secondary discharge standards. Water facilities are currently adequate in Dixon, Elk Mtn., Medicine Bow and Saratoga. Water facilities in Hanna are about at capacity. Only Baggs has an adequate solid waste disposal site with additional years of use available.	The proposed action would generate the need for an additional 117 units in Carbon County, 1.8 percent above the 1978 supply. No new school facilities would be expected due to tract development. Additional teachers but no administrators would be needed as a result of this mine. Additional capacity would be needed in the sewage and water facilities. No solid waste facilities, not otherwise needed, would be required. The number of hospital beds in Carbon County would remain adequate.	Given the current housing situation, housing would be expected to remain scarce and expensive. Additional school personnel needs would be small - three teachers in Carbon County School District #1 in 1987 and two in 1990; one teacher in Carbon County School District #2 in 1987 and two in 1990. The need for additional sewage capacity due to the mine would be a maximum of 0.029 mgd and for water facilities, a maximum of 0.079 mgd.	Because population projections did not differentiate among households headed by employees in different occupations, it was not possible to project a changing mix of housing types based on housing preferences patterns. In addition, the assumed household size may be too large.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Social Services and Public Safety	<p>There is a current shortage of doctors, nurses, and mental health workers in Carbon County. Pumping capacity of fire-fighting equipment is adequate in every community except Dixon, Elk Mountain, Elmo, Hanna, Medicine Bow and Saratoga. Police service is inadequate except in Baggs, Saratoga, Wamsutter, and Rock River. The caseload of employees of the social services agencies in Carbon County is currently high. Recreation and leisure facilities are not addressed.</p>	<p>This proposed action would generate the need for additional nurses. No additional pumping capacity would be required due to this tract. No full time policemen would be required. Caseloads of the social services agency would be expected to increase but specific impacts due to this tract are not addressed.</p>	<p>Impacts would be minimal - one nurse in 1987, two in 1990, and police officers working half time or less.</p>		
	Not addressed in this study.	N/A	N/A	N/A	

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTSTract name or number: Rosebud LMUState: WyomingLegal Description (T and R or metes and bounds): See Chapter 1 (table 1.1-1) for complete legal description (data as of 8/1/79)

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
1. Federal land systems	No; all of LMU is acceptable with no likely problems.	N/A	N/A	All of LMU is considered acceptable with no likely problems.
2. Rights-of-way and easements	Yes; all of LMU is acceptable with no likely problems.	Exception was applied	None	All areas become acceptable with no likely problems after exception was applied.
3. Buffer zones	No; all of LMU is acceptable with no likely problems.	Exception was applied	None	All of LMU determined to be acceptable with no likely problems.
4. Wilderness study areas	No; the LMU lies within the checkerboard; therefore, no wilderness can exist by definition.	Exception was not applied	None	All of LMU determined to be acceptable with no likely problems.
5. Scenic areas	No; there are no Class I areas within the LMU.	Exception was not applied	None	All of LMU determined to be acceptable with no likely problems.
6. Land used for scientific studies	No; there are no lands being used for scientific studies within the LMU.	Exception was not applied	None	All of LMU determined to be acceptable with no likely problems.
7. Historic lands and sites	No; there are no historic lands or sites within the LMU.	Exception was not applied	Entire LMU needs to be inventoried prior to mining.	All of LMU determined to be acceptable with inventory needs.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Rosebud LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
8. Natural Areas	No; there are no natural areas within the LMU.	Exception was not applied	None	All of LMU determined to be acceptable with no likely problems.
9. Federally listed endangered species	Yes; 6,569 acres are acceptable pending study; 36,009 acres are acceptable with inventory needs; 4,252 acres are acceptable with no likely problem before exception.	Exception was not applied pending final consultation with FWS.	Yes; more inventories for black-footed ferrets, peregrine falcons and eagle winter areas.	Final consultation with FWS necessary for final determinations.
10. State listed endangered species	STATE DOES NOT HAVE A LIST; THEREFORE, CRITERION WAS NOT APPLIED.			
11. Eagle nests	Yes; 282 acres unsuitable; 3,321 acres acceptable pending study; 15,722 acres acceptable with inventory needs and 25,505 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	Yes; more inventories for location of bald and golden eagle nests throughout the area.	Final consultation with FWS necessary to make final determinations.
12. Eagle roosts and concentration areas	Yes; 6,394 acres are acceptable pending study and 40,436 are acceptable with inventory needs.	Exception was not applied pending final consultation with FWS.	More inventories are necessary to locate eagle roost/concentration areas.	Final consultation with FWS necessary to make final determinations.

90

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTSTract name or number: Rosebud LMUState: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
13. Falcon cliff-nesting sites	Yes; 134 acres are unsuitable; 2,096 acres are acceptable pending study; 18,072 acres are acceptable with inventory needs; 24,528 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	More inventories are necessary to locate additional falcon nesting sites.	Final consultation with FWS necessary to make final determinations.
14. Migratory birds	Yes; 8,611 acres are acceptable pending study; 23,964 acres are acceptable with inventory needs; 4,252 acres are acceptable with no likely problem.	Exception was not applied pending final consultation with FWS.	More inventories are necessary.	Final consultation with FWS necessary to make final determination.
15. State resident fish & wildlife	Yes; 30,136 acres are acceptable pending study; 16,694 acres are acceptable with no likely problems.	N/A	More inventories are necessary.	Final designations are awaiting the regional environmental impact statement.
16. Flood plains	Yes; 5,077 acres are unsuitable; 1,704 acres are acceptable pending study; 40,346 acres acceptable with no likely problems before exception was applied.	Exception was applied, but no acreage figures available for final tabulation.	More studies necessary for final determination of flood plains; also field exams and peak flow data is necessary.	Final consultation with GS necessary for determinations of flood plains and hazards involved.
17. Municipal watersheds	No; all of LMU is acceptable with no likely problems.	Exception was not applied.	None needed.	All findings based on Hanna URA and MFP.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Rosebud LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
18. National resource waters	No; none of Wyoming Class I waters or proposed Class I waters are within the area. All of area within LMU is acceptable with no likely problems.	Exception was not applied.	None needed	Data obtained from Wyoming Water Quality Rules and Regulations, chapter 1, Quality Standards for Wyoming Surface Waters.
19. Alluvial valley floors	Yes; 18,463 acres are acceptable pending study; 28,187 acres are acceptable with no likely problems.	Exception was not applied as Wyoming BLM developed own criteria to follow.	Need accurate definition of alluvial valley floors and studies to determine possibilities of damage to surface and underground hydrology.	Need Wyoming concurrence on alluvial valley floors criterion; need final consultation with OSM and Wyoming DEQ
20. State proposed criteria	STATE HAS PROPOSED NO CRITERIA; THEREFORE, THIS CRITERION WAS NOT APPLIED.			

SITE-SPECIFIC MATRICES

SEMINOE II

SITE SPECIFIC SUMMARY MATRIX

I. COAL DATA

(From Tract Delineation Report)

Tract name or number: _____

State: _____

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons/year)	Case I: ~2.1 million tons; Case II: 0.7	Case I: extend mine life of existing mine 14 years; Case II: new mine, life approximately 10 years.	Medium positive	Good	
Estimated mine life (years)	Case I: extend present mine life 14 years; Case II: 10 years	Case I: extend mine life, present employment and production 14 years; Case II: new mine, employment and production 10 years.	Medium positive	Good	
Total reserves (tons in place)	Case I: 50,913,076 Case II: 10,418,300 (fed. only)	Both cases: removal of coal from reserves	Low negative	Good	Tonnage Case I includes tonnage currently leased to existing mine.
Recoverable reserves (tons)	Case I: 29,303,340 MT Case II: 7,359,370 MT (fed. only)	Case I: recovery of ~58% Case II: recovery of ~85%	Low negative	Good	
Recovery rate	Case I: 58% Case II: 85%	Case I: loss of ~42% of reserves; Case II: loss of ~15% of reserves.	Low negative	Good	Recovery rate dependent on present technology.
Type of coal (steam/metallurgical)	Subbituminous (steam)	Production of coal for power production	Medium positive	Good	
Sulfur content/ton		.8 - .9% for power uses	Production low sulfur coal	Medium positive	Good.

SITE SPECIFIC SUMMARY MATRIX

I. COAL DATA
(From Tract Delineation Report)

Tract name or number: _____

State: _____

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	Case I: 0 new Case II: 70	Case I: extend employment present 14 years; Case II: new employment of 70.	Medium positive	Good	Case II: 70 employment would carry over to mining employment.
Projected work force (mining)	Case I: 0 new Case II: 70	Case I: extend present employment 14 years; Case II: new employment of 70--10 years.	High positive	Good	
Surface ownership (federal, state, private, etc.)	Case I: 5,480 federal, 640 state, 5,320 private; Case II: 2,720 federal.	Case I: development federal, state and private; Case II: development federal only	Medium positive	Good	
Status of surface owner consent and/or consultation	Not required, no private surface/federal mineral	Both cases: development of coal reserves	Medium positive	Good	40 acres federal surface state mineral included.
Type of mine (surface/underground)	Case I: surface Case II: no existing	Case I: continue present operation; Case II: new surface			
Coal transportation needs	To be supplied by State Office				
Coal access needs	Case I: no new Case II: approximately 60 acres (2 miles)	Case I: none Case II: new rail spur	Low	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Coal markets	Utilities/public power	Both cases: production of coal for utilities	Medium positive	Good	

Other as determined
by Regional Coal
Team

Notes: ¹ Case I is where the existing operator within the LMU leases the remaining federal coal and, thus, all the reserves in the LMU are mined as an extension of the existing mine.

² Case II is where a new operator leases the unleased federal coal within the LMU. Reserves and production are based on only presently unleased federal reserves, assuming the existing operator mines the rest of the LMU reserves concurrently with the new operator.

SITE SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: _____

State: _____

Legal description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
TSP	Ambient air sampling indicates A.G.M. <30 $\mu\text{g}/\text{m}^3$	Large increases directly downwind of tract.	Violations of NAAQS and WAAQS might occur.	Good	If tract were developed concurrently with present mine, increased incidences of WAAQS and NAAQS violations would occur.
101 SO ₂ , NO ₂ , HC, O ₃ , CO	No measurements; probably very small	Very small	Insignificant (no violation of standards).	Good	None
PSD areas Class I Class II Class III	None Entire region None	None	Insignificant	Good	None
NA, AQMA	Annual average at Rawlins Airport is 26.8 miles.	Decreased visibility immediately downwind of tract.	Insignificant	Good	None
Sources of criteria pollutants	Several coal mines in near proximity to tract.	Increases in TSP concentrations might result because of proximity to tract.	Violations of NAAQS and WAAQS would occur more frequently.	Good	None

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CLIMATE</u>					
Annual precipitation	10 to 12 inches	None	None	None	None
Growing season	200 days	None	None	None	None
Airflow Patterns	Predominate wind direction W, WSW, SW. Average wind speed 12 mph (Rawlins Airport data).	None	None	None	None
Peak winds	Longest length of time with winds greater than 9 mph was 62 hours from SSW--Rawlins Airport data.	None	None	None	None
Wind erosion Potential	Moderate	Increase in potential from moderate to high	None	None	None
Inversion Stability Potential	Frequent during cool morning; dissipated by afternoon. Rawlins Airport Data: Unstable, 13%; Neutral, 58%; Stable, 29%	None	None	None	None
NOISE	20 db	Levels would increase to 130 db near some mining activities.	Significant (violation of standards)	Good	Impact of higher levels would be minimized by mandated controls.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>GEOLOGY AND MINERALS</u>					
Landslide & Rockfall	Low potential	Potential would remain low.	Low	Good	
Seismic Potential	Low potential	Potential would remain low.	Low	Good	
Other minerals	No other economic minerals known.	Possible use of sand & gravel for construction purposes; increased difficulty of geophysical exploration.	Low	Good	
Old or abandoned workings	None known				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION</u>	Approximately 6,897 acres big sagebrush; 2,729 acres mountain shrub; 121 acres greasewood.	Destruction of vegetation on acreage disturbed is shown on tables 1.1-3 and 1.1-4.	Complete loss of wildlife and livestock carrying capacity until restored by reclamation. There would be ecological differences between premining and postmining vegetation types. Also affects soil erosion, esthetics, and water qualities. See Wildlife, Land Use, Visual Resources, and Water Resources.	Acceptable	Field studies to determine the success of reclamation are currently in progress.
Reclamation Potential of the Vegetation	Low	Potential for reclamation of a vegetative cover of desirable species to meet objectives of postmining land use would be moderate, assuming a moderate reclamation potential for disturbed soils.	Assuming moderate soil reclamation potential, vegetation desirable for postmining land use could be reestablished in approximately 20 years.	Acceptable-success of current reclamation technology in restoring the premining vegetation types is highly questionable.	Field studies to determine the success of reclamation are currently in progress.
Vegetative Ground Cover and Productivity	25% and 712 lbs/acre.	Reductions of both cover and productivity to zero. Preliminary reclamation would result in a gradual increase of both elements until complete recovery in 5 to 10 years.	Same as the significance of Vegetation above.	Acceptable	Cover and productivity of vegetation could be restored easily but are not usefull in determining the success of reclamation.
Livestock Grazing	2,109 AUMs on tract used by 2 livestock operations in one grazing allotment. Several stockwater reservoirs.	Maximum losses of 33 AUMs in 1987; 63 AUMs by 1990; 162 AUMs by 1995; and 280 AUMs by end of mine life.	Proportionate reductions in the total native range controlled by 2 livestock operations up to a maximum of 3.87 and 0.07 percent.	Good	Quantifications are estimates accurate to nearest 1%.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WILDLIFE HABITAT</u>					
Aquatic	Minor resource 4 small stockwater reservoirs Hanna Draw-intermittent stream. High quality aquatic habitat 1-mile north of tract.	Destruction or disturbance of up to 4 reservoirs. Loss of habitat along 1-2 miles of Hanna Draw. Reduction in quality of adjacent habitat (see Water Resources).	Minor significance except for sage grouse (see Sage Grouse). Less than 5% decrease in carrying capacity of area habitat.	Acceptable	
Terrestrial	6,897 acres big sagebrush; 2,729 acres mountain shrub; 121 acres greasewood.	Destroyed at same rates as specified for vegetation types in Vegetation section.	Minor significance except for those wildlife species (see below) which suffer impacts of major significance. More than 5% decrease in area mountain shrub vegetation (significant for mule deer).	Acceptable success of mitigation by reclamation questionable.	Field studies to determine success of reclamation are currently in progress.
Fisheries	Non-existent	No anticipated impact.	N/A	Outstanding	
Birds					
Nongame (other than raptors)	Minor resource-very numerous.	Loss of the population on 1,645 acres of disturbed habitat.	Relatively minor - estimate <5% reduction in area populations.	Acceptable	
Raptors					
a. Golden eagle & Prairie falcons	Major resource-10 eagle nests and 4 prairie falcon nests.	Reduced nesting success. Loss of hunting habitat.	Major - 17% of eagle area breeding population and 75% of prairie falcon area breeding population would suffer more than 5% reduction of nesting success.	Acceptable	
b. Ferruginous hawks	Minor resource--1 nest.	Disturbance of 1 nest and hunting habitat.	Minor - less than 5% decrease in area population.	Acceptable	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
c. Other raptors	Major resource - 4 red-tailed hawk nests; 1 great-horned owl nest; 1 kestrel nest.	Destruction of all nests.	Minor significance - less than 5% decrease in area populations.	Acceptable	
Game Birds	Major resource, 6 to 7 grouse per square mile. Approximately 640 acres of tract overlaps possible grouse winter concentration area and approximately 5 to 6 miles of high quality brood-rearing habitat along Hanna Draw.	Minimum losses of 2 grouse in 1987; 4 by 1990; 10 by 1995; and 17 by EMOL. Insignificant effect on doves.	Major significance-more than 5% loss of area grouse population as a result of habitat disturbance.	Acceptable	
Mammals Furbearing	Minor resource - coyotes, foxes, bobcats, badgers, weasels and skunks.	Loss of population on 1,645 acres of habitat.	Minor - less than 1% decrease in area population.	Acceptable	
Nongame	Minor resource - all rodents and jackrabbits.	Loss of population on 1,645 acres of disturbed habitat.	Minor - relatively insignificant.	Outstanding	
Game a. Cottontails	Minor resource - approximately 275 per square mile.	Losses of approximately 90 in 1987; 175 by 1990; 450 by 1995; and 770 by end of mine life.	Minor-less than 1% reduction in area population.	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
b. Pronghorn	7 per square mile.	Losses of 2 head in 1987; 4 head by 1990; 10 head by 1995; and 17 head by end of mine life.	Major - more than 5% of area population would be lost.	Acceptable.	Actual losses may be higher because of habitat disturbance from mining existing leases within the LMU.
c. Mule deer	7 per square mile.	Losses of 2 head in 1987; 4 head by 1990; 10 head by 1995; and 18 head by end of mine life.	Same as above.	Acceptable	Same as above.
Sensitive Wildlife Species	None are known to exist (see raptors).	No anticipated impact.	N/A	Acceptable.	
Reptiles and Amphibians					
General	Minor tract resource. No estimates on densities.	Loss of the population on 1,645 acres of disturbed habitat.	Minor - loss of a prey base for some other wildlife species.	Acceptable	
Threatened or Endangered Wildlife Species	Insufficient data to determine presence of black-footed ferrets. Bald eagles use tract as hunting habitat.	May be an impact on black-footed ferrets; but insufficient data to assess. Loss of minor hunting habitat for eagles.	Insufficient data on which to assess. Would probably be insignificant for bald eagles.	Acceptable.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECREATION VALUES</u>					
<u>INCLUDING VRM</u>					
VRM	Mostly Class III; less 1% Class V	Reduced to Class V	Low to moderate		Rehabilitated to Class III.
Hunting	Primarily antelope and small game.	Reduced less than 1%	Low		
ORV	Incidental to hunting may increase due to increased access and number of people in Hanna Area.	Not allowed in mine area	Low		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>					
Archeological	Class II archeological surveys have been conducted on 2 sections. Two sites were located but were not recommended for further work. Over 8,220 acres have been surveyed on and adjacent to the tract.	Surface and buried sites could be destroyed on uninventoried portions of the tract.	Unknown	Good	Cultural surveys on uninventoried portions of the tract will be undertaken prior to mining.
Historical	No historical resources have been located.	Destruction of unknown sites could occur.	Unknown	Good	106 compliance will be conducted on any sites found eligible for National Register of Historic Places.
Paleontology	Few significant paleontological sites in the IMU.	None	None	Good	No comment

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>LAND USE</u>					
Oil and gas leases	7 leases cu 5300 ac.	Curtailed activity during mine life.	Low	Good	N/C
Telephone line	3½ miles	Removed or relocated.	Low	Good	N/C
Road	3½ miles	Removed or relocated.	Low	Good	N/C
Recreation	See Recreation section.				
Other minerals	See Other minerals under Minerals section.				
<u>TRANSPORTATION</u>					
Employee Transportation	I-80, U.S. 30 & 287 and S.H. 130	1. A 2% increase in traffic accidents (8 total accidents) 2. Increased maintenance costs for the affected highways.	1. Low 2. Low	1. 90% probability 2. 80% probability	
Product Transportation	U.P. railroad	No direct impacts	--	90% probability	

SITE SPECIFIC SUMMARY MATRIX
 III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: Seminole II

State: _____

Legal Description (T and R or metes and bounds): _____

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>SOCIAL AND ECONOMIC CONDITIONS</u>					
Population	Every community in the region, with the exceptions of Dixon and Rock River, has experienced steady population growth in the last decade.	Case 1: Under the baseline, every community would experience significant population growth between 1978 and 1990. However, the proposed mining action would not have a significant impact on the population of any community, with the maximum increment of 8 persons occurring in Rawlins*. Case 2: Under the baseline, every community would experience significant population growth between 1978 and 1990. In absolute terms, Rawlins would experience the most significant population impacts as a result of the proposed action (119 additional people by 1990), while in proportional terms the impacts on Walcott Junction would be the greatest (10.6 percent of the projected 1990 population would be attributable to the proposed action.	Case 1: Minor impact, too small to have significant ramifications for public services and facilities, or community cultural and social values. Case 2: Increased demand for public services and facilities. Increasing size and heterogeneity of community would affect cultural and social values of inhabitants.		*Laramie is expected to receive 17 additional inhabitants, but Laramie is situated outside the study area as defined for this study.
Economics	The three most important sources of employment in the regional	Case 1: The impact of the proposed mining action on regional employment and	Case 1: Incremental employment and income attributable to the proposed	Due to apparent differences in the data bases used, income	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Economics (contd)	economy are government, mining and trade respectively. Government and mining are similarly the most important sources of income, although trade in this case ranks fifth behind construction and TCU.	Income would be relatively small: 20 jobs and \$325,000 in additional income in both 1987 and 1990. Case 2: The proposed action would generate an additional 219 jobs over baseline levels by 1987 (138 by 1990). Additional income attributable to the proposed action would be \$3.1 million by 1987 and \$2.8 million by 1990.	action would represent less than 0.05 percent of baseline employment and under 0.05 percent of baseline income in both 1978 and 1990. Such small increments would not have any significant impacts on the employment or income. Case 2: The proposed action would generate additional employment equal to 0.5 percent of baseline employment in 1987 and 0.3 percent in 1990. Incremental income attributable to the proposed action would equal 0.4 percent of baseline income in 1987 and 0.4 percent in 1990. However, the proposed actions would have little impact on the overall situation.	and employment projections do not appear to be completely comparable with published historical data.	
Public Finance	Local communities vary widely in their fiscal condition, i.e., expenditures, revenue base and overall indebtedness.	Public finance impacts not projected in this study.	N/A	N/A	
Infrastructure	Housing in every community is currently in short supply and expensive. School capacity, on the other hand, is adequate. The hospital in Carbon County has	Case 1: The proposed action would generate the need for 5 additional housing units in Carbon County. No new school facilities would be expected due to tract development. No additional teachers or administrators	Case 1: Impacts would be minimal.	Because population projections did not differentiate among households headed by employees in different occupations, it was not possible to project a changing mix of	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<p>Infrastructure (contd)</p>	<p>a low occupancy rate. Sewage facilities are overloaded in Encampment, Rawlins, Baggs, and Saratoga. Sewage facilities are about at capacity in Hanna. Water facilities are adequate in Dixon, Medicine Bow and Saratoga. In Hanna, water facilities are about at capacity. Solid waste facilities do not meet state standards except in Rawlins where the facility has only one additional year of use remaining.</p>	<p>would be needed either. Additional capacity needs for sewage facilities would be a maximum of 0.002 mgd and for water facilities, 0.004 mgd.</p> <p>Case 2: The proposed action would generate the need for an additional 104 housing units in Carbon County, 1.6 percent above 1978 supply. No new school facilities would be needed due to tract development. Additional teachers and administrators would, however be needed. The number of hospital beds in Carbon County would remain adequate. Additional capacity would be needed in the sewage and water facilities of the communities in the region due to this proposed action. No additional solid waste facilities, not otherwise needed, would be required.</p>	<p>Case 2: Given the current housing situation, housing would be expected to remain scarce and expensive. Additional need for school personnel due to this action would be small -- two teachers for Carbon County School District #1 and no administrators in 1987 and two teachers and no administrators in 1990; one teacher and no administrators for Carbon County School District #2 in both 1987 and 1990. The need for additional sewage capacity would be a maximum of 0.005 mgd in the community and 0.066 mgd for water facilities.</p>	<p>housing types based on housing preference patterns. In addition, the assumed household size may be too large.</p>	
<p>Social Services and Public Safety</p>	<p>There is a current shortage of doctors, nurses, and mental health workers in Carbon County. Pumping capacity of firefighting equipment is adequate in each community except</p>	<p>Case 1: The proposed action would generate the need for no additional doctors, mental health workers, pumping capacity, or full time policemen. One additional nurse would be needed.</p>	<p>Case 1: Impacts would be minimal.</p>		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Social Services and Public Safety (contd)	except Elk Mountain, Hanna, Elmo, Medicine Bow, Saratoga, and Dixon. The caseload of employees of the social services agency in Carbon County is currently high. Recreation and leisure facilities are not addressed. Police services are inadequate in all but Baggs, Saratoga, and Hamsutter.	Case 2: This proposed action only generate the need for 1 additional nurse. No additional pumping capacity would be needed due to this proposed mine. No additional police officers would be required. Caseloads of the social services agency would be expected to increase but specific impacts of the mine are not addressed in this study.	Case 2: Only one additional nurse would be needed in both 1987 and 1990 due to this tract.		

Culture and Well
Being

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Agriculture					

Native Americans
and Other Minority
Groups

Not addressed in this study. N/A

N/A

N/A

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Seminole II LMU

State: Wyoming

Legal Description (T and R or metes and bounds): See Chapter 1 (table I.1-1) for complete legal description (data as of 8/1/79)

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
1. Federal land systems	No; all of LMU is acceptable with no likely problems.	N/A	N/A	All of LMU is considered acceptable with no likely problems.
2. Rights-of-way and easements	Yes; all of LMU is acceptable with no likely problems.	Exception was applied.	None	All areas became acceptable with no likely problems after exception was applied.
3. Buffer zones	No; all of LMU is acceptable with no likely problems.	Exception was applied.	None	All of LMU determined to be acceptable with no likely problems.
4. Wilderness study areas	No; the LMU lies within the checkerboard; therefore, no wilderness can exist by definition.	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
5. Scenic areas	No; there are no Class I areas within the LMU.	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
6. Land used for scientific studies	No; there are no lands being used for scientific studies within the LMU.	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
7. Historic lands and sites	No; there are no historic lands or sites within the LMU.	Exception was not applied.	Entire LMU needs to be inventoried before mining starts.	All of LMU determined to be acceptable with inventory needs.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Seminole II LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
8. Natural Areas	No; there are no natural areas within the LMU.	Exception was not applied.	None	All of LMU determined to be acceptable with no likely problems.
9. Federally listed endangered species	Yes; 6,569 acres are acceptable pending study; 36,009 acres are acceptable with inventory needs; 4,252 acres are acceptable with no likely problems before exception.	Exception was not applied pending final consultation with FWS.	Yes; more inventories for black-footed ferrets, peregrine falcons and eagle winter areas.	Final consultation with FWS necessary for final determinations.
10. State listed endangered species	STATE DOES NOT HAVE A LIST; THEREFORE, CRITERION WAS NOT APPLIED.			
11. Eagle nests	Yes; 282 acres unsuitable; 5,321 acres acceptable pending study; 15,722 acres acceptable with inventory needs; and 25,505 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	Yes; more inventories for location of bald and golden eagle nests throughout the area.	Final consultation with FWS necessary to make final determinations.
12. Eagle roosts and concentration areas	Yes; 6,394 acres are acceptable pending study and 40,436 are acceptable with inventory needs.	Exception was not applied pending final consultation with FWS.	More inventories are necessary to locate eagle roost/concentration areas.	Final consultation with FWS necessary to make final determinations.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTSTract name or number: Seminole II LMUState: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
13. Falcon cliff-nesting sites	Yes; 134 acres are unsuitable; 2,096 acres are acceptable pending study; 18,072 acres are acceptable with inventory needs; 24,528 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	More inventories are necessary to locate additional falcon nesting sites.	Final consultation with FWS necessary to make final determinations.
14. Migratory birds	Yes; 8,611 acres are acceptable pending study; 23,964 acres are acceptable with inventory needs; 4,252 acres are acceptable with no likely problems.	Exception was not applied pending final consultation with FWS.	More inventories are necessary.	Final consultation with FWS necessary to make final determination.
15. State resident fish & wildlife	Yes; 30,136 acres are acceptable pending study; 16,694 acres are acceptable with no likely problems.	N/A	More inventories are necessary.	Final determinations are awaiting the regional environmental impact statement.
16. Flood plains	Yes; 5,077 acres are unsuitable; 1,704 acres are acceptable pending study; 40,346 acres were acceptable with no likely problems before exception was applied.	Exception was applied, but no acreage figures are available for final tabulation.	More studies necessary for final determination of flood plains also field exams and peak flow data is necessary.	Final consultation with GS necessary for determinations of flood plains and hazards involved.
17. Municipal watersheds	No; all of LMU is acceptable with no likely problems.	Exception was not applied.	None needed	All findings based on Hanna URA and MFP.

SITE SPECIFIC SUMMARY MATRIX
IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: Seminole II LMU

State: Wyoming

Legal Description (T and R or metes and bounds): _____

Criterion	Applicable to tract	Exception used (if applicable)	Additional data needed	Comments
18. National resource waters	No; none of Wyoming Class I waters or proposed Class I waters are within the area. All of area within LMU is acceptable with no likely problems.	Exception was not applied.	None needed	Data obtained from Wyoming Water Quality Rules and Regulations, chapter 1, Quality Standards for Wyoming Surface Waters.
19. Alluvial valley floors	Yes; 18,463 acres are acceptable pending study; 28,187 acres are acceptable with no likely problems.	Exception was not applied as Wyoming BLM developed own criteria to follow.	Need accurate definition of alluvial valley floors and studies to determine possibilities of damage to surface and underground hydrology.	Need Wyoming concurrence on alluvial valley floors criterion; need final consultation with OSM and Wyoming DEQ.
20. State proposed criteria	STATE HAS PROPOSED NO CRITERIA; THEREFORE, THIS CRITERION WAS NOT APPLIED.			

SITE-SPECIFIC MATRICES

BELL ROCK

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: BELL ROCK

State: COLORADO

Legal description (township and range T6N, R91W, 6th P.M., Sec. 30; Lot 4, 8, T6N, R92W, Sec. 25; Lots 1, 2, N 1/2 or metes and bounds):

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	500,000				
Estimated mine life (years)	20				
Total reserves (tons in place)	46,583,000				
Recoverable reserves (tons)	11,948,000				
Recovery rate (percent)	40				
Type of coal (steam/metallurgical)	Steam				
Sulfur content (percent)	.46 - .63				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	20 - 30				
Projected work force (mining)	50 - 60				
Surface ownership (Federal, State, private, etc.)	Federal 69.21 State Private 374.19				
Status of surface owner consent and/or consultation	Not applicable - tract is proposed for underground mining.				
Type of mine (surface/underground)	Underground				
Coal transportation needs	No Data				
Coal access needs	2 - 3 miles				
Coal markets	No Data				
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: BELL ROCK

State: COLORADO

Legal description (township and range T6N, R91W, 6th P.M., Sec. 30; Lot 4,8, T6N, R92W, Sec. 25; Lots 1,2, N 1/2 or metes and bounds):

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	Williams Fork anticline adjacent to west boundary	Slight - possible drilling problems on axis of anticline.	Low	Good	
Seismic Activity	Low. No faults and no recent destructive occurrences.	None	N/A	Good	
Subsidence Potential	Low - room & pillar mining High - long wall mining	Slight - room & pillar, minor tension crack, High - long wall mining Severe subsidence could occur.	Low - room & pillar High - long wall mining	Fair	

PRELIMINARY SITE SPECIFIC MATRIX BELL ROCK TRACT Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is 22 $\mu\text{g}/\text{m}^3$. Violations exist at Craig.	Mine extension option, no emissions. New mine facilities option, annual emissions estimated at 225 tons/year. Negligible impact on concentrations	Significant	Good	Will be within standards
2. SO_2	Estimated to be very low levels	None to very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x (NO + NO_x)	Estimated to be very low levels	None to very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Unknown	None to very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Unknown	None to very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	None to very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SEPCIFIC MATRIX BELL ROCK TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I	Flattop Wilderness (44 miles), Dinosaur National Monument (44 miles)	Mine extension option, none, new mine facilities option Vistas may be slightly altered near tract	Insignificant	Fair	-
II III	All land not Class I None				
8. AQMA (Air Quality Maintenance areas)	Moffat County in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 100 miles SW)	Mine extension option, none. New mine facilities option, very localized decreases in visibility. No long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Empire Energy underground mine (2 miles S), Utah International (5 miles E), proposed lease tract Empire Energy under-	Low level of emissions will have only a negligible effect on concentrations off site	Insignificant	Good	-

PRELIMINARY SITE SPECIFIC MATRIX BELL ROCK TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
	ground mine (adjacent), proposed lease tract Isles Mountain (adjacent)				
12. Annual precipitation	11-13 inches	None	-	Good	-
13. Growing season >32°F	Approximately 94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	None	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Mine extension option, no emissions. New mine facilities option, 15 tons/year	Insignificant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-

PRELIMINARY SITE SPECIFIC MATRIX BELL ROCK TRACT
(continued)

Section II, AIR QUALITY, Page 1d

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
18. Noise	Background levels from natural causes, about 20 dB	None at tract above-ground	Insignificant	Good	-

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Potential for other Minerals	No other minerals known to occur on tract.	Slight to none.	Low	Good	
Paleontology	Fossil leaves, clams, ammonites No sig. scientific value.	Slight - destruction of fossils. Beneficial impact from additional exposure.	Low	Good	
<u>SOILS</u>					
Soil Productivity	Dryland farming and natural erosion occurring on lease area.	-Loss of 60 Acres of productivity to permanent structures. -Loss of soil to wind & water forces. -Impact to Air Quality.	Low	High ¹	¹ Data is available to assess impact, however, the areas of disturbance are not known. The analysis is on the loss of surface areas and generalizations of soil characteristics occurring in the lease area are used.
<u>WATER RESOURCES</u>					
<u>Surface Water</u>					
Types of Occurrence	All streams on the tract are ephemeral except the Yampa River which crosses the extreme south-eastern part of the tract.	Some stream channels could be disturbed by construction of plant facilities, haul roads, etc.	Very minor and short term.	Field observations	All disturbed channels would be reconstructed as required by OSM regulations.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES (cont.)</u>					
<u>Surface Water</u>					
Quantity	Surface runoff from the tract is minimal and would not be significantly impacted by mining.	Little or none on the tract. Mine effluent would increase flow in Yampa River by estimated 65-145 ac. ft/yr by 1987 and by as much as 470 ac.-ft/yr. by 1990 to end of mine life.	Minor, although any increase in flow in the Yampa and Colorado Rivers would be significant.	Field Observations.	
Quality	No change on tract.	None	None	Field Observations	
Salinity of Receiving Waters	No current salinity problem in the Yampa River. Severe salinity problem in the Colorado River; dissolved solids concentration below Hoover Dam about 68mg/l	Effects of mine effluent and increased population would increase salinity of Colorado River by 0.0029 mg/l (0.0004 percent) by 1987, by 0.0058 mg/l (0.0009 percent) from 1990 through the end of mine life and by 0.0024 mg/l (0.0004 percent) over the long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases and mine discharge to the Yampa River under a NPDES permit.	Effect of mine discharge on salinity of Colorado River would end on completion of mining.
Importance to Livestock and Wildlife	Yampa River in southeastern part of tract is only reliable source of surface water for use by livestock and wildlife.	None	None	Field Observations.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES (cont.)</u>					
<u>Surface Water</u>					
Importance to Agriculture	Surface runoff from the tract is not used locally for agricultural activities.	None	None	Field Observations	All agriculture on the tract is dryland farming.
Importance to People (individual and municipal supplies).	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 35 ac. ft/yr. by 1987 and 39 ac. ft/yr. thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Based on inferred population increases.	Any reduction in the flow of the Colorado River is a significant impact.
Erosion & Sedimentation	Steeper slopes on the tract are moderately eroding. Remainder of the tract is being dryland farmed.	Very minor. Any increased sediment yield as a result of mining and associated urbanization should be less than 0.01 ac. ft/yr.	Insignificant. Long-term sediment yield would be no more than the current rate.	Inferred from field observations and from effects of increased population.	
<u>Ground Water</u>					
Type of Occurrence	Confined (artesian) conditions in bedrock aquifers, which tend to drain toward lowest level where beds cross valley bottoms. Some perching at higher	Some subsidence and fracturing would occur in rocks overlying those coal beds mined. Extent depends on mining method. Alluvial aquifer in Yampa River	Minor. Could cause some increased circulation among deep aquifers.	Inferred from field observations, geology, and topography of tract.	Greatest fracturing and subsidence would occur if long wall method of mining is used.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES (cont.)</u>					
<u>Ground Water</u>					
Type of Occurrence	elevations. Unconfined (water table) conditions in alluvium in Yampa River Valley.	Valley would not be disturbed.			
Quantity	The only spring on the tract flows less than 1 gal/min. Total ground water discharge from the tract is estimated to be no more than 5 gal/min.	Inflow to the mine will increase progressively with increasing depth below river flow. Initial inflow estimated to be 50-100 gal/min by 1987 increasing to 200-300 gal/min after 1990 to end of mine life.	Would require discharge of 40-90 gal/min by 1987 to Yampa River under NPDES permit. Discharge would increase to estimated 290 gal/min after 1990 to end of mine life.	Estimates based on inflow currently occurring in adjacent underground mine operated by Empire Energy Corporation.	Postmining natural discharge from the tract should return to essentially premining rates.
Quality	Shallow bedrock aquifers generally yield poor-quality, high-sulfate water containing as much as 7,000 mg/l dissolved solids. Deep aquifers yield good quality sodium bicarbonate water containing about 750 mg/l dissolved solids.	Fracturing could increase downward movement of poor quality water during mining, but upward movement of water with discharge to the Yampa River would resume after mining.	Effects on the tract would be minor and short term. Mine effluent would increase salt load to Colorado River by 65-145 tons by 1987 and by as much as 470 tons/yr. from 1990 to end of mine life.	Inferred from similar operations elsewhere in western Colorado.	Impacts would largely cease on completion of mining.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
<u>Ground Water</u>					
Importance to Livestock and Wildlife	Only one small spring currently provides water for livestock and wildlife for all but the extreme southeastern part of the tract, which is watered by the Yampa River.	None. Mining should not effect the flow of the spring or the Yampa River.	None	Field observations and geology of tract.	Suitable wells for livestock and wildlife probably could be developed on the tract after mining.
Importance to Agriculture	Ground water discharge from the tract has no effect on local agriculture.	None	None	Field observations	
Importance to People (individual and municipal supplies)	The one spring on the tract is the only current source of potable water. Owner plans to install pump in deep well (converted coal-test hole) on tract.	No impact on spring. Deep well would probably be permanently impaired by mining.	Replacement deep well could be drilled after mining, if desired.	Field observations	
<u>VEGETATION</u>					
Presence of Unique, Unusual Vegetation, Tapes, Associations, & T & E Plants	<u>Penstemon yampaensis</u> occurs along the Yampa River on alluvial, sandy soil. <u>River bottom</u> is present on the tract. The Yampa River runs through a portion along the eastern boundary.	Possible destruction of a plant pop. as a result of the proposed action, possible dist. of pop. as a result of cumulative regional development. The probability is low since Bell Rock is to be an underground operation.	Low	Good-excellent	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION (cont.)</u>					
Ground Cover	Data not available to quantify.	Surface disturbance would occur on: 20 acres - On-site 35 acres - access rds 20 acres - F.L.S.T.L. Information is not avail. to determine what veg types would be disturbed.	Low	Poor	
<u>WILDLIFE</u>					
<u>Habitat</u> Total all types (no type breakdown is available--most is sagebrush.)	Acres - 422	Underground Mine Acres Disturbed: 75 - Lo neg	No chg	Good	
<u>Populations</u>	<u>Level of Use</u>				
Deer	Average	No Chg	No Chg	Good	Dependent upon location of surface facilities.
Golden Eagle	Unknown	Not assessible	Not assessible	Poor	
Great Blue Heron	Unknown	No Chg	No Chg	Poor	Dependent upon location of surface facilities.
Ducks	High	No Chg	No Chg	Good	
Nongame Birds & Mammals	Unknown	Not assessible	No Chg	Poor	
Reptiles & Amphibians	Unknown	Not assessible	No Chg	Poor	
Bald Eagle	High	Not assessible	Not assessible	Poor	
Fisheries	Average	No Chg	No Chg	Good	

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of 50 percent or more; should be confirmable within three years. ^{1/}
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>	Class III survey has been completed of 2 drill locations (approximately 2 acres). No prehistoric or historic sites/isolated finds recorded on tract.	60 percent probability of prehistoric sites/isolated finds on ridge overlooking Yampa River and unnamed drainages, and rock art shelters in outcropping rock on slopes, 30 percent probability for remainder of tract; 90 percent probability of historic sites along drainage bottoms where access is available, 10 percent probability where no access or level land is available	40 percent probability of locating sites eligible to the National Register of Historic Places.	Good-excellent	
<u>RECREATION VALUES</u>	No public access to 69.21 acres of federal owned surface. Some private hunting may be assumed.	Displace private recreation, increase recreation demand due to increased population.	Minimal on short term none on long term.	No recreation data.	Minimal to no effect on public recreation.
Visual Resource Management Class IV	Limited viewing opportunities.	Surface disturbance of 75 acres.	Minimal on short term, none on long term.	Good	Minimal effect on general public.
<u>NOISE</u>	Noise of adjacent mining activities presently exist.	Prolong or extended period of associated mine activity noise.	Minimal on short term, none on long term.	Good	Minimal to no additional impacts.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>Transportation</u>					
Employee Transportation	S.H. 13 ADT = 1,450 MPH/Capacity = .29	Increased traffic accidents.	Moderate	80 percent probability	
<u>Product Transportation</u>	S.H. 13 DRGW Railroad	Increased road maintenance. Increased hazard ratings.	Moderate - Low	85 percent probability 90 percent probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: BELL ROCK

State: COLORADO

Legal description (township and range T6N, R91W, 6th P.M., Sec. 30; Lot 4,8, T6N, R92W, Sec. 25, Lots 1, 2, N 1/2 or metes and bounds):

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	217	Low	Base: Good (1977 Census) Projections: Based on input-output model.	Proposed action impact is low but area will already be heavily impacted.
Meeker	2,976	8,494	17	Low		
Hayden	1,548	2,707	17	Low		
Total	12,239	29,475	251	Low		
<u>ECONOMICS</u>						
(Moffat, Rio Blanco, & Routt Counties)						
Employment						
Mining	1,471	7,174	50	Low	Base: medium (derived from input-output model)	Projections: USAS and model
Other	11,645	20,397	47	Low		
Total	13,116	27,571	97	Low		
Income (thousand)						
Mining	\$ 31,460	\$152,607	\$1,024	Low		
Other	126,440	210,909	513	Low		
Total	\$157,900	\$363,516	\$1,537	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
	(000)	(000)				
Counties						
Revenue	\$ 16,426					
Debt	348					
Communities						
Revenue	3,838					
Debt	671					
School districts assessed valuation	223,542					
<u>INFRASTRUCTURE</u>						
Housing:						
Craig	3,170	6,630	+ 71	Low	Base: Good (DOE publication and personal contacts with COG offices) Projections: Fair (Based on number of households projected by CSU 1/0 Model)	Trended environment will require a 136% increase in total number of housing units, development of this tract will mean an additional one percent increase.
Hayden	497	915	+ 6	Low		
Meeker	<u>774</u>	<u>2,933</u>	<u>+ 6</u>	Low		
Total	4,441	10,478	+ 83	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
School Capacity						
Craig	2,350	5,976	+ 71	Low	Base: Good (Personal contacts with each school) Projections: Fair (Assumes a continuation of 1978 student/population ratio.)	Trended environment will increase student enrollment 148% by 1995 which will necessitate a 127% increase in school capacity. Development of this tract will require an additional one percent increase in school capacity.
Hayden	875	885	+ 6	Low		
Meeker	<u>1,155</u>	<u>2,778</u>	<u>+ 5</u>	Low		
Total	4,380	9,639	+ 82	Low		
Hospital Bed Capacity						
Moffat	30	46	+ 1	Low	Base: Good (Personal contacts with each hospital) Projections: Good (Based on National Standards)	Trended environment will require an 8% increase in bed capacity, development of this tract will require an additional one percent increase.
Rouff	20	29	0	None		
Rio Blanco	<u>45</u>	<u>28</u>	<u>0</u>	None		
Total	95	103	+ 1			
Police Officers						
Craig	17	31	0	None	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 121% increase in the number of police officers in the area; development of this tract would mean no additional increase.
Hayden	3	5	0	None		
Meeker	<u>4</u>	<u>17</u>	<u>0</u>	None		
Total	24	53	0	None		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Fire Pumping Capacity						
Craig	2,800	4,127	+ 22	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean less than one percent increase.
Hayden	2,500	1,677	+ 4	Low		
Meeker	<u>1,225</u>	<u>2,812</u>	<u>+ 2</u>	Low		
Total	6,525	8,616	+ 28	Low		
Water System Capacity						
Craig	5.00	2.74	+ .03	Low	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	Craig's and Hayden's system will be able to handle the demand without problems. Meeker's system will require a 33% expansion for the trended environment; development of this tract will require an additional 5% increase.
Hayden	.64	.41	0	None		
Meeker	<u>2.88</u>	<u>3.82</u>	<u>+ .01</u>	Low		
Total	8.52	6.96	+ .04	Low		
Sewer System Capacity						
Craig	.90	3.07	+ .04	Low	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended environment will necessitate an overall 115% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional one percent increase. Nonetheless, Hayden's system will still be 54% below capacity.
Hayden	1.00	.45	+ .01	Low		
Meeker	<u>.40</u>	<u>1.43</u>	<u>0</u>			
Total	2.30	4.95	+ .05	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+ .04	Low	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 141% increase in the number of acres needed by 1995; development of this tract will require an additional one percent increase.
Hayden	.33	.57	0	None		
Meeker	<u>-.62</u>	<u>1.78</u>	<u>+ .01</u>	Low		
Total	2.57	6.19	+ .05	Low		
Social Services						
Number of Public Assistance Cases						
143 Moffat	333	665	+ 7	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population)	Trended environment will result in a 141% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional one percent increase.
Routt	269	406	0	None		
Rio Blanco	<u>167</u>	<u>322</u>	<u>+ 1</u>	Low		
Total	769	1,393	+ 8	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURE AND WELL-BEING</u>						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School, sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school and solid waste facilities will need expansion)	Low	Low	Good	
Meeker	Fair (Housing, police officers, and fire pumping capacity should be expanded)	Poor (All but hospital and solid waste facilities will have to be expanded)	Low	Low	Good	

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>NATIVE AMERICANS AND OTHER MINORITY GROUPS</u>						
Moffat County						
Spanish Surname	5.63%		Additional jobs will mean	Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90		an increase in number of	Low		
Other	.17			Low		
Total	6.77%		minority individuals, although	Low		
Routt County						
Spanish Surname	3.87%		in proportion to the entire	Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05		population.	Low		
Other	.06			Low		
Total	4.03%			Low		
Rio Blanco County						
Spanish Surname	2.50%			Low		
Black	.38			Low		
American Indian	.22			Low		
Other	.07			Low		
Total	3.17%			Low		
<u>AGRICULTURE</u>						
Moffat County	(Acres)		(Acres)		Base: Medium (1974 Census of Agriculture)	
Cropland	242,103		Loss of 275	Low		
Pasture Land	904,291		Loss of 159	Low		Impacts: Visual estimates of present land use.

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: BELL ROCK

State: COLORADO

Legal description (township and range T6N, R91W, 6th P.M., Sec. 30; Lot 4, 8, T6N, R92W, Sec. 25; Lots 1, 2, N 1/2 or metes and bounds):

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	No			
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of any sites discovered.	No site eligible to NRHP found to date.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	Yes			Bald Eagle winter area
10. State listed endangered species	No			
11. Eagle nests	Unknown		Field survey to locate nests & roosts.	
12. Eagle roosts and concentration areas	Unknown		Field survey to locate nests & roosts.	
13. Falcon cliff-nesting sites	Unknown		Field survey to locate nests & roosts.	
14. Migratory birds	Yes			Great blue heron
15. State resident fish and wildlife	Yes			Mule deer critical winter range.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	No.			
17. Municipal watersheds	No			
18. National resource waters	No.			
19. Alluvial valley floors	Yampa River Valley crosses extreme southeastern part of tract. This alluvial valley floor, however, would not be physically disturbed by the projected underground mining operations.		Final decision on the significance of alluvial valley floors and the impacts on the water supply from mining in the area must be made by OSM.	Observations and results of past mining in the area by Empire Energy Corporation indicate that underground mining on the tract should not materially damage the essential hydrologic functions of the alluvial aquifer underlying the Yampa River.
20. State proposed criteria				

SITE-SPECIFIC MATRICES

EMPIRE

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: EMPIRE

State: COLORADO

Legal description (township and range or metes and bounds): T. 5 N., R. 91 W., 6th P.M., sec 5: Lots 5-12, sec 8: lots 1-8

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	500,000				
Estimated mine life (years)	26				
Total reserves (tons in place)	34,458,372				
Recoverable reserves (tons)	13,783,350				
Recovery rate (percent)	40				
Type of coal (steam/metallurgical)	B & C Bituminous Steam				
Sulfur content (percent)	0.41 - 0.63				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	20 - 30				
Projected work force (mining)	125 - 150				
Surface ownership (Federal, State, private, etc.)	Federal 306 State 0 Private 383				
Status of surface owner consent and/or consultation	Not applicable, underground mining.				
Type of mine (surface/underground)	Underground				
Coal transportation needs	- - -				
Coal access needs	1 mile of access road				
Coal markets	- - -				
Other as determined by Regional Coal Team	- - -				

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: EMPIRE

State: COLORADO

Legal description (township and range
or metes and bounds): T. 5 N., T. 91 W., 6th P.M., sec 5: Lots 5-12, sec 8: Lots 1-8

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	No known faults. Low angles of dip.	None	None	Good	
Seismic activity	No known faults. No recorded seismic events.	None	None	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Potential for other minerals	None known on tract. Some potential for oil and gas.	None	None	Good	
Paleontology	No known fossils of unique scientific value.	Possible destruction of fossils. Beneficial impact from increased exposure.	Low	Fair	
<u>SOILS</u>					
Soil erosion potential	High - 41% Wind Moderate - 59% High - 92% Water Moderate - 8%	Loss of soil - wind and water. Erosional forces.	Low	High	Low - Significance is low because only 20 acres will be disturbed by the proposed action.
Soil reconstruction potential	Good - 0 Fair - 5% Poor - 95%	Problems with soil reconstruction and stabilization.	*. See Comments	High	* The significance of this impact by the proposed action cannot be rated because the location of surface disturbances are not known.
<u>WATER RESOURCES</u>					
<u>Surface Water</u>					
Types of occurrence	All streams on the tract are ephemeral.	Some channels could be disturbed by construction of plant and ancillary facilities.	Very minor and short-term.	Field observations.	All disturbed channels would be reconstructed as required by OSM regulations

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity	Runoff from tract is estimated to be about 29 ac-ft/yr.	Runoff from tract should not be reduced by more than 1-2 ac-ft/yr. Mine effluent would increase flow in Williams Fork River by estimated 65-145 ac-ft/yr from 1990 to end of mine life.	Minor, although any increase in flow in the Colorado River system is a significant beneficial impact.	Field observations and inferred mine effluent	
Quality 154	Probably contains less than 500 mg/l dissolved solids and is a calcium magnesium, sulfate, bicarbonate type.	None on tract.	None	Field observations.	
Salinity of receiving waters	No current salinity problem in the Yampa River. Severe salinity problem in the Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of mine effluent and increased population would increase salinity of Colorado River by 6.0019 mg/l (0.0003 percent) by 1987, by 0.0028 mg/l (0.0004 percent) from 1990 through the end of mine life and by 0.0021 mg/l (0.0003 percent) over the long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases and mine discharge to the Williams Fork River under a NPDES permit.	Effect of mine discharge on salinity of Colorado River would end on completion of mining.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to livestock and wildlife	No water sources on tract.	None.	None.	Field observations.	
Importance to agriculture	Runoff from tract is not used locally for agricultural activities No agriculture on tract	None.	None.	Field observations.	
Importance to people (individual and municipal supplies)	Surface runoff from the tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 30 ac-ft/yr by 1987, and 33 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Based on inferred population increases.	Any reduction in flow of the Colorado River is a significant impact.
Erosion and sedimentation	Tract appears to be generally stable despite steep slopes. Sediment yield from tract estimated to be no more than 0.4 ac-ft/sq mi/yr.	Very minor. Any increased sediment yield as a result of surface disturbances from mining and associated urbanization should be less than 0.01 ac-ft/yr.	Insignificant. Long-term sediment yield would be no more than the current rate.	Inferred from field observations and from effects of increased population.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>Ground Water</u> Type of occurrence	Confined (artesian) conditions in bedrock aquifers which tend to drain to the lowest level where the beds are exposed in the side slopes of the Williams Fork Valley.	Some subsidence and fracturing would occur in rocks overlying these coal beds mined. Extent depends on mining method.	Minor. Could cause some increased ground water circulation among deep aquifers.	Inferred from field observations, geology, and topography of tract.	Greatest fracturing and subsidence would occur if longwall method of mining used.
Quantity	Virtually no ground water discharge is presently occurring from the tract.	Little or no inflow to the mine is expected during the development phase prior to 1987. At full development after 1990 to end of mine life, discharge is expected to be 65-145 ac-ft/yr.	Would require discharge of 40 to 90 gal/min to Williams Fork River under NPDES permit after 1990 to end of mine life.	Estimates based on current discharge from adjacent underground mine operated by Empire Energy Corp.	Postmining natural ground water discharge from the tract should return to essentially premining rates.
Quality	Coal aquifers yield good quality water that contains about 750 mg/l dissolved solids. Water is a sodium bicarbonate type.	Mining should have no significant long-term impact on the quality of ground water discharge from the tract.	Minor and short term.	Inferred from similar operations elsewhere in western Colorado.	
Importance to livestock and wildlife	No wells or springs on the tract. Ground water on the tract is not used by livestock or wildlife.	None.	None.	Field observations.	Suitable wells for livestock and wildlife probably could be developed on the tract after mining.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to agriculture	Ground water occurrence on the tract has no effect on local agriculture.	None.	None.	Field observations.	
Importance to people (individual and municipal supplies)	Ground water on the tract is not used for individual or municipal supplies.	None.	None.	Field observations.	
<u>VEGETATION</u>					
Presence of unique, unusual vegetation types, associations, and threatened and endangered plants	No known threatened and endangered plant species on the site, however, a detailed vegetative survey has not been completed.	Possible destruction of an undiscovered threatened or endangered plant population both as a result of the proposed action and cumulative regional development.	Significant if a threatened or endangered plant population should be destroyed.	Data from NWCCSR and files of the NWCCSR.	
Ground cover	Two primary types - sagebrush and mountain shrub. One secondary type - pinyon-juniper Sagebrush - Apx 50% Mtn shrub - Apx 40% Pinyon-Juniper - Apx 2% Rock outcrop - Apx 8%	Disturbance: 20 acres, 1987 (surface facilities). 40 acres, 1987 (rights-of-way)	Insignificant if reclamation procedures are adhered to.		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECLAMATION POTENTIAL</u>					
<u>WILDLIFE</u>					
Habitat Total - All types (No breakdown available)	<u>Acres</u> 691	<u>Acres Disturbed</u> Underground mine 60 = No change	No change	Satisfactory	
Populations 1. Deer 2. Elk 3. Golden eagle 4. Non-game birds and mammals 5. Reptiles and amphibians 6. Bald eagle 7. Fisheries	<u>Level of Use</u> Average Average Unknown Unknown Unknown Average Average	No change No change Not assessible Not assessible Not assessible No change No change	No change No change Not assessible No change No change No change No change	Fair Fair Poor Poor Poor Fair Good	Dependent upon location of surface facilities.

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of ^{1/} 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>	Approximately 625 acres surveyed on a 2 class II surveys. One historic site, one prehistoric isolated find located and record	10% probability of locating prehistoric sites/isolated finds in remainder of unsurveyed area; 90% probability for historic sites along drainage bottoms and where access is available, 10% probability for remainder.	5% probability of locating sites eligible to the National Register of Historic Places.	Good.	
<u>RECREATION VALUES</u>	Limited access.	Possible loss of some assumed big-game hunting.	Minimal.	Poor.	
Visual resource management	Class IV	Surface disturbance of 40 to 60 acres adjacent to existing active strip mine.	Minimal.	Good.	
<u>NOISE</u>	Strip mining associated noise and major transportation route adjacent to proposed lease.	Extension of 18 to 26 years of mine associated noise should be less due to underground mining method versus strip mining.	Minimal.	Good.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>OTHER FACTORS AS DETERMINED BY THE REGIONAL COAL TEAM</u>					
TRANSPORTATION					
Employee transportation	Colorado Highway 13	11% increase in accidents	Moderate	80% probability	
Product transportation	Colorado Highway 13	Increase of \$10,000 in maintenance costs for Colorado Highway 13	Moderate	80% probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: EMPIRE

State: COLORADO

Legal description (township and range or metes and bounds): T. 5 N., R. 91 W., 6th P.M., sec 5: Lots 5-12, sec 8: Lots 1-8

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments		
<u>POPULATION</u>								
Craig	7,715	18,274	181	Low	Base: good (1977 Census) Projections: based on input-output model.	Proposed action impact is low, but area will already be heavily impacted.		
Meeker	2,976	8,494	15	Low				
Hayden	<u>1,548</u>	<u>2,707</u>	<u>12</u>	Low				
Total	12,239	29,475	208	Low				
<hr/>								
<u>ECONOMICS</u>								
(Moffat, Rio Blanco and Routt Counties)								
Employment								
Mining	1,471	7,174	43	Low	Base: medium (derived from input-output model) Projections: USGS and model			
Other	<u>11,645</u>	<u>20,397</u>	<u>36</u>	Low				
Total	13,116	27,571	79	Low				
Income (thousand)								
Mining	\$ 31,460	\$152,607	\$ 880	Low				
Other	<u>126,440</u>	<u>210,909</u>	<u>449</u>	Low				
Total	<u>\$157,900</u>	<u>\$363,516</u>	<u>\$1,329</u>	Low				

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
	(000)	(000)				
Counties Revenue Debt	\$ 15,297 348					
Communities Revenue Debt	3,838 671					
School districts assessed valuation	223,542					
<u>AGRICULTURE</u>						
<u>Moffat County</u>	<u>Acres</u>	<u>Acres</u>				
Crop land	242,103	None	None			Base: Medium (1974 Census of Agriculture)
Pasture land	904,291	Loss of 691	Low			Impacts: Visual estimates of present land use.

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+ 59	Low	Base: Good (DOE publication and personal contacts with COG offices) Projections: Fair (Based on number of households projected by CSU I/O Model)	Trended environment will require a 136% increase in total number of housing units, development of this tract will mean an additional one percent increase.
Hayden	497	915	+ 4	Low		
Meeker	<u>774</u>	<u>2933</u>	<u>+ 5</u>	Low		
Total	4441	10478	+ 68	Low		
School Capacity						
Craig	2350	5976	+59	Low	Base: Good (Personal contacts with each school) Projections: Fair (Assumes a continuation of 1978 student population ratio.)	Trended environment will increase student enrollment 148% by 1995 which will necessitate a 127% increase in school capacity. Development of this tract will require an additional one percent increase in school capacity.
Hayden	875	885	+ 4	Low		
Meeker	<u>1155</u>	<u>2778</u>	<u>+ 4</u>	Low		
Total	4380	9639	+ 67	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Hospital Bed Capacity						
Moffat	30	46	+ 1	Low	Base: Good (Personal contacts with each hospital) Projections: Good (Based on National Standards)	Trended environment will require an 8% increase in bed capacity; development of this tract will require an additional one percent increase.
Rouff	20	29	0	None		
Rio Blanco	<u>45</u>	<u>28</u>	<u>0</u>	None		
Total	95	103	+ 1	Low		
Police Officers						
Craig	17	31	0	None	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 12% increase in the number of police officers in the area; development of this tract would mean no additional increase.
Hayden	3	5	0	None		
Meeker	<u>4</u>	<u>17</u>	<u>0</u>	None		
Total	24	53	0	None		
Fire Pumping Capacity						
Craig	2800	4127	+ 19	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean less than one percent increase.
Hayden	2500	1677	+ 3	Low		
Meeker	<u>1225</u>	<u>2812</u>	<u>+ 2</u>	Low		
Total	6525	8616	+ 24	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Water System Capacity						
Craig	5.00	2.74	+ .03	Low	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	Craig's and Hayden's system will be able to handle the demand without problems. Meeker's system will require a 33% expansion for the trended environment; development of this tract will require an additional 5% increase.
Hayden	.64	.41	0	None		
Meeker	<u>2.88</u>	<u>3.82</u>	<u>+ .01</u>	Low		
Total	8.52	6.97	+ .04	Low		
Sewer System Capacity						
Craig	.90	3.07	+ .03	Low	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended-environment will necessitate an overall 115% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional one percent increase. Nonetheless, Hayden's system will still be 54% below capacity.
Hayden	1.00	.45	+ .01	Low		
Meeker	<u>.40</u>	<u>1.43</u>	+ 0	None		
Total	2.30	4.95	+ .04	Low		
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+ .04	Low	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 141% increase in the number of acres needed by 1995; development of this tract will require an additional one percent increase.
Hayden	.33	.57	0	None		
Meeker	<u>.62</u>	<u>1.78</u>	<u>+ .01</u>	Low		
Total	2.57	6.19	+ .05	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Social Services						
Number of Public Assistance Cases						
Moffat	333	665	+ 6	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population)	Trended environment will result in a 141% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional one percent increase.
Routt	269	406	+ 0	None		
Rio Blanco	<u>167</u>	<u>322</u>	<u>+ 1</u>	Low		
Total	769	1393	+ 7	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school and solid waste facilities will need expansion)	Low	Low	Good	
Meeker	Fair (Housing, police officers, and fire pumping capacity should be expanded)	Poor (All but hospital and solid waste facilities will have to be expanded)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Hoffat County</u>						
Spanish Surname	5.63%	Additional jobs will mean an increase in number of minority individuals, although not necessarily an increase in proportion to the entire population.	Low	Base: Good (Colorado State Planning Division)		
Black	.07		Low			
American Indian	.90		Low			
Other	.17		Low			
Total	6.77%		Low			
<u>Routt County</u>						
Spanish Surname	3.87%		Low	Impacts: Past trends in energy impacted communities.		
Black	.05		Low			
American Indian	.05		Low			
Other	.06		Low			
Total	4.03%		Low			
<u>Rio Blanco County</u>						
Spanish Surname	2.50%		Low			
Black	.38		Low			
American Indian	.22		Low			
Other	.07		Low			
Total	3.17%		Low			

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: EMPIRE

State: COLORADO

Legal description (township and range
or metes and bounds): T. 5 N., R. 91 W., 6th P.M., sec 5: Lots 5-12, sec 8: Lots 1-8

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	No			
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of any sites.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	Yes	No		Bald eagle winter area.
10. State listed endangered species	No	No		
11. Eagle nests	Unknown		Field survey to locate nests and roosts.	Status of "inactive" nest must be determined.
12. Eagle roosts and concentration areas	Unknown		Field survey to locate nests and roosts.	
13. Falcon cliff-nesting sites	Unknown		Field survey to locate nests and roosts.	
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	Yes		Deer and elk critical winter range. Game and fish buffer zone.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	No			
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	No alluvial valley floors on or adjacent to the tract.	- - -	None	Mining on the tract should have no significant impact on any alluvial valley floors downstream from the tract.
20. State proposed criteria	No			No input received from state.

SITE-SPECIFIC MATRICES

GRASSY CREEK

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: GRASSY CREEK

State: COLORADO

Legal description (township and range or metes and bounds): T5N, R97W, 6th P.M., Sec. 20: S $\frac{1}{2}$ NE $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, Sec. 29: NE $\frac{1}{4}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 32: Lots 3, 4, NW $\frac{1}{4}$

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	225,400				
Estimated mine life (years)	10				
Total reserves (tons in place)	2,652,000				
Recoverable reserves (tons)	2,254,200				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	Steam				
Sulfur content (percent)	0.9				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	--				
Projected work force (mining)	17				
Surface ownership (Federal, State, private, etc.)	Federal - 40 State - 0 Private -720				
Status of surface owner consent and/or consultation	Mostly no reply during consultation, one negative reply.				
Type of mine (surface/underground)	Surface				
Coal transportation needs	N/A				
Coal access needs	N/A				
Coal markets	N/A				
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: GRASSY CREEK

State: COLORADO

Legal description (township and range or metes and bounds): T5N, R97W, 6th P.M., Sec. 20: S₂NE₄, W₂SE₄, E₂SW₄, Sec. 29: NE_{1/4}NW₄, SW_{1/4}NW₄, E₂SW₄, NW₄SW₄, SW₄SW₄, Sec. 32: Lots 3, 4, NW₄

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	Present situation high steep cliffs, supported by massive sandstones. Relatively flat gently sloping dip slopes (6-10°).	None.	Low	Good	
Seismic Activity	No faults. No known seismic events in area.	None.	Low	Good	
Potential For Other Minerals	No known occurrences on tract. Remote possibility for oil & gas.	None.	Low	Good	

PRELIMINARY SITE SPECIFIC MATRIX GRASSY CREEK TRACT Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is 22 $\mu\text{g}/\text{m}^3$. No violations of standards monitored nearby	Annual emissions estimated at 165 tons/year increasing concentrations from 0-5 $\mu\text{g}/\text{m}^3$. Impact diminishes within one-half mile of tract	Significant	Good	Will be within standards
2. SO_2	Very low levels (5-11 ppbv) at several locations N of Hayden (8-10 miles N of tract)	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO}_x + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX GRASSY CREEK TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (24 miles S), Mount Zirkel (30 miles N) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Routt County in AQCR 12	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 120 miles SW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Future Rockcastle strip mine (1 mile NE), Future Peabody Seneca strip mine (3 miles W)	Low level of emissions will have only a negligible effect on concentrations off site	Insignificant	Fair	-
12. Annual precipitation	13-16 inches	None	-	Good	-
13. Growing season >32°F	Approximately 76-94 days	None	-	Good	-

PRELIMINARY SITE SPECIFIC MATRIX GRASSY CREEK TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
14. Airflow patterns (surface)	Predominate winds from the S. Annual average windspeed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 30 tons/year	Insignificant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Possible Occurrence of Significant Paleontological Resources	None recorded to date. No known fossils of rare or unique scientific value.	Possible destruction by mining.	Low	Fair	
<u>SOIL</u> Soil Reconstruction Potential	Area contains slopes in excess of 15%.	1- Problems with reconstruction and stabilization. Due to steep slopes. 2- Loss of soil productivity (228 ac) under the proposed action.	High	Low ¹	¹ Data reliability is low because data available is too general. This area has been contracted by SCS to complete a 3rd order survey and it should be available in January of 1980.
<u>SURFACE WATER</u> Types of Occurrence	Grassy Creek is intermittent in southern part of tract and perennial in discontinuous reaches in northern part of tract. All other streams on tract are ephemeral.	Should have no significant effect on channels on Grassy Creek. Ephemeral stream channels in mined area would be reconstructed.	Very Minor	Field Observations.	All disturbed channels would be reconstructed as required by OSM Regulations.
Quantity	Runoff from the tract probably does not exceed 0.5 inch/yr or about 32 ac-ft/yr. Most of this runoff probably reaches the Yampa River.	Runoff to the Yampa River probably would be reduced by 5 to 20 ac-ft/yr during mining.	Minor and short term. After reclamation runoff from the tract should approximate premining rates.	Inferred from field observations and results of similar operations at nearby mines.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quality	Low flow in Grassy Creek contains about 500 mg/l dissolved solids and ph of 8.2-8.3. No data on high flow, but probably contains less than 500 mg/l dissolved solids.	No significant effect during mining. Leaching of spoils would probably increase salt load to Yampa and Colorado Rivers by about 155 tons/yr over the long term.	No significant impact on aquatic biology of Grassy Creek, Yampa River or Colorado River but would increase salinity of Colorado River.	Inferred from field observations and water quality measurements on low flow in Grassy Creek.	No acid water problems are expected as a result of mining.
Salinity of Receiving Waters	No current salinity problem in Yampa River. Severe salinity problem in Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of mining and increase population would increase salinity of Colorado River by 0.0002 percent by 1987 through the end of mine life and by 0.0012 percent over the long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Moderate. Based on inferred population increases, consumptive use of water by mining and effects of long term leaching of spoils aquifer.	Principal cause of long-term increase in salinity is leaching of reclaimed spoils in mined area.
Importance to Livestock and Wildlife	Perennial flow provides permanent source of water in northern part of tract. Reservoirs provide seasonal water in southern part of tract.	Little or none. No reservoirs would be removed by mining.	Very minor. Sedimentation ponds would provide additional water during mining.	Field observations.	
Importance to Agriculture	No agriculture on or adjacent to the tract.	None.	None.	Field observations	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to People (Individual and Municipal Supplies)	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use on Yampa River water by increased population would be about 5 ac-ft/yr by 1987 and 12 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Moderate. Based on inferred population increases.	Any reduction in flow in the Colorado River is a significant impact.
Erosion and Sedimentation	Tract appears to be very stable except for erosion along existing haulroads. Estimated sediment yield is less than 0.1 ac-ft/yr for first few years after construction.	Increased sediment yield as a result of mining and associated urbanization should be less than 0.01 ac-ft/yr for first few years after construction.	Insignificant. Long term sediment yield would probably be no more than the current low rate.	Inferred from field observations and from effects of increased population.	
<u>GROUND WATER</u>					
Type of Occurrence	Confined (artesian) conditions in bedrock aquifers, which tend to drain towards lowest level where beds cross valley bottoms. Unconfined (water table) conditions in alluvium in Grassy Creek valley.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer characterized by unconfined conditions. Alluvial aquifer in Grassy Creek valley would not be disturbed.	Would require future wells in mined areas to be about 100-200 ft deeper with corresponding higher pumping lifts. New springs may form in valley bottoms near eastern margin of mined area.	Inferred from field observations, geology, and topography of tract.	The combined yield of possible new springs probably would not exceed 10 gal/min.
Quantity	The only spring on the tract flows about 1 gal/min. Total discharge from the tract is estimated to be 15-20 gal/min.	Probably insufficient inflow to the pit for mining operations.	Minor. Supplemented water for mine use (5-20 ac-ft/yr) could be obtained from Grassy Creek, which is the source of water used by nearby mining operations.	Inferred from field observations and geology of tract. No quantitative data are available for this ground area.	Postmining discharge from the tract is expected to be at least 15 ac-ft/yr more than before mining because of greater permeability of spoils.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quality	Bedrock aquifers and alluvium both yield water containing about 500 mg/l dissolved solids. Water is probably a calcium, magnesium, sulfate type.	Leaching of reclaimed spoil materials would probably increase dissolved solids concentration in the mined area to about 1,500-2,000 mg/l.	No significant impact on use of water by livestock and wildlife, but long term increase in salt load to Yampa and Colorado Rivers is estimated to be 100-130 tons/yr.	Inferred from similar operations of nearby mines and from field measurements of specific conductance of water samples.	See surface water for effect on salinity of Colorado River.
Importance to Livestock and Wildlife	Only one small spring on the tract. However, perennial flow in discontinuous reaches of Grassy Creek is fed by underflow in the alluvial aquifer. Principal source of water for livestock and wildlife.	Spring will probably cease to flow soon after mining commences. Perennial flow in Grassy Creek should continue to provide ample water for livestock and wildlife.	Very minor. Spring is on west side of valley near Grassy Creek. Nearby stream would provide alternate source of water.	Field observations.	Suitable wells could be developed for livestock and wildlife on the tract after mining.
Importance to Agriculture	No agriculture on or adjacent to the tract.	None.	None.	Field observations.	
Importance to People (Individual and Municipal Supplies)	Ground water on or discharging from the tract is not used for any domestic supplies.	None	None	Field observations.	
<u>VEGETATION</u>					
Presence of Unique, Unusual Vegetation, Types, Associations, and T/E Plants.	Negative. No T/E plant population are known to inhabit the immediate area.	Possible destruction of a T/E plant population.		Poor. Not much work has been done in this area.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Ground Cover	Data is not available to quantify the vegetation types.	Vegetation loss for mine site: 1978- 17ac; 1990- 54 ac; 1995- 119 ac; 2000- 170 ac; off-site vegetation loss 7.8 peak/imp. pop. growth. An unquantifiable amt. would be lost as a result of a powerline & telephone line. Mag. cannot be determined presently.		Fair	Most of information taken from Final Environmental Statement Northwest Co Coal Site Spec. Analysis Des. of environ. Peabody Coal Co. Pp II 18-20.
<u>WILDLIFE</u>					
Habitat No type breakdown available. Most is Mt. Shrub.	Acres 760 total	1977 390 High Negative	No change	Good	20 year revegetation time.
Populations	Level of Use				
Deer	Average	No change	No change	Good	
Elk	Average	No change	No change	Good	
Blue Grouse	Average	No change	No change	Good	
Beaver	Unknown	Not assessible	No change	Poor	
Nongame Birds and Mammals	Unknown	Not assessible	No change	Poor	
Reptiles & amphibian	Unknown	Not assessible	No change	Poor	
Raptors	Unknown	Not assessible	Low negative	Poor	
Waterfowl	Unknown	Not assessible	No change	Poor	
T/E	None occur				
Fisheries	None occur				

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of ^{1/} 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECREATION VALUES</u>	No public access only 40 acres of federal surface ownership, some private recreation.	Displace private recreation.	Minimal on short term, none on long term base	No recreation data.	No effect on public recreation.
VRM Class IV	Seldom seen area, no public viewing corridor.	Disturbance to 250 to 300 acres of landscape.	Minimal on short term, none on long term basis.	Good.	No effect on general public.
<u>NOISE</u>	Noises are now associated with mining activities adjacent to proposed lease site.	A prolonged or extended period of mine associated noise.	Minimal on short term, none on long term base.	Good	No additional effects.
<u>CULTURAL/HISTORICAL VALUES</u>	No survey has been conducted for cultural values. No prehistoric or historic sites have been recorded on the tract or are known to be present.	30-40% probability of prehistoric sites/isolated finds on ridges	20% probability that sites eligible to the NRHP will found.	Excellent (other surveys have been completed in this area and this analysis is based on these).	
Employee Transportation		1% increase in traffic accidents.	Moderate	80% probability	
Product Transportation		Increase in road maintenance of \$6,700.	Moderate	85% probability.	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: GRASEY CREEK

State: COLORADO

Legal description (township and range

or metes and bounds): T5N, R97W, 6th P.M., Sec. 20: S $\frac{1}{2}$ N $\frac{1}{2}$ E $\frac{1}{2}$, W $\frac{1}{2}$ S $\frac{1}{2}$ E $\frac{1}{2}$, E $\frac{1}{2}$ S $\frac{1}{2}$ W $\frac{1}{2}$, Sec. 29: NE $\frac{1}{4}$ N $\frac{1}{2}$ E $\frac{1}{2}$, SW $\frac{1}{4}$ N $\frac{1}{2}$ E $\frac{1}{2}$, E $\frac{1}{2}$ S $\frac{1}{2}$ W $\frac{1}{2}$, NW $\frac{1}{4}$ S $\frac{1}{2}$ W $\frac{1}{2}$, SW $\frac{1}{4}$ S $\frac{1}{2}$ W $\frac{1}{2}$, Sec. 32: Lots 3, 4, NW $\frac{1}{4}$

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments	
<u>POPULATION</u>							
Craig	7,715	18,274	40	Low	Base: good (1977 Census) Projections: based on input-output model	Proposed action impact is low, but area will already be heavily impacted.	
Hayden	1,548	2,707	16	Low			
Oak Creek	792	1,257	6	Low			
Steamboat Springs	<u>4,780</u>	<u>12,100</u>	<u>16</u>	Low			
Total	14,835	34,338	78				
<u>ECONOMICS</u>							
(Moffat and Routt Counties)					Base: medium (derived from input-output model)		
Employment							Projections: USGS and model
Mining	1,001	2,060	17	Low			
Other	<u>8,784</u>	<u>15,902</u>	<u>14</u>	Low			
Total	9,785	17,962	31	Low			
Income (thousand)							
Mining	\$ 20,506	\$ 42,201	\$ 348	Low			
Other	<u>88,728</u>	<u>164,454</u>	<u>160</u>	Low			
Total	\$109,234	\$206,655	\$ 508	Low			

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>	(000)	(000)				
Counties Revenue Debt	\$ 12,095 348					
Communities Revenue Debt	7,179 4,391					
School districts assessed valuation	278,681					

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+13	Low	Base: Good (DOE publication and personal contacts with COG offices) Projections: Fair (Based on number of households projected by CSU I/O Model)	Trended environment will require an 80% increase in total number of housing units, development of this tract will mean less than a one percent increase.
Hayden	497	915	+ 5	Low		
Oak Creek	479	429	+ 2	Low		
Steamboat Springs	<u>2577</u>	<u>4129</u>	<u>+ 5</u>	Low		
Total	6723	12103	+25	Low		
School Capacity						
Craig	2350	5976	+13	Low	Base: Good (Personal contacts with each school) Projections: Fair (Assumes a continuation of 1978 student population ratio.)	Trended environment will increase student enrollment 123% by 1995 which will necessitate a 123% increase in school capacity. Development of this tract will require less than a one percent increase in school capacity.
Hayden	875	885	+ 5	Low		
Oak Creek	510	524	+ 2	Low		
Steamboat Springs	<u>1355</u>	<u>3957</u>	<u>+ 5</u>	Low		
Total	5090	11342	+25	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Hospital Bed Capacity						
Moffat	30	46	0	None	Base: Good (Personal contacts with each hospital) Projections: Good (Based on National Standards)	Trended environment will require a 50% increase in bed capacity; development of this tract will require no additional increase.
Rouff	<u>20</u>	<u>29</u>	<u>0</u>	None		
Total	50	75	0	None		
Police Officers						
Craig	17	31	0	None	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 71% increase in the number of police officers in the area; development of this tract would require no additional increase.
Hayden	3	5	0	None		
Oak Creek	1	3	0	None		
Steamboat Springs	<u>14</u>	<u>21</u>	<u>0</u>	None		
Total	35	60	0	None		
Fire Pumping Capacity						
Craig	2800	4127	+ 4	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean a less than one percent increase.
Hayden	2500	1677	+ 4	Low		
Oak Creek	1250	1129	+ 3	Low		
Steamboat Springs	<u>1250</u>	<u>3350</u>	<u>+ 3</u>	Low		
Total	7800	10283	+14	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Water System Capacity						
Craig	5.00	2.74	+0.01	Low	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	Each community's system will easily be able to handle the increased demand resulting from the trended environment and development of this tract.
Hayden	.64	.41	0	None		
Oak Creek	.72	.19	0	None		
Steamboat Springs	<u>2.46</u>	<u>1.82</u>	<u>0</u>	None		
Total	8.82	-5.16	+0.01	Low		
Sewer System Capacity						
Craig	.90	3.07	+0.01	Low	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended environment will necessitate an overall 22% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional one percent increase. Nonetheless, Hayden's system will still be 54% below capacity.
Hayden	1.00	.45	+0.01	Low		
Oak Creek	.25	.21	0	None		
Steamboat Springs	<u>2.58</u>	<u>2.03</u>	<u>+0.01</u>	Low		
Total	4.73	5.76	+0.03	Low		
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+0.01	Low	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 131% increase in the number of acres needed by 1995, development of this tract will require less than a one percent increase.
Hayden	.33	.57	0	None		
Oak Creek	.17	.26	+0.01	Medium		
Steamboat Springs	<u>1.00</u>	<u>2.54</u>	<u>0</u>	None		
Total	3.12	7.21	+0.02	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Social Services Number of Public Assistance Cases						
Moffat	333	665	+ 1	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population)	Trended environment will result in a 78% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean no additional percentage increase.
Routt	<u>269</u>	<u>406</u>	<u>+ 1</u>	Low		
Total	602	1071	+ 2	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school, and solid waste facilities will need expansion)	Low	Low	Good	
Steamboat Springs	Fair (School, hospital, solid waste facilities, and fire pumping capacity should be expanded)	Fair (Housing, school, hospital, fire pumping capacity, police officers and solid waste facilities will require expansion)	Low	Low	Good	
Oak Creek	Good (Sewer system needs expansion as does police department and hospital bed capacity)	Good (School, hospital, and number of police officers will need additions)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%	Additional jobs will mean an increase in numbers of minority individuals, although not necessarily an increase in proportion to the entire population.		Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90			Low		
Other	.17			Low		
Total	6.77%			Low		
<u>Routt County</u>						
Spanish Surname	3.87%			Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05			Low		
Other	.06			Low		
Total	4.03%			Low		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AGRICULTURE</u>					
<u>Routt County</u>	(acres)	(acres)			
Crop Land	166,147	None	None	Base: medium (1974 Census of Agriculture) Impacts: visual estimates of present land use	
Pasture Land	484,238	Loss of 760	Low		

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: GRASSY CREEK

State: COLORADO

Legal description (township and range or metes and bounds): T5N, R97W, 6th P.M., Sec. 20: S₁NE₄, W₁SE₄, E₂SW₄, Sec. 29: NE₁NE₄, S₁E₁NE₄, E₂SW₄, NW₁SW₄, SW₁SW₄, Sec. 32: Lots 3, 4, NW₄

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	No			
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of any sites.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	No			
10. State listed endangered species	No			
11. Eagle nests	Unknown			No data
12. Eagle roosts and concentration areas	Unknown			No data
13. Falcon cliff-nesting sites	Unknown			No data
14. Migratory birds	Unknown			No data
15. State resident fish and wildlife	Yes	No		Deer and elk critical winter range—Coordination with DCW necessary.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains.	Yes	Yes-No threat to lives or property		Flood plain parallels Grassy Creek proper.
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	The bottom of Grassy Creek valley, which has perennial flow in discontinuous reaches in the northern part of the tract and local subirrigation in the southern part of the tract, is a possible alluvial valley floor. The bottom of Grassy Creek valley would not be physically disturbed by mining.		Final decision on alluvial valley floors and possible impacts on the water supply from mining upstream must be evaluated by OSM.	Observations indicate that mining on the tract in the area immediately west of Grassy Creek valley should have no significant impact on this possible alluvial valley floor provided that the alluvial aquifer is not physically disturbed..
20. State proposed criteria	No			No information received from state of Colorado.

SITE-SPECIFIC MATRICES

DANFORTH HILLS #1

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: DANFORTH HILLS #1

State: COLORADO

Legal description (township and range
or metes and bounds): See Site-Specific Analysis

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	1,141,000				
Estimated mine life (years)	30				
Total reserves (tons in place)	40,277,520				
Recoverable reserves (tons)	34,235,890				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	Steam C Bituminous				
Sulfur content (percent)	.41				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	30 - 50				
Projected work force (mining)	90				
Surface ownership (Federal, State, private, etc.)	Federal 0 State 0 Private 879.71				
Status of surface owner consent and/or consultation	No reply from consultation during MFP process.				
Type of mine (surface/underground)	Surface				
Coal transportation needs	- - -				
Coal access needs	10 - 20 miles				
Coal markets	- - -				
Other as determined by Regional Coal Team	- - -				

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: DANFORTH HILLS #1

State: COLORADO

Legal description (township and range
or metes and bounds): See Site-Specific Analysis

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
AIR QUALITY					
GEOLOGY AND MINERALS					
Geologic hazards	Low potential	None	Low	Good	
Seismic activity	Low. No faulting evident. No recent destructive occurrences	None	N/A	Good	
Subsidence potential	Low angle of dip (5°) competent formations.	None	Low	Good	

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 1 TRACT
Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is $22 \mu\text{g}/\text{m}^3$. No violations of standard nearby	Annual emissions estimated at 160 tons/year increasing concentrations from $0-5 \mu\text{g}/\text{m}^3$. Impact diminishes within one-half mile of tract	Significant	Good	Concentrations from tract within standards. Combined concentrations from other proposed lease tracts may approach standards
2. SO_2	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO} + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Levels approaching standard measured in Rio Blanco County (tract adjacent to county)	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Levels approaching standard measured in Rio Blanco County	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 1 TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (41 miles SE), Dinosaur National Monument (40 miles NW) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Moffat and Rio Blanco Counties in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 60 miles SW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Proposed lease tracts Danforth Hills 1 and 3 strip mine (adjacent), Colowyo strip mine (5 miles NE)	Concentrations will be increased by adjacent Danforth Hills 1 and 3 strip mines	Possibly significant	Fair	-
12. Annual precipitation	11-13 inches	None	-	Good	-

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 1 TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
13. Growing season >32°F	Approximately 94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 45 tons/year	Insignificant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Potential for other minerals	Oil and gas fields on domal structure - Wilson Creek, five miles away, Iles Dome six miles away, Thornburg Dome, seven miles away. No occurrence on tract.	Low. Remote possibility of encountering oil and gas on tract.	Low	Good	
Paleontology	Fragmented dinosaur bones, fossil imprints, plants, clams, ammonites. No unusual scientific value.	Low. Possible destruction by mining. Beneficial impact from additional exposure.	Low	Fair	
<u>SOILS</u>					
Soil erosion potential	High - 23% Wind-Moderate - 58% Slight Mod. - 19% High - 100% Water	Loss of soil - water Loss of soil - wind Impact to air quality	Moderate	High	Moderate - Significance of erosion would be reduced by OSM regulations at mine plan review.
Soil reconstruction potential	Poor (810 acres)	Severe problems with soil reconstruction and stabilization.	High	High	High - Revegetation would be difficult and costly on all of the mined area. Top dressing would be needed to establish and maintain vegetation.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
WATER RESOURCES					
<u>Surface Water</u>					
Types of occurrence	All streams on the tract are small and ephemeral. Channel gradients are very steep, averaging 400-2,800 ft/mi.	All channels would be removed and must be reconstructed.	Minor, provided that stable channels can be reconstructed on such steep gradients.	Field observations.	All stream channels would be reconstructed to standards established by OSM Regulations.
Quantity	Runoff from tract estimated to be about 0.39 inch or about 27 ac-ft/yr. Most of this runoff is probably dissipated by evapotranspiration downstream before reaching Yampa River.	Runoff to Good Spring Creek should be reduced by no more than 25 ac-ft/yr as a result of mining on the tract.	Minor and short-term. After reclamation, runoff from the tract should return to approximately premining rates.	Inferred from field observations and from similar operations at other surface coal mines in northwestern Colorado.	Because of inferred losses downstream, use of water on the tract would not necessarily reduce water yield to the Yampa River.
Quality	Surface runoff probably contains less than 500 mg/l dissolved solids and is a magnesium, calcium, sulfate, bicarbonate type.	No significant effect during mining. Leaching of spoils would probably increase salt load to the Yampa and Colorado Rivers by about 50 tons/yr over the long-term.	No significant impact on aquatic biology of receiving waters, but would increase salinity of Colorado River.	Inferred from field observations and water quality measurements.	No acid water problems are expected as a result of mining.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Salinity of receiving waters	No current salinity problem in Yampa River; severe salinity problem in Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of mining and increased population would increase salinity of Colorado River by 0.0003 percent by 1987, by 0.0006 percent from 1990 to end of mine life, and by 0.0014 percent over the long-term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases and post-mining leaching of the spoils aquifer.	Principal cause of long-term increase in salinity is leaching of reclaimed spoils in the mined area.
Importance to livestock and wildlife	Seasonal water provided by two small reservoirs.	The two existing reservoirs on the tract would be removed by mining.	Very minor. Sedimentation ponds should provide alternate source of water during mining.	Field observations.	If desired, reservoirs could be reconstructed as part of reclamation plans.
Importance to agriculture	No agriculture on tract. Hay meadows in nearby Good Spring Creek Valley are not dependent on runoff from the tract.	None.	None.	Field observations.	
Importance to people (individual and municipal supplies)	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 25 ac-ft/yr by 1987, and 66 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Based on inferred population increases from mining.	Any reduction in flow in the Colorado River is a significant impact.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Erosion and sedimentation	Tract appears to be very stable, except for erosion along existing unimproved roads. Estimated sediment yield from tract is 0.1 - 0.2 ac-ft/yr.	Any change in sediment yield as a result of mining and associated urbanization would be less than 0.1 ac-ft/yr assuming that reclamation is successful.	Insignificant, provided that reclamation effectively stabilizes the steep slopes along the east side of the tract.	Based on field observations and inferred effects of increased population.	If reclamation of steep slopes is not successful, erosion and sediment yield could be 10 times premining rate.
<u>Ground Water</u> Type of occurrence	Perched conditions in bedrock aquifers above level of Good Spring Creek Valley and confined (artesian) conditions below that level. No alluvial aquifers on the tract.	Bedrock aquifers in the mined area would be replaced with more permeable spoils aquifer. Perched conditions would be replaced with unconfined (water-table) conditions in spoils aquifer.	Would require future wells in the mined area to be about 350 feet deeper with correspondingly higher pumping lifts.	Moderate. Inferred from field observations, well data, and geology of tract.	
Quantity	Total ground-water discharge from the tract is estimated to be no more than 5 gal/min.	All ground water discharge would cease during mining. After reclamation, discharge from the tract should increase to as much as 15-20 gal/min.	Very minor.	Inferred from field observations and geology of tract.	Ground water discharge from tract after reclamation would be into reclaimed spoils in the area now being mined by Colowyo Coal Co.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quality	Perched aquifers yield magnesium, calcium sulfate water containing 475-1,000 mg/l dissolved solids. Confined deep aquifers yield sodium bicarbonate water with about 500 mg/l dissolved solids.	Leaching of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 2,000 mg/l.	Would have no significant effect on use of water by livestock and wildlife, but long-term increase in salt load to Yampa and Colorado Rivers is estimated to be about 50 tons/yr.	Inferred from similar operations in the Yampa Coal Field and from field measurements of specific conductance of water samples.	See Surface Water for effect of spoils leachate on salinity of Colorado River.
Importance to livestock and wildlife	Only one unused well exists on the tract. A small spring flowing less than one gal/min occurs immediately north of the tract.	Well would be destroyed. Spring would be destroyed by ongoing Colowyo Mine.	Moderate. Existing well could be used as source of water once spring is destroyed by Colowyo Mine.	Field observations.	Replacement well could be obtained by drilling to depth of about 450 feet.
Importance to agriculture	No agriculture on the tract. Hay meadows exist on bottom of nearby Good Springs Creek Valley.	None.	None.	Field observations.	Hay meadows in Good Spring Valley are not dependent on ground-water discharge from the tract.
Importance to people (individual and municipal supplies)	Ground water on or discharging from the tract is not used for any domestic supplies.	None.	None.	Field observations.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments																																																						
VEGETATION Presence of unique, unusual vegetation, types, associations, and threatened and endangered plants	No threatened or endangered plant species are known to inhabit the area. A field survey has not been done to date.	Possible destruction of threatened and endangered plant population as a result of the proposed action. Possible destruction of threatened and endangered plant population as a result of cumulative regional development, and outdoor recreational vehicle use.	Unknown	Extensive herbarium work done at Colorado State University, Fort Collins, CO, Colorado University, Boulder, CO, and University of Wyoming, Laramie, WY. Plant Information Network, C.S.U., Fort Collins, CO.	Mitigation possible. Field survey to determine presence or absence of threatened and endangered. Effectiveness of mitigation High.																																																						
Ground cover	<table border="0"> <tr> <td>Sagebrush</td> <td>35%</td> <td>(305 ac)</td> </tr> <tr> <td>Mt. Shrub</td> <td>47%</td> <td>(415 ac)</td> </tr> <tr> <td>P-J</td> <td>11%</td> <td>(95 ac)</td> </tr> <tr> <td>Aspen</td> <td>5%</td> <td>(45 ac)</td> </tr> <tr> <td>Riverbottom</td> <td>2%</td> <td>(15 ac)</td> </tr> <tr> <td colspan="3"><u>% Ground Cover</u></td> </tr> <tr> <td>Sagebrush</td> <td>62.5%</td> <td></td> </tr> <tr> <td>Mt. Shrub</td> <td>85.0%</td> <td></td> </tr> <tr> <td>P-J</td> <td>15.0%</td> <td></td> </tr> <tr> <td>Aspen</td> <td>85.0%</td> <td></td> </tr> <tr> <td>Riverbottom</td> <td>97.5%</td> <td></td> </tr> <tr> <td colspan="3">Total average ground cover 69 %</td> </tr> </table>	Sagebrush	35%	(305 ac)	Mt. Shrub	47%	(415 ac)	P-J	11%	(95 ac)	Aspen	5%	(45 ac)	Riverbottom	2%	(15 ac)	<u>% Ground Cover</u>			Sagebrush	62.5%		Mt. Shrub	85.0%		P-J	15.0%		Aspen	85.0%		Riverbottom	97.5%		Total average ground cover 69 %			<table border="0"> <tr> <td colspan="2">Vegetation Loss - Mine site</td> </tr> <tr> <td>Sagebrush</td> <td>49% (395 ac)</td> </tr> <tr> <td>Mt. Shrub</td> <td>37% (300 ac)</td> </tr> <tr> <td>P-J</td> <td>10% (85 ac)</td> </tr> <tr> <td>Aspen</td> <td>4% (30 ac)</td> </tr> <tr> <td>Riverbottom</td> <td>-- -- --</td> </tr> <tr> <td colspan="2">200-400 ac Facilities</td> </tr> <tr> <td colspan="2">80-100 ac Haul Roads</td> </tr> <tr> <td colspan="2">Both locations not supplied in tract delineation report. Impact not determinable. Data N/A to determine vegetation loss for telephone line.</td> </tr> </table>	Vegetation Loss - Mine site		Sagebrush	49% (395 ac)	Mt. Shrub	37% (300 ac)	P-J	10% (85 ac)	Aspen	4% (30 ac)	Riverbottom	-- -- --	200-400 ac Facilities		80-100 ac Haul Roads		Both locations not supplied in tract delineation report. Impact not determinable. Data N/A to determine vegetation loss for telephone line.			Moderate. Pieper, Rex 1) Measurements Techniques for Herbaceous and Shrubby Vegetation Chapter IV, Measuring Cover, page 72. Perkins, 10/77. Short-term-1 Chapter 2, Ranger Spec. Professional judgment based on field exams in area around Colowyo Coal Co.	Mitigation possible - reclamation. Effectiveness of mitigation would be high after a period of time and if reclamation is successful.
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Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments																										
<u>RECLAMATION POTENTIAL</u>																															
<u>WILDLIFE</u>																															
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Populations	<u>Level of Use</u>																														
1. Deer	Average	Moderate negative	Low negative	Good																											
2. Elk	Average	Moderate negative	Low negative	Good																											
3. Blue and Sage grouse	Average	Local = Low negative County = No change	No change	Good																											
4. Beaver	Average	Local = Low negative	No change	Good																											
5. Non-game birds and mammals	Unknown	Not assessible	No change	Poor																											
6. Reptiles and amphibians	Unknown	Not assessible	No change	Poor																											
7. Raptors	Unknown	Not assessible	Low negative	Poor																											
8. Waterfowl	Low	Low negative	No change	Good																											
9. Threatened or endangered	None occur	- - -	- - -	- - -																											
10. Fisheries	None occur	- - -	- - -	- - -																											

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE

Term	Definition
High positive	* Increase in parametric value of 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

* Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>	Approximately 330 acres surveyed on a class III survey. No prehistoric or historic sites located and recorded.	15-20% probability of prehistoric sites/ isolated finds on ridges or knolls overlooking drainages or as rock art/shelters on rock outcropping on slopes, 5-10% probability for remainder of tract; 90% probability for historic sites being found along drainage bottoms and where access is available, 10% probability for remainder or tract.	5-10% probability of locating sites eligible to the National Register of Historic Places.	Good - outstanding	
<u>RECREATION VALUES INCLUDING VRM</u> Recreation	No federally-owned surface, maybe some wildlife observation.	Minimal, large quantity of observation opportunity in general area.	Minimal short-term; none long-term.	Fair	
Visual resource management	Class IV adjacent active mine, shrub relief, steep banks.	Severe disruption to landscape, however, sensitivity minimized by existing active mine.	Minimal short-term; none long-term.	Good	Data based on previous visual impact of strip mining.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>NOISE</u>	Large volume of vehicular traffic, mine-associated noise.	Extend or prolong existing factors.	Minimal short-term; none long-term.	Good	
<u>NET ENERGY ANALYSIS</u>					
<u>OTHER FACTORS AS DETERMINED BY THE REGIONAL COAL TEAM</u>					
TRANSPORTATION					
Employee transportation	Colorado Highway 13	10% increase in traffic accidents	Moderate	80% probability	
Product transportation	1. Colorado Highway 13 2. DRGW Railroad	1. \$34,000 increase in road maintenance. 2. Increased hazard rating for at-grade crossing.	1. High 2. Low	1. 85% probability 2. 90% probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: DANFORTH HILLS #1

State: COLORADO

Legal description (township and range or metes and bounds): See Site-Specific Analysis

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments		
<u>POPULATION</u>								
Craig	7,715	18,274	240	Low	Base: good (1977 Census) Projections: based on input-output model.	Proposed action impact is low, but area will already be heavily impacted.		
Meeker	2,976	8,494	150	Low				
Hayden	<u>1,548</u>	<u>2,707</u>	<u>28</u>	Low				
Total	12,239	29,475	418	Low				
<u>ECONOMICS</u>								
(Moffat, Rio Blanco and Routt Counties)								
Employment								
Mining	1,471	7,174	90	Low	Base: medium (derived from input-output model) Projections: USGS and model			
Other	<u>11,645</u>	<u>20,397</u>	<u>73</u>	Low				
Total	13,116	27,571	163	Low				
Income (thousand)								
Mining	\$ 31,460	\$152,607	\$1,843	Low				
Other	<u>126,440</u>	<u>210,909</u>	<u>811</u>	Low				
Total	\$157,900	\$363,516	\$2,654	Low				

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
	(000)	(000)				
Counties Revenue	\$ 16,246					
Debt	348					
Communities Revenue	3,838					
Debt	671					
School districts assessed valuation	223,542					
<u>INFRASTRUCTURE</u>						
Housing						
Craig	3,170	6,630	+ 78	Low	Base: Good (DOE publication and personal contacts with COG offices) Projections: Fair (Based on number of households projected by CSU I/O Model)	Trended environment will require a 136% increase in total number of housing units, development of this tract will mean an additional one percent increase.
Hayden	497	915	+ 9	Low		
Meeker	<u>774</u>	<u>2,933</u>	<u>+ 49</u>	Low		
Total	4,441	10,478	+136	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
School Capacity						
Craig	2,350	6,213	+78	Low	Base: Good (Personal contacts with each school) Projections: Fair (Assumes a continuation of 1978 student/population ratio.)	Trended environment will increase student enrollment 148% by 1995 which will necessitate a 127% increase in school capacity. Development of this tract will require an additional one percent increase in school capacity.
Hayden	875	947	+ 9	Low		
Meeker	<u>1,155</u>	<u>2,778</u>	<u>+49</u>	Low		
Total	4,380	9,938	+136			
Hospital Bed Capacity						
Moffat	30	46	+ 1	Low	Base: Good (Personal contacts with each hospital) Projects: Good (Based on National Standards)	Trended environment will require an 8% increase in bed capacity, development of this tract will require an additional one percent increase.
Routt	20	29	0	None		
Rio Blanco	<u>45</u>	<u>28</u>	<u>0</u>	None		
Total	95	103	- 1	Low		
Police Officers						
Craig	17	31	0	None	Base: Good (Personal contacts with each department) Projection: Good (Based on National Standards)	Trended environment will necessitate a 121% increase in the number of police officers in the area; development of this tract would require no additional increase.
Hayden	3	5	0	None		
Meeker	<u>4</u>	<u>17</u>	<u>0</u>	None		
Total	24	53	0	None		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Fire Pumping Capacity						
Craig	2,800	4,127	+ 24	Low	Base: Good (Personal contacts with each department) Projection: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean an additional one percent increase.
Hayden	2,500	1,677	+ 7	Low		
Meeker	<u>1,225</u>	<u>2,812</u>	<u>+ 19</u>	Low		
Total	6,525	8,616	+ 50	Low		
Water System Capacity						
Craig	5.00	2.74	+ .04	Low	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	Craig's and Hayden's system will be able to handle the demand without problems. Meeker's system will require a 33% expansion for the trended environment; development of this tract will require a two percent additional increase.
Hayden	.64	.41	0	None		
Meeker	<u>2.88</u>	<u>3.82</u>	<u>+ .07</u>	Low		
Total	8.52	6.97	+ .11	Low		
Sewer System Capacity						
Craig	.90	3.07	+ .04	Low	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended environment will necessitate an overall 115% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional one percent increase. Nonetheless, Hayden's system will still be 54% below capacity.
Hayden	1.00	.45	+ .01	Low		
Meeker	<u>.40</u>	<u>1.43</u>	<u>+ .02</u>	Low		
Total	2.30	4.95	+ .07	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+ .05	Low	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 141% increase in the number of acres needed by 1995; development of this tract will require an additional one percent increase.
Hayden	.33	.57	0	None		
Meeker	<u>-.62</u>	<u>1.78</u>	<u>+.04</u>	Low		
Total	2.57	6.19	+ .09	Low		
Social Services Number of Public Assistance Cases						
Moffat	333	665	+ 7	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population.)	Trended environment will result in an 81% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional one percent increase.
Routt	269	406	0	None		
Rio Blanco	<u>167</u>	<u>322</u>	<u>+ 3</u>	Low		
Total	769	1,393	+ 10	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURE AND WELL-BEING</u>						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School, sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school and solid waste facilities will need expansion)	Low	Low	Good	
Meeker	Fair (Housing, police officers, and fire pumping capacity should be expanded)	Poor (all but hospital and solid waste facilities will have to be expanded)	Low	Low	Good	

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>NATIVE AMERICANS AND OTHER MINORITY GROUPS</u>						
Moffat County						
Spanish Surname	5.63%		Additional jobs will mean an increase in number of minority individuals, although not necessarily an increase in proportion to the entire population.	Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90			Low		
Other	.17			Low		
Total	6.77%			Low		
Routt County						
Spanish Surname	3.87%		in proportion to the entire population.	Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05			Low		
Other	.06			Low		
Total	4.03%			Low		
Rio Blanco County						
Spanish Surname	2.50%			Low		
Black	.38			Low		
American Indian	.22			Low		
Other	.07			Low		
Total	3.17%			Low		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AGRICULTURE</u>					
<u>Moffat County</u>	(acres)	(acres)			
Crop land	242,103	None	None	Base: medium (1974 Census of Agriculture)	
Pasture land	904,291	Loss of 876	Low		

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number DANFORTH HILLS #1

State: COLORADO

Legal description (township and range
or metes and bounds): See Site-Specific Analysis

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No	N/A	None	
2. Rights-of-way and easements	No	N/A	None	
3. Buffer zones	No	N/A	None	
4. Wilderness study areas	No	N/A	None	
5. Scenic areas	No	N/A	None	
6. Land used for scientific studies	No	N/A	None	
7. Historic lands and sites	Yes. No survey data available.	No. Not applied, no consultation with advisory council	Class III survey and evaluation of any Cultural Resources.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No	N/A	None	
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	Unknown		Field survey to locate nests and roosts	
12. Eagle roosts and concentration areas	Unknown		Field survey to locate nests and roosts	
13. Falcon cliff-nesting sites	Unknown		Field survey to locate nests and roosts	
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	No		Mule deer critical winter range. Coordination with DOW necessary for mitigation.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	Yes	Yes. No danger to life or property.	None	Good Spring Creek - T. 3 N, R. 93 W, sec. 11, SE 1/4 SW 1/4.
17. Municipal watersheds	No	N/A	None	
18. National resource waters	No	N/A	None	
19. Alluvial valley floors	No alluvial valley floors exist on the tract. The bottom of Good Spring Creek Valley immediately east of the tract, however, is almost certainly an alluvial valley floor.	---	The possible impacts of mining on the tract on the alluvial aquifer in Good Spring Creek Valley must be evaluated by DSM.	Observations indicate that mining on the tract should have no significant impact on the probable alluvial valley floor in Good Spring Creek Valley.
20. State proposed criteria	No	N/A	None	No information or data submitted from State of Colorado.

SITE-SPECIFIC MATRICES

DANFORTH HILLS #3

SITE-SPECIFIC MATRICES

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: DANFORTH HILLS #3

State: COLORADO

Legal description (township and range

or metes and bounds): T.3N., R.93W., Sec. 19: Lots 1-4, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 20: Lot 2, N $\frac{1}{2}$, SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 21: Lots 1-7, 9, 10, NW $\frac{1}{4}$, NE $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 28: Lots 3-10, 12, 13, 15, 17, Sec. 29: Lots 1-8

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	3,555,600				
Estimated mine life (years)	30				
Total reserves (tons in place)	125,330,000				
Recoverable reserves (tons)	106,700,000				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	C Bituminous steam				
Sulfur content (percent)	0.41				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	60 - 80				
Projected work force (mining)	250				
Surface ownership (Federal, State, private, etc.)	Federal - 1621.05 State - 0 Private - 562.81				
Status of surface owner consent and/or consultation	No reply during surface owner consultation				
Type of mine (surface/underground)	surface				
Coal transportation needs	40 miles of railroad				
Coal access needs	3 miles of access roads				
Coal markets					
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: DANFORTH HILLS #3

State: COLORADO

Legal description (township and range or metes and bounds): T.3N., R.93W., Sec. 19: Lots 1-4, NE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 20: Lot 2, N $\frac{1}{2}$, SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 21: Lots 1-7, 9, 10, N $\frac{1}{2}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 28: Lots 3-10, 12, 13, 15, 17, Sec. 29: Lots 1-8

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	No known faults. Low angles of dip	None	None	Good	
Seismic Activity	No known faults. No recorded seismic events.	None	None	Good	
Other Minerals	No known on tract. Some potential for oil & gas. Existing oil & gas fields in area.	None	None	Good	
Paleontological Resources	No known fossils of unique scientific value.	Possible destruction of fossils. Beneficial impact from increased exposure.	Low	Fair	

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 3 TRACT

Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is $22 \mu\text{g}/\text{m}^3$. No violations of standard nearby	Annual emissions estimated at 875 tons/year increasing concentrations from $0-20 \mu\text{g}/\text{m}^3$. Impact diminishes within 1 mile of tract	Significant	Good	Concentrations from tract within standards. Combined concentrations from other proposed lease tracts may approach standards
2. SO_2	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO} + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Levels approaching standard measured in Rio Blanco County (tract within county)	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Levels approaching standard measured in Rio Blanco County	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 3 TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (41 miles SE), Dinosaur National Monument (36 miles NW) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Moffat and Rio Blanco Counties in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 80 miles SW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Proposed lease tracts Danforth Hills 1 and 3 strip mines (adjacent) Colowyo strip mine (5 miles NE)	Concentrations will be increased by adjacent Danforth Hills 1 and 3 strip mines	Possibly significant	Fair	-
12. Annual precipitation	11-13 inches	None	-	Good	-

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 3 TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
13. Growing season >32°F	Approximately 94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 35 tons/year	Insignificant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Soils	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Soil Erosion Potential	High - 0% Wind - Moderate - 0% Low Mod. - 81% Low - 10%	Loss of soil by wind and water erosional forces.	Low ¹	High	¹ Significance of impacts would be lessened by O.S.M. Regulations on Reclamation.
	High - 0% Water - Moderate - 0% Low Mod. - 88% Low. - 10%	Adverse impact to air quality.			
Soil Reconstruction Potential	Good - 0% Fair - 0% Poor - 100%	Severe problems with soil reconstruction and stabilization on 100% of mined area. Loss of soil productivity on all off site facilities & new housing developments.	High ¹	High	¹ Revegetation would be difficult & costly on 100% of mined area, due to steep slopes & shallow soils. Top dressing and surface stabilization would be needed to establish and maintain vegetation.
	*Missing % not rated due	to rock outcrop.			

Matrix for Water Resources

Danforth Hills #3, Section II, Page 3

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
<u>Surface Water</u>					
Types of Occurrence	West Fork of Good Spring is perennial. All other streams on the tract are ephemeral.	West Fork of Good Spring Creek would not be physically disturbed by mining. Virtually all other channels on the tract would be removed by mining and must be reconstructed.	Minor, provided that stable channels can be reconstructed on the steep gradients that occur on the tract.	Field observations	All stream channels would be reconstructed to standards established by OSM regulations.
Quantity	Runoff from the tract estimated to be only about 10 ac-ft/yr.	Runoff from the tract should be reduced by no more than 5 ac-ft/yr as a result of mining.	Minor and short term. After reclamation, runoff from the tract should return to approximately premining rates.	Inferred from field observations and from similar operations at other surface coal mines in northwestern Colorado	Because of evapotranspiration losses downstream, use of water on the tract would not necessarily reduce water yield to the Yampa River.
Quality	Surface runoff is a magnesium, calcium, sodium, sulfate, bicarbonate type and contains about 675 mg/l dissolved	No significant effect during mining. Leaching of spoils would probably increase salt load to Yampa and Colorado Rivers by about 100 tons/yr over the long term.	No significant impact on aquatic biology of receiving waters, but would increase salinity of the Colorado River.	Inferred from field observations and water quality data.	No acid water problems are expected as a result of mining.
Salinity of receiving waters	No current salinity problem in the Yampa River. Severe salinity problem in the Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of mining and increased population would increase salinity of Colorado River by 0.0013 percent by 1987, by 0.0017 percent from 1990 to end of mine life, and by 0.0027 percent over the long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases and postmining leaching of the spoils aquifer.	Principal cause of long-term increase in salinity is the leaching of reclaimed spoils in the mined area.

Matrix for Water Resources

Danforth Hills #3, Section II, Page 4

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to livestock and wildlife	Permanent water provided by West Fork of Good Spring Creek. Seasonal water provided by one small reservoir.	Flow in West Fork Good Spring Creek should not be affected by mining. The one existing reservoir would be removed by mining.	Minor. Sedimentation ponds should provide alternative source of water during mining.	Field observations.	If desired, reservoirs could be constructed on the post-mining reclaimed surface.
Importance to agriculture	Hay meadows exist on the bottom of West Fork Good Spring Creek Valley in southeastern part of tract. No agriculture on that part of tract which would be mined.	Little or none.	Little or none.	Field observations.	Hay meadows in West Fork Good Spring Creek Valley are not dependent on surface runoff from tract.
Importance to people (Individual and municipal supplies)	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 146 ac-ft/yr by 1987 and 192 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Based on inferred population increases from mining.	Any reduction in flow in the Colorado River is a significant impact.
Erosion and sedimentation	Tract appears to be very stable except for erosion along existing unimproved roads. Estimated sediment yield from tract is about 0.5 ac-ft/yr.	Assuming that reclamation is successful, any change in sediment yield as a result of mining and associated urbanization would be less than 0.1 ac-ft/yr. Increased sediment yield from construction of ancillary facilities cannot be estimated until routes are known. Increases, however, should be small.	Insignificant, provided that reclamation effectively stabilizes the steep slopes that exist on the tract.	Based on field observations and inferred effects of increased population.	If reclamation of the steep slopes is not successful, erosion and sediment yield could be 10 times premining rate.

Matrix for Water Resources

Danforth Hills #3, Section II, Page 5

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Ground Water					
Type of Occurrence	Perched conditions in bedrock aquifers above level of principal stream valleys east and west of the tract and confined (artesian) conditions below that level. Unconfined (water table) conditions in alluvial aquifer underlying West Fork Good Spring Creek.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer characterized by unconfined conditions. Alluvial aquifer in West Fork Good Spring Creek Valley would not be disturbed.	Would require future wells in the mined area to be about 350 feet deeper with correspondingly higher pumping lifts.	Moderate. Inferred from field observations, well data, and geology of tract.	
Quantity	Total ground-water discharge from the tract is estimated to be about 35 gal/min.	All ground-water discharge would cease during mining. After reclamation, discharge from the tract should increase to as much as 45 gal/min.	Very minor.	Inferred from field observations and geology of tract.	New springs may form on side slopes of principal valleys east and west of tract.
Quality	Perched aquifers yield magnesium, calcium, sulfate water containing 500 - 1,000 mg/l dissolved solids. Confined deep aquifers yield sodium bicarbonate water with 500 - 1,000 mg/l dissolved solids.	Leaching of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 2,000 mg/l.	Would have no significant effect on use of water by livestock and wildlife, but long term increase in salt load to Yampa and Colorado Rivers is estimated to be about 100 tons/yr.	Inferred from similar operations in the Yampa Coal Field and from available water-quality data.	See Surface Water for effect of spoils leachate on salinity of Colorado River.
Importance to livestock and wildlife	No stock-water wells or springs on that part of tract which would be disturbed by mining.	Little or none.	Little or none.	Field observations.	

Matrix for Water Resources

Danforth Hills #3, Section II, Page 6

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to Agriculture	Hay meadows exist on bottom of West Fork Good Spring Creek Valley in southeastern part of tract. No agriculture on that part of tract which would be mined.	Little or none.	Little or none.	Field observations.	Hay meadows in West Fork Good Springs Creek Valley are not dependent on groundwater discharge from the tract.
Importance to people (individual and municipal supplies)	One domestic well on bottom of West Fork Good Springs Creek Valley currently flows at the land surface.	Well may cease flowing during mining, necessitating a pumping lift of less than 25 feet. Water quality should not be affected.	Minor. Well should resume flowing after completion of mining.	Field observations and inferred effect of mining on confining pressures.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<p><u>VEGETATION</u></p> <p>Presence of Unique, Unusual Vegetation, Types, Associations, and T & E Plants</p>	<p>There are no T & E Plants known to inhabit the immediate area. The riverbottom has potential for having unique & unusual plant species.</p>	<p>According to the amount of area stripped, that would include 76 acres of riverbottom which would be detrimental to several resources. Possible loss of T & E Plant pop. as a result of prop. action.</p>	<p>Significant although, if locals could be protected in some way then the loss of some pop. would be insignificant.</p>	<p>CSU Herbarium, CU Herbarium, P.I.N. (Plant Info Network), Co. Native Plant Society working dist. Federal Register.</p>	
<p>Ground Cover</p>	<p>Sagebrush 942 ac/43% Grassland 405 ac/19% Mt. Shrub 421 ac/19% Aspen Wldls 335 ac/15% Riverbottoms 80 ac/4% Ave. ground cover - 78.5% Sagebrush 62.5% Grassland 97.5% Mt. Shrub 85% Aspen Wldls 85% Riverbottom 62.5%</p>	<p><u>Veg Loss - On-Site</u> 1987: 470 - 670 ac. 1990: 540 - 740 ac. 1995: 1030 - 1230 ac. 2017: 2500 - 2700 ac. <u>Veg Loss - Offsite</u> 1987 1195 ac. 1990 1224 ac. 1995 1224 ac. 2017 1224 ac. <u>Veg Type - Loss</u> Sagebrush 896 ac/42% Grassland 398 ac/19% Mt. Shrub 421 ac/20% Aspen Wldls 315 ac/15% Riverbottom 76 ac/4%</p>	<p>Insignificant if reclamation procedures are followed.</p>	<p>Mod.</p>	

Element	Present Situation		Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>Wildlife</u>						
<u>A. Habitat</u>	<u>Acres</u>	<u>% of Total</u>	<u>Acres Disturbed 2017</u>			
1. Sagebrush	942	43	High negative	Low negative		
2. Mt. Shrub	421	19		" "		
3. Grassland	405	19		" "		
4. Aspen	335	15		" "		
5. Riparian	80	4		" "		
<u>B. Populations</u>	<u>Level of Use</u>					
1. Deer	Average		Low negative	Low negative	Good	
2. Elk	Average		Low negative	Low negative	Good	
3. Blue Grouse	Average		Local = Low negative County = No change	No change	Good	
4. Beaver	Unknown		Low negative	No change	Good	
5. Nongame Birds & Mammals	Unknown		Not assessible	No change	Poor	
6. Reptiles & Amphibians	Unknown		Not assessible	No change	Poor	
7. Waterfowl	Low		Low negative	No change	Good	
8. Threatened or Endangered	None occur		--	--	--	
9. Fisheries	None occur		--	--	--	

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of 50 percent or more; should be confirmable within three years. ^{1/}
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Cultural/Historical Values	Approximately 65 acres surveyed on a class II survey, approximately 15 acres surveyed on 2 class III surveys, and approximately 180 acres on a judgemental reconnaissance survey. No prehistoric sites/isolated finds located and recorded.	15-20% probability of prehistoric sites/isolated finds on ridges and knolls overlooking drainages, and as rock/art/shelters sites on rocks outcropping on slopes, 5% probability for remainder of tract; 90% probability for historic sites being found along drainage bottoms and where access is available, 10% probability for remainder of tract.	5-10% probability of locating sites eligible to the National Register of Historic Places.	Good - Outstanding	
Recreation Values	No public access. 50 hunters through access holders.	Displacement of 50 hunters.	Minimal short term, insignificant on long term.	Good	
VRM	Class IV, mountain shrub, steep banks.	Severe surface disturbance, visual sensitivity diminished by active mining present in general area.	Minimal short term insignificant on long term.	Good	
Noise	Major transportation route, coal mining agriculture.	Increased mine associated noise or extention of.	Minimal short term, none on long term.	Good	
Net Energy Analysis					

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Employee Transportation	1. U.S. 40 & S. Hwy 13	1. 18% increase in traffic accidents 2. Increased road maintenance costs	1. Moderate 2. Low	1. 90% probability 2. 80% probability	
Product Transportation	1. DRGW railroad	1. Increased grade crossing hazard ratings by approximately .30 acc./5 yrs.	3. Moderate	1. 90% probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: DANFORTH HILLS #3

State: COLORADO

Legal description (township and range
or metes and bounds): T3N, R93W of 6th Principal Meridian

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	702	Low	Base: good (1977 Census) Projections: based on input-output model.	Proposed action impact is low, but area will already be heavily impacted.
Meeker	2,976	8,494	444	Medium		
Hayden	<u>1,548</u>	<u>2,707</u>	<u>*83</u>	Low		
Total	12,239	29,475	1,229	Low		
<u>ECONOMICS</u>						
(Moffat, Rio Blanco, & Routt Counties)					Base: medium (derived from input-output model)	
Employment						
Mining	1,471	7,174	250	Low	Projections: USGS and model	
Other	<u>11,645</u>	<u>20,397</u>	<u>232</u>	Low		
Total	<u>13,116</u>	<u>27,571</u>	<u>482</u>	Low		
Income (thousand)						
Mining	\$ 31,460	\$152,607	\$5,120	Low		
Other	<u>126,440</u>	<u>210,909</u>	<u>2,616</u>	Low		
Total	\$157,900	\$363,516	\$7,736	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>	(000)	(080)				
Counties Revenue Debt	\$ 16,426 348					
Communities Revenue Debt	3,838 671					
School districts assessed valuation	223,542					

Element	Present Situation	Trends in 1995	Anticipated Effect Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+229	Low	Base: Good (DOE publication and personal contacts with COG offices) Projections: Fair (Based on number of households projected by CSU I/O Model)	Trended environment will require a 136% increase in total number of housing units, development of this tract will mean an additional four percent increase.
Hayden	497	915	+ 27	Low		
Meeker	<u>774</u>	<u>2933</u>	<u>+145</u>	Medium		
Total	4441	10478	+401	Medium		
School Capacity						
Craig	2350	5976	+239	Medium	Base: Good (Personal contacts with each school). Projections: Fair (Assumes a continuation of 1978 student population ratio).	Trended environment will increase student enrollment 148% by 1995 which will necessitate a 127% increase in school capacity. Development of this tract will require an additional four percent increase in school capacity.
Hayden	875	885	+ 30	Low		
Meeker	<u>1155</u>	<u>2778</u>	<u>+125</u>	Medium		
Total	4380	9938	+394	Medium		
Hospital Bed Capacity						
Moffat	30	46	+ 2	Low	Base: Good (Personal contacts with each hospital) Projections: Good (Based on National Standards)	Trended environment will require an 8% increase in bed capacity, development of this tract will require an additional three percent increase.
Rouff	20	29	0	None		
Rio Blanco	<u>45</u>	<u>28</u>	+ 1	Low		
Total	95	103	+ 3	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Police Officers						
Craig	17	31	+ 1	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 121% increase in the number of police officers in the area; development of this tract would mean an additional six percent increase.
Hayden	3	5	+ 1	High		
Meeker	<u>4</u>	<u>17</u>	<u>+ 1</u>	High		
Total	24	53	+ 3	Medium		
Fire Pumping Capacity						
Craig	2800	4127	+71	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean an additional two percent increase.
Hayden	2500	1677	+21	Low		
Meeker	<u>1225</u>	<u>2812</u>	<u>+55</u>	Low		
Total	6525	8616	+147	Low		
Water System Capacity						
Craig	5.00	2.74	+ .11	Low	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	Craig's and Hayden's system will be able to handle the demand without problems. Meeker's system will require a 33% expansion for the trended environment; development of this tract will require an additional 5% increase.
Hayden	.64	.41	+ .01	Low		
Meeker	<u>2.88</u>	<u>3.82</u>	<u>+ .20</u>	Medium		
Total	8.52	6.97	+ .32	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Sewer System Capacity						
Craig	.90	3.07	+12	Medium	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended environment will necessitate an overall 115% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional four percent increase. Nonetheless, Hayden's system will still be 53% below capacity.
Hayden	1.00	.45	+02	Low		
Meeker	<u>.40</u>	<u>1.43</u>	<u>+07</u>	Medium		
Total	2.30	4.95	+21	Medium		
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+14	Medium	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 141% increase in the number of acres needed by 1995; development of this tract will require an additional four percent increase.
Hayden	.33	.57	+02	Medium		
Meeker	<u>.62</u>	<u>1.78</u>	<u>+10</u>	Medium		
Total	2.57	6.19	+26	Medium		
Social Services Number of Public Assistance Cases						
Moffat	333	665	+21	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population)	Trended environment will result in an 81% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional two percent increase.
Routt	269	406	+ 2	Low		
Rio Blanco	<u>167</u>	<u>322</u>	<u>+ 9</u>	Low		
Total	769	1393	+32	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School, sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school and solid waste facilities will need expansion)	Low	Low	Good	
Meeker	Fair (Housing, police officers, and fire pumping capacity should be expanded)	Poor (All but hospital and solid waste facilities will have to be expanded)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%	Additional jobs will mean an increase in number of minority individuals, although not necessarily an increase in proportion to the entire population.		Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90			Low		
Other	.17			Low		
Total	6.77%			Low		
<u>Routt County</u>						
Spanish Surname	3.87%			Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05			Low		
Other	.06			Low		
Total	4.03%			Low		
<u>Rio Blanco County</u>						
Spanish Surname	2.50%			Low		
Black	.38			Low		
American Indian	.22			Low		
Other	.07			Low		
Total	3.17%			Low		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AGRICULTURE</u>					
<u>Rio Blanco County</u>	(acres)	(acres)		Base: medium (1974 Census of Agriculture)	
Cropland	81,106	Loss of 50	Low		
Pastureland	398,497	Loss of 2,119	Low	Impacts: visual estimates of present land use	

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: DANFORTH HILLS #3

State: COLORADO

Legal description (township and range

or metes and bounds): T.3N., R.93W., Sec. 19: Lots 1-4, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 20: Lot 2, N $\frac{1}{2}$, SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 21: Lots 1-7, 9, 10, N $\frac{1}{2}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 28: Lots 3-10, 12, 13, 15, 17, Sec. 29: Lots 1-8

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	Yes	N/A possible to use #4 or 5	Cost/mile to relocate existing line.	ROW holder will likely refuse to move - costs prohibitive.
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey & evaluation of any sites.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	No	No		
12. Eagle roosts and concentration areas	No	No		
13. Falcon cliff-nesting sites	No	No		
14. Migratory birds	No	No		
15. State resident fish and wildlife	No	No		

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains				
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	The bottom of the West Fork of Good Spring Creek in the Southeastern part of the tract is almost certainly an alluvial valley floor. The projected mining operations would not physically disturb this valley floor.		The possible impacts of any mining on the tract on the tract on the alluvial aquifer underlying the West Fork of Good Spring Creek must be evaluated by OSM.	Field observations indicate that mining on the tract should have no significant impact on the alluvial aquifer underlying the West Fork of Good Spring Creek.
20. State proposed criteria	No			No data from State.

SITE-SPECIFIC MATRICES

HAYDEN GULCH

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: HAYDEN GULCH

State: CO₂OR⁰⁰

Legal description (township and range T 5 N, R 89 W, Sec. 10: Lots 8, 9, 14, 15, Sec. 11: Lots 16, 17, Sec. 13: Lots 6, 10-17, Sec. 14: All, Sec. or metes and bounds): 15: Lots 1-16, Tr. 51, Sec. 16: Lots 3, 4, 8-10, SE¹/₄NE¹/₄, N¹/₂SE¹/₄, Sec. 21: N¹/₂NE¹/₄, S¹/₂NE¹/₄, NW¹/₄, N¹/₂SE¹/₄, Sec. 22: All, Sec. 23: All, Sec. 24: All, Sec. 25: All, Sec. 26: N¹/₂, N¹/₂S¹/₂, Sec. 27: N¹/₂NE¹/₄

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	2,756,000				
Estimated mine life (years)	30				
Total reserves (tons in place)	97,270,000				
Recoverable reserves (tons)	82,679,500				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	"A" sub-bituminous steam				
Sulfur content (percent)	.71				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	50-70				
Projected work force (mining)	212				
Surface ownership (Federal, State, private, etc.)	Federal 366.33 Private 5,143.65 State 132				
Status of surface owner consent and/or consultation	All affirmative				
Type of mine (surface/underground)	Surface				
Coal transportation needs	10 miles of railroad				
Coal access needs	2-3 miles access roads				
Coal markets	NA				
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: HAYDEN GULCH

State: COLORADO

Legal description (township and range T 5 N, R 89 W, Sec. 10: Lots 8, 9, 14, 15, Sec. 11: Lots 16, 17, Sec. 13: Lots 6, 10-17, Sec. 14: All, Sec. or metes and bounds): 15: Lots 1-16, Tr. 51, Sec. 16: Lots 3, 4, 8-10, SE $\frac{1}{4}$ NE $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 21: N $\frac{1}{2}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 22: All, Sec. 23: All, Sec. 24: All, Sec. 25: All, Sec. 26: N $\frac{1}{2}$, N $\frac{1}{2}$ S $\frac{1}{2}$, Sec. 27: N $\frac{1}{2}$ NE $\frac{1}{4}$

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	No known hazards on tract.	None	None	Good	
Seismic activity	No faults identified. No known seismic occurrences.	None	None	Good	
Potential for other minerals	No known minerals other than coal, slight potential for oil and gas.	Low	Low	Good	

PRELIMINARY SITE SPECIFIC MATRIX HAYDEN GULCH TRACT

Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is 22 $\mu\text{g}/\text{m}^3$. No violations of standards nearby	Annual emissions estimated at 925 tons/year increasing emissions 0-20 $\mu\text{g}/\text{m}^3$. Impact diminishes within 1 mile of tract	Significant	Good	Concentrations from tract within standards. Combined concentrations from other proposed lease tracts may approach standards
2. SO_2	Very low levels (5-11 ppbv) at several locations N of Hayden (8-10 miles N of tract)	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO} + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX HAYDEN GULCH TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (27 miles SE), Mount Zirkel (35 miles NE) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Routt County in AQCR 12	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 110 miles SSW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Future Peabody Seneca 2 strip mine (5 miles SE), existing Hayden Gulch strip mine (adjacent) proposed lease tract Williams Fork (adjacent)	Increased TSP concentrations from individual mines may interact	Possibly significant	Good	-
12. Annual precipitation	13-16 inches	None	-	Good	-

PRELIMINARY SITE SPECIFIC MATRIX HAYDEN GULCH TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
13. Growing season >32°F	Approximately 76-94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 110 tons/year	Significant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Paleontological resources ¹	None recorded to date. No known fossils with rare or unique scientific value.	Possible destruction by mining. Beneficial impact from additional exposure.	Low	Fair	
<u>SOILS</u>					
Soil erosion potential	Wind - Data not available High - 79% Water - Mod. - 19% Low - 2%	Loss of soil by wind and water on 55 acres/year for 30 years. Impact on air quality.	Moderate ¹	Good	¹ Significance of erosion by wind and water would be reduced by OSM regulations.
Soil reconstruction potential	Good - 6% Fair - 17% Poor - 77%	Severe problems with revegetation and soil stabilization on 2,250 acres of strippable area.	High ¹	Good	¹ Revegetation and stabilization would be difficult and costly on strippable area due to steep slopes and erosion potential. Top dressing and stabilization techniques would be needed to establish and maintain vegetation.
<u>WATER RESOURCES</u>					
<u>Surface Water</u>					
Types of occurrence	Dill and Hayden Gulches have perennial flows of 10-25 gal/min. All other streams are ephemeral.	Should have little or no impact on perennial streams, which would not be disturbed. Ephemeral stream channels in mined area would be reconstructed.	Very minor	Field observations	All disturbed stream channels would be reconstructed as required by OSM regulations.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity	Runoff from tract probably does not exceed 0.5 inch/yr. or about 240 ac-ft/yr. Most runoff from tract is probably dissipated by evapotranspiration.	Runoff to river net probably would not be reduced by more than 25 ac-ft/yr. during mining.	Minor and short term. After reclamation, runoff from the tract should approximate premining rates.	Inferred from field observations and results of similar operations at nearby mines.	Because of losses down stream, use of water on the tract would not necessarily reduce water yields to the Yampa River.
Quality	Water in reservoirs indicates that runoff contains 600-1,000 mg/l dissolved solids. Water degrades downstream from tract, increasing to more than 3,000 mg/l dissolved solids.	No significant effect during mining. Effect of leaching of spoils would probably not significantly increase salinity in receiving streams offsite.	Very minor. Should not increase the salt load to the Yampa and Colorado Rivers.	Inferred from field observations and water quality measurements.	No acid water problems are expected as a result of mining.
Salinity of receiving waters	No current salinity problem in Yampa River. Severe salinity problem in Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of increased population would increase salinity of Colorado River by 0.0007 percent by 1987 and by 0.0015 percent after 1990 over long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Moderate. Based on inferred population increases.	Assumes no increased contribution of salt to the river net as a direct consequence of mining.
Importance to livestock and wildlife	Perennial flows in Dill and Hayden Gulches provide permanent source of water. Temporary water furnished by 25 small reservoirs.	No effect on perennial streams. Five reservoirs would be removed by mining.	Very minor. Sedimentation ponds should provide alternate source of water during mining.	Field observations.	Reservoirs could be reconstructed after reclamation, if desired.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to agriculture	All agriculture on and adjacent to tract is dryland farming.	None	None	Field observations	
Importance to people (individual and municipal supplies)	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 77 ac-ft/yr by 1987 and 159 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount	Moderate. Based on inferred population increases from mining.	Any reduction in flow in the Colorado River is a significant impact.
Erosion and sedimentation	Tract appears to be very stable; estimated sediment yield is less than 0.1 ac-ft/sq. mi/yr.	Changes in sediment yield as a result of mining and associated urbanization would be 0.02-0.05 ac-ft/yr for first few years after construction.	Insignificant. Long-term sediment yield would probably be less than current rate.	Field observations and from inferred effects of increased population.	
<u>Ground Water</u>					
Type of Occurrence	Perched conditions in bedrock aquifers above level of principal streams and confined (artesian) conditions below that level. Unconfined (water table) conditions in alluvium in Dill, Hayden, and Berry Gulches.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer. Perched conditions would be replaced by unconfined conditions. Alluvial aquifers would not be disturbed.	Would require future wells in mined areas to be about 200 ft. deeper with correspondingly higher pumping lifts. New springs may form on sides of principal valleys.	Moderate, inferred from field observations, well data, and geology of tract.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity	Most wells yield less than 10 gal/min. Total discharge from tract probably does not greatly exceed 50 gal/min.	Probably insufficient inflow to pit for mining operations.	Minor. Supplemental water for mine use (20-80) ac-ft/yr) could be obtained from wells 500-1,000 ft. deep with no impact on existing supplies.	Inferred from field observations and geology of tract.	Discharge of new springs to principal valleys should increase total ground water yield by as much as 100 gal/min.
Quality	Shallow bedrock aquifers and alluvium yield calcium, magnesium, sulfate water containing 500-1,600 mg/l dissolved solids. Deep aquifers yield sodium bicarbonate water containing 700-1,100 mg/l dissolved solids.	Leaching of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 2,500 mg/l.	Minor. Would have no significant effect on use of water by livestock and wildlife. Offsite effects minimal.	Inferred from similar operations of nearby mines and from field measurements of specific conductance of water samples.	Should not increase salinity of Colorado River because streams off tract have much higher dissolved-solids concentrations.
Importance to livestock and wildlife	Only one warm-water spring on tract. However, small perennial flows in Dill, Hayden, and Berry Gulches are fed by springs off tract. Five stock wells on tract.	No effect on spring. Two stock wells would be physically destroyed.	Minor. Wells can be replaced, but pumping lift would be greater. Should present no significant impact to use of windmills for power.	Field observations	Suitable wells could be developed for livestock and wildlife on the tract after mining.
Importance to agriculture	All agriculture on and adjacent to tract is dryland farming. Small subirrigated areas in Dill and Hayden Gulches are not farmed.	None	None	Field observations	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to people (individual and municipal supplies)	Ground water on or discharging from the tract is not used for any domestic supplies.	None	None	Field observations	
<u>VEGETATION</u>					
Presence of unique, unusual vegetation, types associations, and threatened and endangered plants	There are no T&Es reported from the immediate area, although a T&E survey has not been done on entire tract. There are no unique, unusual vegetation types on the lease tract.	Possibility of destroying a T&E plant population as a result of proposed action and cumulative regional development.	Significant, although, if type locals could be protected in some way then the loss of some populations would be insignificant.	C.S.U. and C.U. Herbarium P.I.N. (Plant Information Network) at C.S.U. Colorado Native Plant Society working list of T&E plants. Federal Register June 1975,*1976.	
Ground cover	*3-1 ⁰ Veg types & 2-2 ⁰ *Mountain Shrub *Sagebrush *Grassland Aspen woodlands River bottom Data is not available to quantify what vegetation types will be disturbed. % Average Ground Cover - Data is not available.	Vegetation loss on 55 acres each year - ie. 220 ac. by 1990, 495 ac. by 1995, and 1,650 ac. 2017 from stripping. 600 ac. in 1987 for mine operation support facilities. Population growth and urban expansion - 49 ac. - 1987 101 ac. - 1990 Soil erosion includes off-road vehicle use.		Poor	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments	
<u>WILDLIFE</u>						
A. Habitat Total - all types (No breakdown available)	<u>Acres</u> 5,509	<u>Acres Disturbed</u> 1,650 = Moderate neg.	Low negative	Good		
B. Populations	<u>Level of Use</u>					
1. Deer	Average	Low negative	Low negative			
2. Elk	Average	Low negative	Low negative			
3. Golden Eagle	High	No change	No change	Good	No impact, if buffer zone not leased.	
4. Blue Grouse	Average	Low negative	No change	Satisfactory		
5. Sage Grouse	Low	Low negative	No change	Satisfactory		
6. Nongame Birds and Mammals	Unknown	Not assessable	Low negative	Poor		
7. Reptiles and Amphibians	Unknown	Not assessable	No change	Poor		
8. Threatened or Endangered	None occur	--	--	Satisfactory		
9. Fisheries	None occur	--	--	Satisfactory		
<u>CULTURAL/HISTORICAL VALUES</u>	Approximately 130 acres covered on a judgemental reconnaissance survey and a class III survey of 3 drill locations. No prehistoric or historic sites/isolated finds located and recorded.	30-40% probability for pre-historic sites on ridges or knolls overlooking drainages, in saddles, or as rock art/shelters on rock outcropping on slopes; 10-15% probability for remainder of tract; 90% probability of historic sites along drainage bottoms and where access is available, 10% probability for remainder of tract.	20-25% probability of locating sites eligible to the National Register of Historic Places.	Excellent		

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value ^{1/} of 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECREATION VALUES INCLUDING VRM</u>	No public access, assumed some private recreation.	Loss of some private recreation.	Minimal	Poor	
	VRM Class IV	Severe disruption to landscape.	Minimal	Good	
<u>NOISE</u>	Open air, agricultural.	Mining associated noise.	Minimal not located near residential areas.	Good	
<u>EMPLOYEE TRANSPORTATION</u>	<ol style="list-style-type: none"> Road Segments B & C will reach capacity by 2000. Accidents B - 216 C - 98 	<ol style="list-style-type: none"> Road Segments B & C will reach or be over capacity by 1995. Traffic accidents will increase by 7%. Road maintenance increased by \$31,000. 	<ol style="list-style-type: none"> highly significant moderately significant Highly significant 	<ol style="list-style-type: none"> 80% probability 90% probability 70% probability 	Land 3 will result in increased public expenditure for upgrades or maintenance.
<u>PRODUCT TRANSPORTATION</u>	<ol style="list-style-type: none"> Rail movements at 4/day. Grade crossing hazards average 2.5 acc/5 yrs. 	<ol style="list-style-type: none"> Grade crossing hazards will increase by .25 acc/5 yrs. 	<ol style="list-style-type: none"> Low significance 	<ol style="list-style-type: none"> 85% probability 	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: HAYDEN GULCH

State: COLORADO

Legal description (township and range T 5 N, R 89 W, Sec. 10: Lots 8, 9, 14, 15, Sec. 11: Lots 16, 17, Sec. 13: Lots 6, 10-17, Sec. 14: All, or metes and bounds): Sec 15: Lots 1-16, Tr. 51, Sec. 16: Lots 3, 4, 8-10, S_{1/2}NE_{1/4}, N_{1/2}SE_{1/4}, Sec. 21: N_{1/2}NE_{1/4}, S_{1/2}NE_{1/4}, NW_{1/4}, N_{1/2}SE_{1/4}, Sec. 22: All, Sec. 23: All, Sec. 24: All, Sec. 25: All, Sec. 26: N_{1/2}, N_{1/2}S_{1/2}, Sec. 27: N_{1/2}NE_{1/4}

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	457	Low	Base: good (1977 Census) Projections: based on input-output model	Proposed action impact is low, but area will already be heavily impacted.
Hayden	1,548	2,707	304	Medium		
Oak Creek	792	1,257	40	Low		
Steamboat Springs	4,780	12,100	203	Low		
Yampa	312	345	9	Low		
Total	15,147	34,683	1,013	Low		
<u>ECONOMICS</u>						
(Moffat and Routt Counties)						
Employment						
Mining	1,001	2,060	212	Medium	Base: medium (derived from input-output model) Projections: USGS and model	
Other	8,784	15,902	183	Low		
Total	9,785	17,962	395	Low		
Income (thousand)						
Mining	\$ 20,506	\$ 42,201	\$ 4,342	Medium		
Other	88,728	164,454	2,088	Low		
Total	\$109,234	\$ 206,655	\$ 6,430	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>	(000)	(000)				
Counties						
Revenue	\$ 12,095	--				
Debt	348					
Communities						
Revenue	7,523	--				
Debt	4,620					
School districts assessed valuation	278,681					

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+149	Low	Base: Good (DOE publication and personal contacts with COG offices). Projections: Fair (Based on number of households forecast by CSU I/O Model).	Trended environment will require a 78% increase in total number of housing units, development of Hayden Gulch Tract will mean an additional three percent increase.
Hayden	497	915	+ 99	High		
Steamboat Springs	2577	4129	+ 66	Low		
Oak Creek	479	429	+ 13	Low		
Yampa	<u>150</u>	<u>120</u>	<u>+ 3</u>	Low		
Total	6873	12223	+330	Low		
School Capacity						
Craig	2350	5976	+149	Low	Base: Good (Personal contacts with each school). Projections: Fair (Assumes a continuation of 1978 student population ratio).	Trended environment will increase student enrollment 123% by 1995, necessitating a 123% increase in school capacity. Development of Hayden Gulch Tract will require an additional three percent increase in school capacity.
Hayden	875	885	+100	High		
Steamboat Springs	1355	3957	+ 66	Low		
Oak Creek	((((
Yampa	(<u>510</u>	(<u>524</u>	(<u>+ 16</u>	(Low		
Total	5090	11342	+331	Low		
Hospital Bed Capacity						
Moffat	30	46	+ 1	Low	Base: Good (Personal contacts with each hospital). Projections: Good (Based on National Standards).	Trended environment will require a 50% increase; development of this tract will require an additional three percent increase.
Routt	<u>20</u>	<u>29</u>	<u>+ 1</u>	Low		
Total	50	75	+ 2	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Sewer System Capacity						
Craig	.90	3.07	+ .08	Low	Base: Good (Personal contact with each community's public works office). Projections: Fair (Based on National Standards).	Trended environment will necessitate an overall 22% increase in the sewer system capacity (Craig system will require a 241% increase); development of this tract will require an additional three percent increase. (Although Hayden system would require a 13% expansion due to the tract development it would still be 49% below capacity.
Hayden	1.00	.45	+ .06	Low		
Steamboat Springs	2.58	2.03	+ .04	Low		
Oak Creek	.25	.21	+ .01	Low		
Yampa	.05	.06	+ 0	None		
Total	4.78	5.82	+ .19	Low		
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+ .09	Low	Base: Good (Personal contacts with each community's town hall). Projections: Fair (Based on National Standards).	
Hayden	.33	.57	+ .06	Medium		
Steamboat Springs	1.00	2.54	+ .04	Low		
Oak Creek	+.17	.26	+ .01	Medium		
Yampa	.07	.07	0	None		
Total	3.19	7.28	+ .20	Low		
Social Services Number of Public Assistance Cases						
Moffat	333	665	+ 14	Low	Base: Good (Colorado Department of Social Services). Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population).	Trended environment will result in a 75% increase in the total number of public assistance cases (a 100% increase in Moffat County); development of this tract would mean an additional two percent increase.
Routt	269	406	+ 11	Low		
Total	602	1071	+ 25	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school, and solid waste facilities will need expansion)	Low	Low	Good	
Steamboat Springs	Fair (School hospital, solid waste facilities, and fire pumping capacity should be expanded)	Fair (Housing, school, hospital, fire pumping capacity, police officers and solid waste facilities will require expansion)	Low	Low	Good	
Oak Creek	Good (Sewer system needs expansion as does police department and hospital bed capacity)	Good (School, hospital, and number of police officers will need additions.)	Low	Low	Good	
Yampa	Good (Fire pumping capacity should be expanded.)	Fair (School and fire pumping capacity will need expansion as will the police force)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%	Additional jobs will mean an increase in numbers of minority individuals, although not necessarily an increase in proportion to the entire population.		Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90			Low		
Other	.17			Low		
Total	6.77%			Low		
<u>Routt County</u>						
Spanish Surname	3.87%			Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05			Low		
Other	.06			Low		
Total	4.03%			Low		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AGRICULTURE</u> <u>Routt County</u> Crop land Pasture land	(acres) 166,147 484,238	(acres) Loss of 30 Loss of 5,897	Low Low	Base: medium (1974 Census of Agriculture) Impacts: visual estimates of present land use	

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: HAYDEN GULCH

State: COLORADO

Legal description (township and range T 5 N, R 89 W, Sec. 10: Lots 8, 9, 14, 15, Sec. 11: Lots 16, 17, Sec. 13: Lots 6, 10-17, Sec. 14: All, or metes and bounds): Sec. 15: Lots 1-16, Tr. 51, Sec. 16: Lots 3, 4, 8-10, S $\frac{1}{2}$ NE $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 21: N $\frac{1}{2}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 22: All, Sec. 23: All, Sec. 24: All, Sec. 25: All, Sec. 26: N $\frac{1}{2}$, N $\frac{1}{2}$ S $\frac{1}{2}$, Sec. 27: N $\frac{1}{2}$ NE $\frac{1}{4}$

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	Yes-High voltage transmission line accross tract.	Yes-Consent of owner of transmission line would be obtained by leasee.		
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of any sites found.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No	4.3		
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	Yes	No		2 nests in Sec. 21, S $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$ section is unsuitable—buffer zone
12. Eagle roosts and concentration areas	No	No		
13. Falcon cliff-nesting sites	No	No	Inventory cliffs for Falcon use.	
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	No		Deer and elk critical winter range—Coordination with DOW necessary.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains.	Yes		Delineation of actual flood plain boundary.	Flood plains along Temple Gulch, Dill Gulch, and Berry Gulch.
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	The bottoms of Dill Gulch and Hayden Gulch, which bound the tract on the northwest and southeast margins respectively, are possible alluvial valley floors. Both streams are perennial with local sub-irrigation occurring on the valley floors. Valley floors would not be physically disturbed by mining.		Final decision on alluvial valley floors and possible impacts on the water supply from mining upstream must be evaluated by OSM.	Observations indicate that mining on adjacent areas should have no significant impact on these valley floors provided that the alluvial aquifers are not physically disturbed.
20. State proposed criteria	No			No input received from state.

SITE-SPECIFIC MATRICES

LAY

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: LAY

State: COLORADO

Legal description (township and range
or metes and bounds): See Proposed Action of Site Specific Analysis

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	2,716,230				
Estimated mine life (years)	30				
Total reserves (tons in place)	90,541,000				
Recoverable reserves (tons)	76,959,850				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	Steam				
Sulfur content (percent)	0.49				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	50-70				
Projected work force (mining)	208				
Surface ownership (Federal, State, private, etc.)	Federal 1,878.60 Private 9,343.09 State 640				
Status of surface owner consent and/or consultation	Completion MFP Supplement, some negative replies received, mostly no response.				
Type of mine (surface/underground)	Surface				
Coal transportation needs	25 miles of railroad				
Coal access needs	NA				
Coal markets	NA				
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: LAY

State: COLORADO

Legal description (township and range
or metes and bounds): See Proposed Action of Site-Specific Analysis

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
AIR QUALITY					
GEOLOGY AND MINERALS					
Geologic hazards	Low on dipslopes, low to moderate near ridgetop along south escarpment.	None	Low-moderate	Good	
Seismic activity	Low level faulting. No major displacement visible on surface.	None	N/A	N/A	
Subsidence potential	Low-low-angle dipslopes.	None	Low-moderate	Good	
Potential for other minerals	Uranium currently being mined to the west of the tract. Low potential on the tract.	Low - there is the potential for mining claims existing on the tract.	Could prevent mine development because of litigation.	Good	

PRELIMINARY SITE SPECIFIC MATRIX LAY CREEK TRACT

Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is $22 \mu\text{g}/\text{m}^3$. No violations of standards nearby	Annual emissions estimated at 1100 tons/year increasing concentrations 0-20 $\mu\text{g}/\text{m}^3$. Impact diminishes within 1 mile of tract	Significant	Good	Will be within standards
2. SO_2	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO}_x + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX LAY CREEK TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Dinosaur National Monument (28 miles W) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Moffat County in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 100 miles SSW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	Future Energy West (5 miles SE)	None	Insignificant	-	-
12. Annual precipitation	11-13 inches	None	-	Good	-
13. Growing season >32°F	Approximately 94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-

PRELIMINARY SITE SPECIFIC MATRIX LAY CREEK TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 176 tons/year	Significant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Possible occurrence of significant Paleontological resources.	Low - none have been recorded to date.	Possible destruction by mining. Beneficial impact through additional exposure.	Low	Good	
SOILS Soil erosion potential	5% High Mid - 93% moderate 39% High Water - 55% moderate	Loss of soil, air quality impact, water quality impact.	Low - 1	High - 2	1. Significance of erosion is expected to be reduced by OSM Regulations during mine plan review. 2. Data not available to predict air quality impacts from wind erosion.
Soil reconstruction potential	Good - 9% (308 acres) Fair - 8% (274 acres) Poor - 83% (2,838 acres)	Difficult and costly reclamation on 2,838 acres.	High	High	Revegetation difficult and costly because of limiting factors noted in Table 2 on 83% of mined top dressing needed to establish and maintain vegetation.
WATER RESOURCES Surface Water Types of Occurrence	Lay Creek is intermittent. All other streams are ephemeral.	Little or none.	Very minor.	Field observations.	Stream channels would be reconstructed as required by OSM Regulations.
Quantity	Estimated runoff is about 0.5 inch (500 ac-ft) annually.	Runoff may be reduced by up to 100 ac-ft/yr during mining, but should return to approximately premining rates after mining.	Minor.	Low. Effects of development largely inferred.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quality	Good, probably contains less than 1,000 mg/l dissolved solids.	Little or none.	Very minor, any impacts should be short-term.	Low to moderate. Based on quality of water in reservoirs in the general area.	
Salinity of receiving waters (Colorado River)	Severe salinity problem; dissolved-solids concentration below Hoover Dam about 681 mg/l.	Little or no direct impact from mining. Municipal uses would increase salinity of Colorado River.	Would increase salinity of Colorado River by as much as 0.010 mg/l (0.0014 percent). Impact would be long-term.	Moderate. Based on inferred population increases.	Any increase in salinity of the Colorado River is a significant impact.
Importance to livestock and wildlife.	Temporary water furnished by 9 small reservoirs.	Four reservoirs would be removed by mining.	Minor. Sedimentation ponds would provide alternate source of water during mine life.	Field observations.	Reservoirs could be rebuilt after mining.
Importance to agriculture	Runoff from tract to agricultural areas in Bord Gulch and Lay Creek Valleys furnishes less than 5 percent of surface water supply.	Loss of as much as 25 ac-ft annually in runoff to valley floors	Minor, should be short-term.	Low. Effects of development largely inferred.	
Importance to people (individual and municipal supplies)	Runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 103-105 ac-ft/yr.	Minor impact on Yampa River. Would reduce flow in Colorado River by corresponding amount.	Moderate. Based on inferred population increase.	Any reduction in the flow of the Colorado River is a significant impact.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Erosion and sedimentation	Moderate erosion. Tract yields an estimated 0.8 ac-ft/sq.mi/yr.	Sedimentation ponds would reduce sediment yield from tract by 1-4 ac-ft/yr. This should offset any temporary increase in sediment yield from ancillary facilities.	Minor, long-term effect may be to slightly decrease annual sediment yield from affected areas.	Field observations.	
<u>Ground Water</u> Type of occurrence	Confined in bedrock fms; unconfined (water table) in alluvium in principal stream valleys.	Bedrock aquifers in mined area would be replaced with more permeable spoils aquifer. Alluvial aquifers probably would not be disturbed.	Would require future wells in mined areas to be about 200 feet deeper with correspondingly higher pumping lifts.	Moderate, but adequate	If desired, suitable wells for livestock and wildlife could be developed on tract after mining.
Quantity	Total discharge from the tract is probably less than 25 gal/min.	Probably insufficient water in pit for mining.	Required supplemental water for mine use (40-80 ac-ft/yr) can be obtained from wells 500-1,000 ft deep.		Discharge to adjacent valleys should increase slightly following mining.
Quality	Fair to good; contains 600 to 1,400 mg/l dissolved solids.	Leaching of spoils would increase dissolved-solids concentrations to 2,000-3,000 mg/l in spoils aquifer.	Minor, but should be long-term.	Inferred from similar operations in northwestern Colorado.	Should have no effect on salinity of the Colorado River.
Importance to livestock and wildlife	No stock-water wells or springs on tract.	None	- - -	Field observations.	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to agriculture	Irrigation well in Bord Gulch obtains water from alluvium. Sub-irrigation occurring in Lay Creek Valley.	Little or none, provided that the probable alluvial valley floors in Bord Gulch and Lay Creek Valleys are not disturbed.	Minor, if alluvial aquifers are not mined.	Moderate. Impact largely inferred.	Bottoms of Bord Gulch and Lay Creek Valley are almost certainly alluvial valley floors.
Importance to people (individual and municipal supplies)	One ranch well obtains water from alluvium in Lay Creek Valley.	Little or none, if alluvial aquifers are not mined.	Minor.	Moderate	
VEGETATION Presence of unique, unusual vegetation, types, associations and threatened and endangered plants	On areas surveyed (approximately 10%), no threatened or endangered plant species found. Populations of <u>Oxytropis obnapiformis</u> is located two miles south of coal lease boundary and Type Local is in the Lay area. Other populations found around Maybell and Sunbeam, as well as other threatened and endangered plant species. Riparian habitat is located T. 8 N, R. 93 W, sec. 28.	Possible destruction of threatened and endangered population on the mining area. Also, possible destruction of threatened and endangered plants around Lay, Sunbeam and Maybell from population expansion, urbanization and increase in outdoor recreational vehicle use. If the river bottom around Lay Creek is proved unsuitable, impacts on riparian habitat would be slight, if any. If it is stripped, then loss of 255 acres would occur.	Insignificant -- Other sizable populations do exist, if full scale coal development occurs in this area, efforts should be made to protect a sizable population and habitat to prevent extinction (an extinct species is one which we can learn little about). Significant in relation to riparian habitat.	July 1, 1975 and June 16, 1976 Federal Register, Threatened and Endangered Species List; Colorado Native Plant Society Working List of T & E plants; communication with Dieter Wikens, Herbarium Curator CSU and studying in herbarium with threatened and endangered species for identification in field; on the ground survey of approximately 10% of total acreage excluding area stated in Comments.	Areas not surveyed (10% coverage) due to change of boundaries are: R. 93 W, T. 8 N, sec. 24, SE 1/4 SW 1/4; S 1/2 SW 1/4, sec. 35-N 1/2 NE 1/4 sec. 36-N 1/2 N 1/2 R. 92 W, T. 8 N, sec. 30 - A11 sec. 19 - S 1/2 S 1/2 sec. 31 - N 1/2 N 1/2 Efforts should be made for possible reseedling of unique plants, so as not to eliminate.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Ground cover Types 1/ Sagebrush 4 Barren Mt. shrub 5a Cropland 19 Juniper 9 Riverbottom 20a	Sagebrush 6855 ac ^{2/} 53% Barren Mt. Shrub 3505 ac 27% Cropland 1340 ac 10% Juniper 510 ac 4% River bottom 710 ac 6% Average ground cover for total 12,920 acres is 52% ^{3/} Sagebrush 62.5% } Barren Mt. } Shrub 37.5% } Cropland 37.5% } 4/ Juniper 37.5% } Riverbottom 85.0% }		Insignificant if reclamation is achieved.	1/ Final Environmental Statement, NW Co. Coal; Regional Analysis, Terrestrial Flora, p. 12-129. 2/ Williams Fork P.U. MFP Veg. Step I, Aerial photos, on site inspections. 3/ Pieper, Rea D. "Measurement Techniques for Herbaceous and Shrubs and Vegetation, Chapter IV, Measuring Cover, p. 72." 4/ Rated according to percent ground surface cover by vegetation of 3420 acres to be mined. Projected loss: Sagebrush 1569 ac 45% Barren Mt. Shrub 1038 ac 30% Cropland 245 ac 7% Juniper 320 ac 10% Riverbottom 255 ac 8%	Delineation of vegetation types in areas not surveyed and without photo coverage were taken from W.F.P.U., U.R.A., Veg. Step II.

Element	Present Situation		Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
WILDLIFE	<u>Acres</u>	<u>% of Total</u>	<u>Acres Disturbed (with reclamation) Year 2017</u>			
Habitat:						
Big Sagebrush	6,855	53	2,910 = Mod. neg.	Low negative	Good	Natural revegetation will take 20 years.
Mountain shrub	3,505	27	1,490 = Mod. neg.	Low negative	Good	
Juniper	510	4	254 = Mod. neg.	No change	Good	50-year replacement time.
Cropland	1,340	10	636 = Mod. neg.	No change	Good	Replacement of these scarce areas will be difficult.
Riparian	710	6	381 = High neg.	Moderate negative	Good	
Aquatic		-1	= High neg.	Moderate negative	Good	
Populations	<u>Level of Use</u>		<u>Resid. Impacts</u>			
Sage Grouse	Average		High neg. 75%	Local = High neg.	Good	Mitigating measures have low chance of success.
Golden Eagle	High		Mod. neg. 25%	County = Low neg.	Good	
Other Raptors	Average		High Neg. 75%	Mod. neg.	Fair	Mitigation success doubtful.
Deer	Average		No Change 0	No change	Good	
Antelope	Low		No change 0	No change	Good	
Non-game birds and mammals	Unknown		Not assessable	Low neg.	Poor	
Reptiles and amphibians	Unknown		Not assessable	Low neg.	Poor	
Ducks	Average		Mod. neg. 25%	Local - Mod. Neg. County = No change	Good	
Threatened or Endangered Fisheries	None occur		--	--	Good	
	None occur		--	--	Good	

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	* Increase in parametric value of 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

* Parameters considered are quantity of habitat and/or numbers of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
WILD HORSES					
WILDERNESS VALUES					
VISUAL RESOURCES	Open air, agricultural environment, view from Moffat County Road N-17. Rolling hills and bluffs with sage, grasses, and some juniper. Class III and IV.	Primary visual considerations will include area to be stripped of coal. Minimal to no impact at end of mine life.	Severe on short-term basis. Minimal on long-term.	Excellent.	The nature of strip mining concludes the extent of visual disturbance.
Noise	Road traffic, farm machinery, natural sounds from domestic livestock and native wildlife.	Severe intrusion of heavy equipment, possible rail cars, and increased traffic volume on Moffat County Road N-17. Minimal to no impact at end of mine life.	Severe on short-term basis; none on long-term basis.	Excellent.	Necessary equipment to remove coal.
RECREATION RESOURCES	No public access. Hunting by permission of private land owners. Possible wildlife observation from Moffat County Road N-17.	Loss of some private hunting. Loss of possible wildlife observation. Minimal to no impact at end of mine life.	Minimal on short-term basis; none on long-term basis.	Poor.	No recreation data. No traffic volume data.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
CULTURAL RESOURCES Cultural/Historical values	Ten percent reconnaissance class II of tract completed. Located four historic sites, 15 prehistoric sites/isolated finds, and one site of unknown age.	Eighty percent probability of additional prehistoric sites/isolated finds on ridgetops and benches in southern half of tract. Thirty percent probability for remainder for tract; 70-80 percent of historic sites will be in drainage bottoms.	Sixty percent probability of locating sites eligible to the National Register of Historic Places.	Good.	
LAND USE					
TRANSPORTATION Employee transportation	Existing highway.	Increased traffic on U.S. 40. Increased accidents.	Very low. Moderate.	High (95% probability) High (85% probability)	
Product transportation	Addition to existing rail system.	Increased surface disturbance. Increased hazard ratings. Increased rail traffic	Low Moderate Very low	High(100% probability) High (80% probability) High(100% probability)	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: LAY

State: COLORADO

Legal description (township and range
or metes and bounds): See Proposed Action of Site-Specific Analysis

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments		
POPULATION								
Craig	7,715	18,274	+ 878	Low	Base: Good (1977 Census) Projections: Based on input-output model.	Proposed action impact is low, but area will already be heavily impacted.		
Hayden	<u>1,548</u>	<u>2,707</u>	+ 110	Low				
Total	9,263	20,981	+ 988	Low				
ECONOMICS								
Moffat & Routt Counties:								
Employment								
Mining	1,001	2,060	208	Medium	Base: Medium (derived from input-output model)			
Other	<u>8,784</u>	<u>15,902</u>	<u>178</u>	Low				
Total	9,785	17,962	386	Low	Projections: USGS and model.			
Income								
Mining	\$ 20,506	\$ 42,201	\$4,261	Medium				
Other	<u>88,728</u>	<u>164,454</u>	<u>2,043</u>	Low				
Total	\$109,234	\$206,655	\$6,304	Low				

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
PUBLIC FINANCE	(000)	(000)				
Counties						
Revenue	\$ 12,095					
Debt	348					
Communities						
Revenue	3,313					
Debt	671					
School Districts Assessed valuation	200,183					
INFRASTRUCTURE						
Housing						
Craig	3,170	6,630	+286	LOW	Base: Good (1978, DOE publication) Projections: Fair (Based on Input/Output Model)	Trended environment will require 106% increase in housing units, the addition of Lay Tract to the trended environment would require a 115% increase.
Hayden	496	915	+ 36	LOW		
Total	3,666	7,545	+322	LOW		
SCHOOL CAPACITY						
Craig	2,350	6,213	+299	LOW	Base: Good (Personal contacts with each school) Projections: Four (Assumes a coordination of the 1978 student/population ration)	Trended environment will require a 122% increase in student capacity. Inclusion of Lay Tract would require a 132% increase.
Hayden	875	947	+ 39	LOW		
Total	3,225	7,169	+338	LOW		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
HOSPITAL BEDS						
Craig	30	46	+2	Low	Base: Good (Personal contacts with each hospital Projections: Good (Based on National Standards))	Trended environment will require a 53% increase in hospital beds. The addition of Lay Creek to this environment would require a 60% total increase.
Hayden	20	29	+0	Low		
Total	50	75	+2	Low		
POLICE OFFICERS						
Craig	17	31	+2	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will require an 80% increase in police officers. Inclusion of Lay Tract will require a total 90% increase.
Hayden	3	5	+0	Low		
Total	20	36	+2	Low		
FIRE PUMPING CAPACITY						
Craig	2,800	4,127	+88	Low	Base: Good (Personal contacts with each department. Projections: Good (Based on National Standards))	Trended environment will require a 10% increase in current capacity. Lay Tract would necessitate an additional 2% increase.
Hayden	2,500	1,677	+27	Low		
Total	5,300	5,804	+115	Low		
WATER SYSTEM CAPACITY						
Craig	5.00	2.74	+ .13	Low	Base: Good (Personal contacts with each community) Projections: Fair (Based on National Standards)	Both community water systems are currently capable of serving the population increases for the trended environment and the Lay Tract development.
Hayden	.64	.41	+ .01	Low		
Total	5.64	3.15	+ .14	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
SEWER SYSTEM CAPACITY						
Craig	.90	3.07	+ .15	Medium	Base: Good (Personal contacts with each community's public works office). Projections: Fair (Based on National Standards).	Trended environment will necessitate an overall 85% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional five percent increase. Nonetheless, Hayden's system will still be 53% below capacity.
Hayden	1.00	.45	+ .02	Low		
Total	1.90	3.52	+ .17	Medium		
300 SOLID WASTE (Acres Needed Per Year)						
Craig	1.62	3.84	+ .18	Low	Base: Good (Personal contacts with each community's town hall). Projections: Fair (Based on National Standards).	Trended environment will require a 126% increase in the number of acres needed by 1995; development of this tract will require an additional five percent increase.
Hayden	.33	.57	+ .02	Medium		
Total	1.95	4.41	+ .20	Medium		
SOCIAL SERVICES Number of Public Assistance Cases						
Moffat	333	665	+ 48	Medium	Base: Good (Colorado Department of Social Services). Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population).	Trended environment will result in a 78% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional five percent increase.
Routt	269	406	+ 2	Low		
Total	602	1071	+ 50	Medium		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school, and solid waste facilities will need expansion.	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%		Additional jobs will mean	Low	Base: Good (Colorado State Planning Division)	
Black	.07		an increase in numbers of	Low		
American Indian	.90		minority individuals,	Low		
Other	.17		although not necessarily an	Low		
Total	6.77%		increase in proportion to	Low		
<u>Routt County</u>						
Spanish Surname	3.87%		the entire population.	Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05			Low		
Other	.06			Low		
Total	4.03%			Low		

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AGRICULTURE</u>					
Moffat County	(Acres)	(Acres)		Base: Medium (1974 Census of Agriculture)	
Cropland	242,103	Loss of 1,156	Low		
Pasture land	904,291	Loss of 11,655	Low	Impacts: Visual estimates of present land use	

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number LAY

State: COLORADO

Legal description (township and range or metes and bounds): See Proposed Action of Site-Specific Analysis

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	Yes	Yes	- - -	Lessee would have to negotiate with pipeline right-of-way holder.
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of sites found.	No site eligible to NRHP found to date.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	Yes	No		Buffer zones have been established in coordination with USFWS
12. Eagle roosts and concentration areas	Yes	No		
13. Falcon cliff-nesting sites	No	No	Potential in sections 5 and 6, T. 7 N, R. 93 W.	Coordination with USFWS and Colorado Division of Wildlife. This township not reviewed for unsuitability.
14. Migratory birds	Yes	No		
15. State resident fish and wildlife	Yes	No	Mitigating measures Buffer zone	Deer critical winter range Sage grouse strutting ground

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	Yes	No	- - -	Lay Creek and Bord Gulch are unsuitable.
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	The bottoms of Bord Gulch and Lay Creek Valley on the tract are almost certainly alluvial valley floors.	---	Final decision on alluvial valley floors and possible impacts on the water supply by mining upstream must be evaluated by OSM.	Observations indicate that mining on adjacent areas should have no significant impact on these valley floors, provided that the alluvial aquifers are not actually disturbed.
20. State proposed criteria	No			

SITE-SPECIFIC MATRICES

DANFORTH HILLS #2

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: DANFORTH HILLS #2

State: COLORADO

Legal description (township and range or metes and bounds): T. 3N, R. 93W, Sec. 5: Lots 1, 2, S 1/2 NE 1/4, SE 1/4, Sec. 7: Lots 4-6, 9, 10, NE 1/4 NE 1/4, S 1/2 NE 1/4, SE 1/4 Sec. 8: All, Sec. 17: All, Sec. 18: Lots 1-6, NE 1/4, E 1/2 W 1/2, SE 1/4

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	4,298,500				
Estimated mine life (years)	30				
Total reserves (tons in place)	151,710,000				
Recoverable reserves (tons)	128,953,000				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	C Bituminous Steam				
Sulfur content (percent)	.41				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	60 - 80				
Projected work force (mining)	250				
Surface ownership (Federal, State, private, etc.)	Federal 723.23 State 0 Private 1890.49				
Status of surface owner consent and/or consultation	No reply during surface owner consultation				
Type of mine (surface/underground)	Surface				
Coal transportation needs	30 miles of railroad				
Coal access needs	3-4 miles of access road ^s				
Coal markets	--				
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: DANFORTH HILLS #2

State: COLORADO

Legal description (township and range or metes and bounds): T. 3N, R. 93W, Sec. 5: Lots 1, 2, S 1/2 NE 1/4, SE 1/4, Sec. 7: Lots 4-6, 9, 10, NE 1/4 NE 1/4, S 1/2 NE 1/4 SE 1/4 Sec. 8: All, Sec. 17: All, Sec. 18: Lots 1-6, NE 1/4, E 1/2 W 1/2, SE 1/4

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	No faults. Dips average 5° to northeast	None	None	Good	
Seismic activity	No faults. No recorded major occurrences.	None	None	Good	
Other minerals	No known occurrences on tract. Slight potential for oil & gas. Several existing O&G fields within 6 miles.	None	Low	Good	

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 2 TRACT
Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is 22 $\mu\text{g}/\text{m}^3$. No violations of standard nearby	Annual emissions estimated at 1000 tons/year increasing concentrations from 0-20 $\mu\text{g}/\text{m}^3$. Impact diminishes within 1 mile of tract	Significant	Good	Concentrations from tract within standards. Combined concentrations from other proposed lease tracts may approach standards
2. SO ₂	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO _x (NO _x + NO _x)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Levels approaching standard measured in Rio Blanco County (tract adjacent to county)	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O ₃	Levels approaching standard measured in Rio Blanco County	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 2 TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (44 miles SE), Dinosaur National Monument (36 miles NW) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Moffat and Rio Blanco Counties in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 80 miles SW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Proposed lease tracts Danforth Hills 1 and 3 strip mines (adjacent) Colowyo strip mine (5 miles NE)	Concentrations will be increased by adjacent Danforth Hills 1 and 3 strip mines	Possibly significant	Fair	-
12. Annual precipitation	11-13 inches	None	-	Good	-

PRELIMINARY SITE SPECIFIC MATRIX DANFORTH HILLS NO. 2 TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
13. Growing season >32°F	Approximately 94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 45 tons/year	Insignificant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). No and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments												
<u>Paleontological resources</u>	No fossils of unique scientific value recorded to date.	Possible destruction of fossils beneficial impact from increased exposure.	Low	Fair													
<u>SOILS</u> Soil erosion potential	<table border="0"> <tr> <td>High</td> <td>6%</td> </tr> <tr> <td>Wind - Moderate</td> <td>90%</td> </tr> <tr> <td>Low</td> <td>0%</td> </tr> <tr> <td>High</td> <td>91%</td> </tr> <tr> <td>Water - Moderate</td> <td>5%</td> </tr> <tr> <td>Low</td> <td>0%</td> </tr> </table>	High	6%	Wind - Moderate	90%	Low	0%	High	91%	Water - Moderate	5%	Low	0%	Loss of soil by wind and water erosional forces. Adverse impact on air quality.	Moderate (1)	High	(1) Significance of impacts would be high due to the water erosion potential. However, a moderate is given anticipating O.S.M. reclamation regulations.
High	6%																
Wind - Moderate	90%																
Low	0%																
High	91%																
Water - Moderate	5%																
Low	0%																
Soil reconstruction potential	<table border="0"> <tr> <td>Good -</td> <td>0%</td> </tr> <tr> <td>Fair -</td> <td>4%</td> </tr> <tr> <td>Poor -</td> <td>96%</td> </tr> </table>	Good -	0%	Fair -	4%	Poor -	96%	Severe problems with soil reconstruction and stabilization on 96% of mined area Loss of soil productivity on off site facilities & new housing developments.	High (1)	High	(1) Revegetation would be difficult and costly on 96% of mined area. Top dressing and surface stabilization would be needed to establish and maintain vegetation.						
Good -	0%																
Fair -	4%																
Poor -	96%																
<u>WATER RESOURCES</u> Surface Water - Types of occurrence	Wilson Creek is perennial. Taylor Creek is intermittent. All other streams on the tract are ephemeral.	Wilson Creek would not be physically disturbed by mining. Virtually all other channels on the tract would be removed by mining and must be reconstructed.	Minor, provided that stable channels can be reconstructed on the steep gradients that occur on the tract.	Field observations.	All stream channels would be reconstructed to standards established by OSM regulations.												
Quantity	Runoff from the tract estimated to be only about 12 ac-ft/yr.	Runoff to Wilson Creek should be reduced by no more than 5 ac-ft/yr as a result of mining on the tract.	Minor and short term. After reclamation, runoff from the tract should return to approximately premining rates.	Inferred from field observations and from similar operations at other surface coal mines in a northwestern Colorado.	Because of evapotranspiration losses downstream, use of water on the tract would not necessarily reduce water yield to the Yampa River.												

Element	Present Situation	Trends in 1995	Anticipated Effect o. Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+250	Medium	Base: Good (DOE publication and personal contacts with COG offices) Projections: Fair (Based on number of households projected by CSU I/O Model)	Trended environment will require a 136% increase in total number of housing units, development of this tract will mean an additional four percent increase.
Hayden	497	915	+ 30	Low		
Meeker	<u>774</u>	<u>2933</u>	<u>+157</u>	Medium		
Total	4441	10478	+437	Medium		
School Capacity						
Craig	2350	5976	+249	Medium	Base: Good (Personal contacts with each school) Projections: Fair (Assumes a continuation of 1978 student population ratio.)	Trended environment will increase student enrollment 148% by 1995 which will necessitate a 127% increase in school capacity. Development of this tract will require an additional four percent increase in school capacity.
Hayden	875	885	+ 30	Low		
Meeker	<u>1155</u>	<u>2778</u>	<u>+156</u>	Medium		
Total	4380	9938	+435	Medium		
Hospital Bed Capacity						
Moffat	30	46	+ 2	Low	Base: Good (Personal contacts with each hospital) Projections: Good (Based on National Standards)	Trended environment will require an 8% increase in bed capacity, development of this tract will require an additional three percent increase.
Rouff	20	29	0	None		
Rio Blanco	<u>45</u>	<u>28</u>	<u>+ 1</u>	Low		
Total	95	103	+ 3	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Police Officers						
Craig	17	31	+ 1	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 121% increase in the number of police officers in the area; development of this tract would mean an additional six percent increase.
Hayden	3	5	+ 1	High		
Meeker	<u>4</u>	<u>17</u>	<u>+ 1</u>	High		
Total	24	53	+ 3	Medium		
Fire Pumping Capacity						
Craig	2800	4127	+77	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean an additional two percent increase.
Hayden	2500	1677	+23	Low		
Meeker	<u>1225</u>	<u>2812</u>	<u>+60</u>	Low		
Total	6525	8616	+160	Low		
Water System Capacity						
Craig	5.00	2.74	+ .12	Low	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	Craig's and Hayden's system will be able to handle the demand without problems. Meeker's system will require a 33% expansion for the trended environment; development of this tract will require a six percent additional increase.
Hayden	.64	.41	+ .01	Low		
Meeker	<u>2.88</u>	<u>3.82</u>	<u>+ .22</u>	Medium		
Total	8.52	6.97	+ .35	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Sewer System Capacity						
Craig	.90	3.07	+13	Medium	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended environment will necessitate an overall 115% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional five percent increase. Nonetheless, Hayden's system will still be 53% below capacity.
Hayden	1.00	.45	+02	Medium		
Meeker	<u>.40</u>	<u>1.43</u>	<u>+08</u>	Medium		
Total	2.30	4.95	+23	Medium		
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	+16	Medium	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 141% increase in the number of acres needed by 1995; development of this tract will require an additional five percent increase.
Hayden	.33	.57	+02	Medium		
Meeker	<u>.62</u>	<u>1.78</u>	<u>+10</u>	Medium		
Total	2.57	6.19	+28	Medium		
Social Services						
Number of Public Assistance Cases						
Moffat	333	665	+23	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population.)	Trended environment will result in an 81% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional three percent increase.
Routt	269	405	+ 2	Low		
Rio Blanco	<u>167</u>	<u>322</u>	<u>+10</u>	Low		
Total	769	1393	+35	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School, sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school and solid waste facilities will need expansion)	Low	Low	Good	
Meeker	Fair (Housing, police officers, and fire pumping capacity should be expanded)	Poor (All but hospital and solid waste facilities will have to be expanded)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect o. Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%		Additional jobs will mean	Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90		an increase in number of	Low		
Other	.17			Low		
Total	6.77%		minority individuals, although	Low		
<u>Routt County</u>						
Spanish Surname	3.87%		in proportion to the entire	Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05		population.	Low		
Other	.06			Low		
Total	4.03%			Low		
<u>Rio Blanco County</u>						
Spanish Surname	2.50%			Low		
Black	.38			Low		
American Indian	.22			Low		
Other	.07			Low		
Total	3.17%			Low		

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: DANFORTH HILLS #2

State: COLORADO

Legal description (township and range or metes and bounds): T. 3N, R. 93W, Sec. 5: Lots 1, 2, S 1/2 NE 1/4, SE 1/4, Sec. 7: Lots 4-6, 9, 10, NE 1/4 NE 1/4, S 1/2 NE 1/4 SE 1/4 Sec. 8: All, Sec. 17: All, Sec. 18: Lots 1-6, NE 1/4, E 1/2 W 1/2, SE 1/4

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	Yes	N/A - possible to use #5	ROW holder would not provide cost/mile to move existing line.	ROW holder will not move right of way 345 KV Craig to Rifle 150 foot ROW - cost prohibitive to move.
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of any sites.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	Unknown		Field survey to locate nests and roosts	
12. Eagle roosts and concentration areas	Unknown		Field survey to locate nests and roosts	
13. Falcon cliff-nesting sites	Unknown		Field survey to locate nests and roosts	
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	No	Mule deer critical winter range. Coordination with DOW necessary.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	No			
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	The bottom of Wilson Creek in northwestern part of tract is almost certainly an alluvial valley floor. The bottom of Taylor Creek Valley on the tract is a possible alluvial valley floor		The possible impacts of mining on the tract on the alluvial aquifers in Wilson Creek and Taylor Creek Valleys must be evaluated by OSM.	Field observations indicate that mining on the tract should have no significant impact on the alluvial aquifer in Wilson Creek Valley, but would seriously impact the hydrologic function of the possible alluvial valley floor in Taylor Creek Valley.
20. State proposed criteria	No			No data received from state

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quality	Surface runoff is a magnesium, calcium, sodium, sulfate, bicarbonate type and contains about 675 mg/l dissolved solids.	No significant effect during mining. Leaching of spils would probably increase salt load to Yampa and Colorado Rivers by about 90 Ton/yr. over the long term.	No significant impact on aquatic biology of receiving waters, but would increase salinity of Colorado River.	Inferred from field observations and water quality data.	No acid water problems are expected as a result of mining.
Salinity of receiving waters	No current salinity problem in Yampa River. Severe salinity problem in Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of mining and increased population would increase salinity of Colorado River by 0.0013 percent by 1987, by 0.0019 percent from 1990 to end of mine life, and by 0.0028 percent over the long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases and post-mining leaching of the spoils aquifer.	Principal cause of long-term increase in salinity is the leaching of reclaimed soils in the mined area.
Importance to livestock and wildlife	Permanent water provided by Wilson Creek. Seasonal water provided by intermittent flow in Taylor Creek and by five small reservoirs.	All five existing reservoirs would be removed by mining and Taylor Creek would probably change from intermittent to ephemeral stream.	Minor. Sedimentation ponds should provide alternative source of water during mining.	Field observations	If desired, reservoirs could be reconstructed as part of reclamation plan.
Importance to agriculture	Hay meadows exist on the bottom of Wilson Creek Valley in the northwestern part of the tract. No agriculture on that part of tract that would be mined.	None	None	Field observations	
Importance to people (individual and municipal supplies)	Surface runoff from tract not used for individual or municipal supplies	None on tract. Consumptive use of Yampa River water by increased population would be about 146 ac-ft/yr by 1987 & 209 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Based on inferred population increases from mining.	Any reduction in flow in the Colorado River is a significant impact.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Erosion and sedimentation	Tract appears to be very stable except for erosion along existing unimproved roads. Estimated sediment yield from tract is about 0.61 ac-ft/yr.	Any change in sediment yield as a result of mining and associated urbanization would be less than 0.1 ac-ft/yr. assuming that reclamation is successful. Increased sediment yield from construction of ancillary facilities cannot be estimated until routes are known. Increases, however, should be small.	Insignificant, provided that reclamation effectively stabilizes the steep slopes on the tract.	Based on field observations and inferred effects of increased population.	If reclamation of steep slopes is not successful, erosion and sediment yield could be 10 times premining rate.
GROUND WATER Type of occurrence	Perched conditions in bedrock aquifers above level of Wilson Creek Valley and confined (artesian) conditions below that level. Unconfined (water table) conditions in alluvial aquifers bottoming Wilson Creek and Taylor Creek Valley.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer characterized by unconfined conditions. Alluvial aquifer in Taylor Creek Valley would probably be permanently impaired. Alluvial aquifer in Wilson Creek Valley would not be disturbed.	Would probably eliminate underflow in Taylor Creek alluvium. Would require future wells in the mined area to be about 350 feet deeper with correspondingly higher pumping lifts.	Moderate. Inferred from field observations, well data and geology of tract.	
Quantity	Total ground-water discharge from the tract is estimated to be about 30gal/min.	All ground-water discharge would come during mining. After reclamation, discharge from the tract should increase to as much as 40 gal/min.	Very minor	Inferred from field observations and geology of tract.	New springs may form on east side of Wilson Creek near north western corner of tract.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quality	Perched aquifers yield magnesium, calcium, sulfate water containing 500 - 1,000 mg/l dissolved solids. Confined deep aquifers yield sodium bicarbonate water with 500-1,000 mg/l dissolved solids.	Leasing of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 2,000 mg/l.	Would have no significant effect on use of water by livestock and wildlife, but long-term increase in salt load to Yampa and Colorado Rivers is estimated to be about 90 tons/yr.	Inferred from similar operations in the Yampa Coal Field and from field measurements of specific conductance of water samples	See surface water for effect of spoils leachate on salinity of Colorado River.
Importance to livestock and wildlife	Only one stock water well exist on the tract.	Well would not be impacted.	None	Field observations	Well on bottom of Wilson Creek Valley, which would not be disturbed by mining.
Importance to agriculture	Hay meadows exist on bottom of Wilson Creek Valley in northwestern part of tract. No agriculture on that part of tract that would be mined.	Little or none.	Little or none	Field observations	Hay meadows in Wilson Creek Valley are not dependent on ground-water discharge from the tract.
Importance to people (Individual and municipal supplies)	Ground water on or discharging from the tract is not used for any domestic supplies.	None	None	Field observations	
<u>VEGETATION</u>					
Presence of unique, unusual vegetation, types, associations, and T & E plants	There are no T & E plants known to inhabit the immediate proposed mining site. In the NW, the River Bottom traverses the lease area. This has potential for having unique vegetation.	Poss. of losing T&E plant pop. within the lease area as a result of the proposed action, 6 acres of riverbottom would be disturbed according to the tract delineation reports.			

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Ground Cover	Sagebrush 1233 ac/47% Grassland 705 ac/27% Mt. Shrub 285 ac/11% Aspen Wood lds 225ac/9% Riverbottoms 165 ac/6% Ave. ground cover . Sagebrush 71.5% Sagebrush 62.5% Grassland 62.5% Mt. Shrub 85% Aspen Woodlands 85% Riverbottoms 62.5%	<u>VEG LOSS - ON-SITE</u> 1987 400 - 600 ac. 1990 570 - 770 ac. 1995 995 -1195 ac. 2017 2950 -3150 ac. <u>VEG LOSS - OFF SITE</u> 1987 975 acres 1990 1016 acres 1995 1016 acres 2017 1016 acres <u>VEG TYPES - LOSS</u> Sagebrush 1232 ac/50% Grassland 705 ac/28% Mt. Shrub 295 ac/11% Aspen 225 ac/9% Riverbottom < 19%/6 ac.	LOW	GOOD	
WILDLIFE					
A. Habitat	<u>Acres</u> <u>% of Total</u>	<u>Acres Disturbed</u> 2017			
1. Sagebrush	1233 47	2550 = Hi neg	Lo neg		
2. Mt. Shrub	285 11		Lo neg		
3. Grassland	705 27		No change		
4. Aspen	225 9		No change		
5. Riparian	165 6		No change		
B. Populations	<u>Level of Use</u>				
1. Deer	Average	Lo neg	Lo neg		Good
2. Elk	Average	Lo neg	Lo neg		Good
3. Blue & Sage Grouse	Average and Low	Local = Lo neg County = No change	No change		Good
4. Beaver	Low	Lo neg	No change		Good
5. Nongame birds & Mammals	Unknown	Not assessible	No change		Poor
6. Reptiles & Amphibians	Unknown	Not assessible	No change		Poor
7. Golden Eagle & other raptors	Unknown	Not assessible	Lo neg		Poor

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
8. Waterfowl	Low	Lo neg	No change	Good	
9. Threatened or Endangered	None occur	---	---	---	
10. Fisheries	None occur	---	---	---	

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

1/ Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Cultural/Historical Values	Approximately 620 acres surveyed on a class II survey, and approximately 5 acres on 2 class III surveys. No prehistoric or historic sites located and recorded. One prehistoric isolated find located.	15% probability of prehistoric sites/isolated finds on ridges and knolls overlooking drainages or as rock art/shelter on rock outcropping on slopes. 5% probability on remainder of tract; 90% probability for historic sites being found along drainage bottoms and where access is available, 10% probability for remainder of tract.	5% probability of locating sites eligible to the National Register of Historic Places.	Good - Outstanding	
Recreational Values	No public access 40-50' hunters by access holders.	Loss of hunting for 40-50 hunters to be displaced to other locations.	Insignificant	Good	
WRM	Class IV mountain shrub community steep terrain.	Severe disruption to landscape.	Minimal due to existing oil, gas, and coal activities and viewing clientele.	Good	
Noise	Oil, gas, coal and agriculture.	Increased coal mine associated noise and traffic volume	Minimal (except to the few residents in the area).	Good	
Employee transportation	1. U.S. 40 & S.H. 13	1. 18% increase in traffic accidents 2. Increased road maintenance costs.	1. Moderate 2. Low	1. 90% probability 2. 80% probability	
Product transportation	1. DRGW railroad	1. Increased grade crossing hazard ratings by approx. .30 acc/5 years.	3. Moderate	1. 90% probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: DANFORTH HILLS #2

State: COLORADO

Legal description (township and range

or metes and bounds): T 3N, R 93W of 6th Principal Meridian

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	763	Low	Base: good (1977 Census) Projections; based on input-output model.	Proposed action impact is low, but area will already be heavily impacted.
Meeker	2,976	8,494	479	Medium		
Hayden	1,548	2,707	91	Low		
Total	12,239	29,475	1,333	Low		
<u>ECONOMICS</u>						
(Moffat, Rio Blanco and Routt Counties)						
Employment					Base: medium (derived from input-output model)	Projections: USGS and model
Mining	1,471	7,174	250	Low		
Other	11,645	20,397	275	Low		
Total	13,116	27,571	525	Low		
Income (thousand)						
Mining	\$ 31,460	\$152,607	\$5,121	Low		
Other	126,440	210,909	3,049	Low		
TOTAL	\$157,900	\$363,516	\$8,170	Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
	(000)	(000)				
Counties						
Revenue	\$16,426					
Debt	348					
Communities						
Revenue	3,838					
Debt	671					
School districts assessed valuation	223,542					
<u>AGRICULTURE</u>						
Moffat County	(Acres)		(Acres)		Base: Medium (1974 Census of Agriculture)	
Cropland	242,103		Loss of 30	Low		
Pasture land	904,291		Loss of 2,575	Low	Impacts: Visual estimates of present land use.	

SITE-SPECIFIC MATRICES

PINNACLE

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: PINNACLE

State: COLORADO

Legal description (township and range or metes and bounds): T. 4 N, R. 86 W, sec. 7: Lots 5, 6, T. 5 N, R. 87 W; sec. 36: Lot 6-9, 14-15, NW 1/4 NW 1/4

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	90,000				
Estimated mine life (years)	10				
Total reserves (tons in place)	1,095,240				
Recoverable reserves (tons)	930,954				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	Steam				
Sulfur content (percent)	0.55				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	10				
Projected work force (mining)	10				
Surface ownership (Federal, State, private, etc.)	Federal 313.22 Private 0 State 0				
Status of surface owner consent and/or consultation	No reply during surface owner consultation.				
Type of mine (surface/underground)	Surface				
Coal transportation needs	- -				
Coal access needs	15 miles of access roads				
Coal markets	- -				
Other as determined by Regional Coal Team	- -				

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: PINWACLE

State: COLORADO

Legal description (township and range or metes and bounds): T. 4 N, R. 86 W, sec. 7: Lots 5, 6, T. 5 N, R. 87 W; sec. 36: Lots 6-9, 14-15, NW 1/4 NW 1/4

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	Low-moderate due to increased subsurface water.	Increased landslide potential.	Moderate to high.	Good	
Seismic activity	Moderate-high evidence of fault on the surface with high potential for displacement.	None	Low	Good	The high degree of faulting is going to make mining difficult.

PRELIMINARY SITE SPECIFIC MATRIX PINNACLE TRACT
Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is 22 $\mu\text{g}/\text{m}^3$. No violations of standard monitored nearby	Annual emissions estimated at 85 tons/year increasing emissions 0-5 $\mu\text{g}/\text{m}^3$. Impact deminishes within one-half mile of tract	Significant	Good	Will be within standards
2. SO_2	Very low levels (5-11 ppbv) at several locations N of Hayden (8-10 miles N of tract)	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO} + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX PINNACLE TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (28 miles S), Mount Zirkel (23 miles NE) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Routt County in AQCR 12	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 120 miles SW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Future Rockcastle strip mine (4 miles NW), Energy Fuel strip mine (4 miles NE), Sheridan strip mine (2 miles E), Future Energy West strip mine (4 miles SE), P & M Edna strip mine (5 miles ESE)	Low level of emissions will have only a negligible effect on concentrations off site	Insignificant	Fair	-

PRELIMINARY SITE SPECIFIC MATRIX PINNACLE TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
12. Annual precipitation	13-16 inches	None	-	Good	-
13. Growing season >32°F	Approximately 76-94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 10 tons/year	Insignificant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Subsidence potential	Low-moderate due to increased subsurface water.	Increased due to surface disturbance.	Moderate to high.	Good	There are several springs on this tract that increase the potential for subsidence.
Potential for other minerals	Low - No other mineral occurrences of economic interest are known to exist.	None	Low	Good	
Paleontology	Low - No significant finds have been recorded to date in the Williams Fork Formation.	Low - There exists the potential for possible destruction but also new exposure may be a beneficial impact.	Low	Good	
SOILS					
Soil erosion potential	Wind-Data not available -60% High Water-34% Moderate - 6% Not rated	Loss of soil by water erosion on 114 acres per year.	Low	High	Low - Significance of erosion is expected to be reduced by OSM reevaluations during mine plan review. High - Data is based on Soil Conservation Service and soil series descriptions, as more information is received the wind erosion potential can be updated.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Soil reconstruction potential	Good - 0% Fair - 34% Poor - 60%	Difficult and costly reclamation for 211 acres.	High	High	High - Severe problems with soil revegetation and stabilization. Top dressing necessary to establish and maintain vegetation.
<u>WATER RESOURCES</u>					
<u>Surface Water</u>					
Types of occurrence	Two streams draining the tract are springfed and thus perennial below an altitude of about 7,100 feet.	Perennial flow would permanently cease in mined area. Flow would probably resume downstream from mined area.	Permanent loss of surface water in mined area with corresponding loss of riparian habitat.	Moderate. Inferred from field observations and geology of tract.	Stream channels would be reconstructed as required by DSM regulations, but would be ephemeral streams after mining.
Quantity	Runoff from tract probably averages about 2 inches per year (about 60 ac-ft/yr.	Runoff would be reduced by about 20 ac-ft/yr, which is the amount of water used in mining operations.	Minor and short-term. After reclamation, runoff to Fish Creek should approximate premining rates.	Low to moderate. Inferred from observed base flow in perennial streams.	Any use of water on tract would reduce accordingly. The volume of water available for other uses downstream.
Quality	Base flows contain 500 to 1,000 mg/l dissolved solids and have pH of 7.9 to 8.2. Fish Creek has about 570 mg/l dissolved solids and pH of 8.3.	No significant effect during mining. Leaching of spoils aquifer after reclamation would increase dissolved solids concentrations to about 2,000 mg/l.	No significant impact on Fish Creek, but would increase salt load to Colorado River by about 200 tons/yr over long-term.	Inferred from ongoing operations at nearby Energy Fuels Mine.	Increased salinity should have no significant impact on aquatic biology downstream.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Salinity of receiving waters (Colorado River)	No salinity problem in Yampa River. Severe salinity problem in Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of mining and increased population would increase salinity in Colorado River by 0.0002 percent by 1987, by 0.0001 percent at maximum development, and 0.002 percent over long-term.	Any increase in salinity of Colorado River is regarded as a significant impact.	Moderate. Based on inferred leaching of spoils and population increases.	
Importance to livestock and wildlife	Perennial flows on tract provide permanent source of water. Tract used primarily for farming.	Permanent loss of water, primarily for wildlife, in central part of tract.	Minor. Streams should resume flowing downstream from mined area.	Inferred from field observations and geology of tract.	
Importance to agriculture	No agriculture on tract. Hay meadows in nearby Good Spring Creek Valley are not dependent on runoff from the tract.	None.	None.	Field observations.	
Importance to people (individual and municipal supplies)	Surface runoff from tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 1.4 ac-ft/yr by 1987, and 6.6 ac-ft/yr thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Moderate. Based on inferred population increases.	Any reduction in flow of the Colorado River is a significant impact.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Erosion and sedimentation	Tract generally stable; estimated sediment yield 0.15 to 0.20 ac-ft/yr.	Changes in sediment yield as a result of mining and associated urbanization would be less than 0.1 ac-ft/yr.	Insignificant.	Field observations.	
<u>Ground Water</u> Type of occurrence	Confined in bedrock forms; unconfined (water table) in alluvium in stream valleys on tract.	Bedrock and alluvial aquifers would be replaced with spoils aquifer that should be equally permeable with water table conditions.	Springs in central part of tract would dry up. New springs would occur near west margin of mined area.	Moderate. Based largely on field observations.	If desired, suitable wells for livestock and wildlife could be developed on tract after mining.
Quantity	Total discharge from the tract is estimated to be 50 to 100 gal/min.	Inflow to pit should be more than adequate for mining. Discharge to Fish Creek would be reduced by about 20 ac-ft/yr during mining.	Minor, discharge from tract should return to approximately premining rate on completion of reclamation.		High ground-water discharge attributed to increased recharge as a result of farming with intermittent following.
Quality	Fair to good; contains 500 to 1,000 mg/l dissolved solids.	Leaching of spoils would increase dissolved-solids concentrations to about 2,000 mg/l in spoils aquifer and spring discharge to Fish Creek.	Would increase salt load to Fish Creek and eventually to Colorado River by about 200 tons/yr. Impact would be long-term.	Inferred from ongoing operations at the nearby Energy Fuels Mine.	See surface water for impact on salinity of Colorado River.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to livestock and wildlife	Springs and perennial flow in channels downstream provide excellent water for livestock and wildlife.	Springs would dry up in central part of tract and reappear at lower altitude near west margin of mining.	Minor, unless land use is changed from primarily farming to grazing.	Moderate, inferred largely from field observations and geology of tract.	If necessary in the future, wells could probably be completed in the mined area at depths of less than 100 feet.
Importance to agriculture	All agriculture on tract is dryland farming. Subirrigation is occurring only on floor of Fish Creek Valley, which is not farmed on the tract.	None.	- - -	Field observations.	
Importance to people (individual and municipal supplies)	Domestic supply of W. L. Rogers obtained from developed spring near northeastern boundary of tract.	Spring will very probably cease flowing permanently.	Company is required to replace any interrupted supply.	Inferred from field observations and geology of tract.	A well could be completed as an alternate source of water, but water quality may be poorer than current supply. Also, cost of pumping and maintenance would greatly exceed that of present supply.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<p><u>VEGETATION</u></p> <p>Presence of unique, unusual vegetation, types, associations, and threatened and endangered plants</p>	<p>No threatened or endangered plant species are known to inhabit the immediate area. Some riparian vegetation exists around the Fish Creek drainage.</p>	<p>None concerning threatened and endangered plants.</p>	<p>Insignificant determination should be made if in fact a threatened and endangered plant population does exist even though the area involved is relatively small.</p>	<p>No data is available on threatened and endangered plants in this area.</p>	<p>From past experience, threatened and endangered plants have been found in areas with unusual soils or vegetative habitat. A good area in this mining unit would be the mountain shrub rock outcrop of which very little will be disturbed. The possibility of mitigation requires a pedestrian survey to determine the presence or absence of threatened or endangered plants.</p>
<p>Ground cover (Rate according to percent of ground surface covered by vegetation.)</p>	<p><u>Delination Vegetative Types</u> Sagebrush 36% (127 ac) Mt. shrub rock outcrop 9% (33 ac) Cropland 55% 192% Ground cover Sagebrush 62.5% Mt. shrub 15% (12 ac) Cropland 37.5% Total percent ground cover for the 352 acres is 38 percent.</p>	<p>Sagebrush 32 ac (26%) Mt. shrub rock outcrop 8 ac (7%) Cropland 77 ac (67%) Loss of 2,310 bushels of wheat per year as a result of the cropland being mined.</p>	<p>Insignificant.</p>	<p>Final Environmental Impact Statement Northwest Colorado Coal, site-specific energy fuels, terrestrial flora.</p> <p>Professional judgment based on field exams</p>	<p>Mitigation possible - reclamation. Effectiveness of mitigation would be good.</p>

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>RECLAMATION POTENTIAL</u>					
<u>WILDLIFE</u>					
Habitat	<u>Acres</u> <u>Percent of Total</u>	<u>Acres Disturbed</u> Peak End 1995 1992			
Sagebrush	127 36	45=Mod neg 127=Hi neg	No change	Good	All require 20-year revegetation time.
Mt. shrub	33 9	11=Mod neg 33=Hi neg	No change	Good	
Cropland	192 55	68=Mod neg 192=Hi neg	No change	Good	
Populations	<u>Level of Use</u>	<u>Residual Impacts Percent</u>			
Deer	Average	No change 0	No change	Good	No data available on number of birds using ground.
Elk	Low	No change 0	No change	Good	
Sharp-tailed grouse	High (dancing ground)	High negative	Local - High negative County- Low negative	Poor	
Non-game birds and mammals	Unknown	Not assessible	No change	Poor	No population data.
Reptiles and amphibians	Unknown	Not assessible	No change	Poor	No population data.
Threatened or Endangered	None occur	- - -	- - -	- - -	- - -
Fisheries	None occur	- - -	- - -	- - -	- - -

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of ^{1/} 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>CULTURAL/HISTORICAL VALUES</u>	Ten acres completed on a class II survey. No historic or prehistoric sites/isolated located and recorded.	Thirty percent probability of prehistoric sites/isolated finds on south end of tract on ridge; 10 percent probability for remainder of tract; 90 percent probability of historic sites along the drainage bottoms where access is available.	Twenty percent probability of locating sites eligible to the National Register of Historic Places.	Good	
<u>RECREATION VALUES INCLUDING VRM</u> Recreation	No public surface ownership. May displace some private recreation and wildlife observation from Routt County Road 27.	No impact on public recreation.	Minimal	Poor	No public use data or road use volume.
Visual Resource Management	Area highly visible from Routt County Road 27. Agriculture and open space environment, rolling hills, sage grasses and shrubs; some visible water, perennial stream.	Severe visual impacts on short-term basis.	Severe short-term, minimal long-term.	Excellent.	Data based on previous visual impact of strip mining.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>NOISE</u>	Some agricultural machinery and existing road traffic.	Severe intrusion of heavy equipment and haul trucks.	Severe, short-term; none, long-term.	Excellent.	Data based on previous noise levels from strip mining operations.
<u>NET ENERGY ANALYSIS</u>					
<u>OTHER FACTORS AS DETERMINED BY THE REGIONAL COAL TEAM</u>					
Transportation	Existing Routt County Road 27.	Increased maintenance costs.	Moderate.	High (90 percent probability)	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: PINNACLE

State: COLORADO

Legal description (township and range or metes and bounds): T. 4 N. R 86 W, sec. 7: Lots 5, 6, T. 5 N, R. 87 W; sec. 36: Lot 6-9, 14-15, NW 1/4 NW 1/4

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	15	Low	Base: good (1977 Census) Projections: based on input-output model	Proposed action impact is low, but area will already be heavily impacted.
Hayden	1,548	2,707	6	Low		
Oak Creek	792	1,257	6	Low		
Steamboat Springs	4,780	12,100	15	Low		
Total	14,835	34,338	42	Low		
<u>ECONOMICS</u>						
Moffat & Routt Counties						
Employment						
Mining	1,001	2,060	10	Low	Base: medium (derived from input-output model)	
Other	8,784	15,902	6	Low		
Total	9,785	17,962	16	Low		
Income (thousand)						
Mining	\$ 20,506	\$ 42,201	\$ 205	Low	Projections: USGS and model	
Other	88,728	164,454	69	Low		
Total	\$ 109,234	206,655	\$ 274	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+ 5	Low	Base: (DOE publication personal contacts with COG offices) Projections: (Based on number of household projected by CSU I/O Model)	Trended environment will require an 80% increase in total number of housing units, development of this tract will mean less than a one percent increase.
Hayden	497	915	+ 2	Low		
Steamboat Springs	2577	4129	+ 5	Low		
Oak Creek	<u>479</u>	<u>429</u>	<u>+ 2</u>	Low		
Total	6723	12103	+14	Low		
School Capacity						
Craig	2350	5976	+ 5	Low	Base: Good (Personal contacts with each school) Projections: Fair (Assumes a continuation of 1978 student population ratio)	Trended environment will increase student enrollment 123% by 1995 which will necessitate a 123% increase in school capacity. Development of this tract will require a less than one percent increase in school capacity.
Hayden	875	885	+ 2	Low		
Steamboat Springs	1355	3957	+ 5	Low		
Oak Creek	<u>510</u>	<u>524</u>	<u>+ 2</u>	Low		
Total	5090	11342	+14	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Hospital Bed Capacity						
Moffat	30	46	0	None	Base: Good (Personal contacts with each hospital) Projections: Good (Based on National Standards)	Trended environment will require a 50% increase in bed capacity; development of this tract will require no additional increase.
Rouff	<u>20</u>	<u>29</u>	<u>0</u>	None		
Total	50	75	0	None		
Police Officers						
Craig	17	31	0	None	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 71% increase in the number of police officers in the area; development of this tract would mean no additional increase.
Hayden	3	5	0	None		
Steamboat Springs	14	21	0	None		
Oak Creek	<u>1</u>	<u>3</u>	<u>0</u>	None		
Total	35	60	0	None		
Fire Pumping Capacity						
Craig	2800	4127	+ 2	Low	Base: Good (Personal contacts with each department) Projections: Good (Based on National Standards)	Trended environment will necessitate a 32% increase in pumping capacity; development of this tract will mean less than a one percent increase.
Hayden	2500	1677	+ 1	Low		
Steamboat Springs	1250	3350	+ 3	Low		
Oak Creek	<u>1250</u>	<u>1129</u>	<u>+ 3</u>	Low		
Total	7800	10263	+ 9	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Water System Capacity						
Craig	5.00	2.74	0	None	Base: Good (Personal contact with each community's public works office) Projections: Fair (Based on National Standards)	
Hayden	.64	.41	0	None		
Steamboat Springs	2.46	1.82	0	None		
Oak Creek	<u>.72</u>	<u>.19</u>	<u>0</u>	None		
Total	8.82	5.16	0	None		
Sewer System Capacity						
Craig	.90	3.07	0	None	Base: Good (Personal contacts with each community's public works office) Projections: Fair (Based on National Standards)	Trended environment will necessitate an overall 22% increase in the sewer system capacity (Craig's system will require a 24% increase); development of this tract will mean no additional percentage increase.
Hayden	1.00	.45	+ .01	Low		
Steamboat Springs	2.58	2.03	+ .01	Low		
Oak Creek	<u>.25</u>	<u>.21</u>	<u>0</u>	None		
Total	4.73	5.76	+ .02	Low		
Solid Waste (Acres Needed Per Year)						
Craig	1.62	3.84	0	None	Base: Good (Personal contacts with each community's town hall) Projections: Fair (Based on National Standards)	Trended environment will require a 13% increase in the number of acres needed by 1995; development of this tract will require no additional percentage increase.
Hayden	.33	.57	0	None		
Steamboat Springs	1.00	2.54	0	None		
Oak Creek	<u>.17</u>	<u>.26</u>	<u>+ .01</u>	Medium		
Total	3.12	7.21	+ .01	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
Social Services Number of Public Assistance Cases						
Moffat	333	665	+ 1	Low	Base: Good (Colorado Department of Social Services) Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population)	Trended environment will result in a 78% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean one additional individual receiving public assistance.
Routt	<u>269</u>	<u>406</u>	<u>0</u>	None		
Total	602	1071	+ 1	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School, sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school, and solid waste facilities will need expansion)	Low	Low	Good	
Steamboat Springs	Fair (School, hospital, solid waste facilities, and fire pumping capacity should be expanded)	Fair (Housing, school, hospital, fire pumping capacity, police officers and solid waste facilities will require expansion)	Low	Low	Good	
Oak Creek	Good (Sewer system needs expansion as does police department and hospital bed capacity)	Good (School, hospital, and number of police officers will need additions.)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%	Additional	Jobs will mean	Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90	an increase	in numbers of	Low		
Other	.17			Low		
Total	6.77%	minority	individuals, although	Low		
<u>Routt County</u>						
Spanish Surname	3.87%	not necessarily	an increase		Impacts: Past trends in energy impacted communities.	
Black	.05	in proportion	to the entire	Low		
American Indian	.05	population.		Low		
Other	.05			Low		
Total	4.03%			Low		

Element	Present Situation	Trends In 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
	(000)	(000)				
Counties						
Revenue	12,095					
Debt	348					
Communities						
Revenue	7,179					
Debt	4,391					
School districts assessed valuation	278,681					
<u>AGRICULTURE</u>						
Routt County	(Acres)		(Acres)		Base: Medium (1974 Census of Agriculture)	
Cropland	166,147		Loss of 188			
Pasture land	484,238		Loss of 6		Impacts: Visual estimates of present land use	

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: PINNACLE

State: COLORADO

Legal description (township and range or metes and bounds): T. 4 N., R. 86 W., sec. 7: Lots 5, 6, T. 5 N., R. 87 W.; sec. 36: Lots 6-9, 14-15, NW 1/4 NW 1/4

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No	- - -	- - -	
2. Rights-of-way and easements	No	- - -	- - -	
3. Buffer zones	No	- - -	- - -	
4. Wilderness study areas	No	- - -	- - -	
5. Scenic areas	No	- - -	- - -	
6. Land used for scientific studies	No	- - -	- - -	
7. Historic lands and sites	Yes	Not applied - lack of time.	Class III survey and evaluation of any sites found.	No known sites eligible to National Register of Historic Places.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No	---	---	
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	No	No		
12. Eagle roosts and concentration areas	No	No		
13. Falcon cliff-nesting sites	No	No		
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	No		Sharp tailed grouse dancing ground buffer zone- unsuitable. Mule deer critical winter range mitigation coordination with Dow necessary.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	Yes	No		Fish Creek NW 1/4 NW 1/4 sec. 36, T.5.N., R.87 W
17. Municipal watersheds	No	N/A		
18. National resource waters	No	N/A		
19. Alluvial valley floors	The bottom of Fish Creek Valley in the extreme northwestern corner of the tract is almost certainly an alluvial valley floor. Mining would not disturb this part of the tract.	---	Final decisions on alluvial valley floors and possible impacts on the water supply mining within the watershed must be evaluated by OSM	Observations indicate that the projected mining operations should have no significant impact on the essential hydrologic functions of Fish Creek Valley if the valley is not physically disturbed
20. State proposed criteria	No	N/A		

SITE-SPECIFIC MATRICES

ILES MOUNTAIN

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: ILES MOUNTAIN

State: COLORADO

Legal description (township and range T5N, R92W, Sec. 3; Lot 17, Sec. 10; Lot 3, NE $\frac{1}{4}$, SE $\frac{1}{4}$, NW $\frac{1}{4}$, S $\frac{1}{4}$, Sec. 11; NW $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 13; S $\frac{1}{2}$ NW $\frac{1}{4}$, or metes and bounds): SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 14; S $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, S $\frac{1}{2}$, Sec. 15; All, Sec. 22; Lots 1, 3, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 23; N $\frac{1}{2}$, SE $\frac{1}{4}$, Sec. 24; All, Sec. 25, N $\frac{1}{2}$ W $\frac{1}{2}$

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	1,908,000				
Estimated mine life (years)	20				
Total reserves (tons in place)	44,990,000				
Recoverable reserves (tons)	38,165,000				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	Subbituminous "A" steam				
Sulfur content (percent)	.4				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	40 - 60				
Projected work force (mining)	140				
Surface ownership (Federal, State, private, etc.)	Federal 1,634.73 State 0 Private 1,447.37				
Status of surface owner consent and/or consultation	Mostly affirmative some negative replies.				
Type of mine (surface/underground)	Surface				
Coal transportation needs	N/A				
Coal access needs	4 - 5 miles of access roads.				
Coal markets					
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: ILES MOUNTAIN

State: COLORADO

Legal description (township and range T5N, R92W, Sec. 3; Lot 17, Sec. 10; Lot 3, NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, S $\frac{1}{4}$, Sec. 11; NW $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 13; S $\frac{1}{2}$ NW $\frac{1}{4}$, or metes and bounds): SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 14; S $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, S $\frac{1}{2}$, Sec. 15; All, Sec. 22; Lots 1, 3, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 23; N $\frac{1}{2}$, SE $\frac{1}{4}$, Sec. 24; All, Sec. 25, N $\frac{1}{2}$ N $\frac{1}{2}$

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	Dip slope of Iles Mountain is very susceptible to landsliding. Several large slides have been mapped near the tract.	Possible disruption to toe of a slide causing activation.	Low-moderate	Good	
Seismic activity	No known major event. No faults on tract.	None	None	Good	
Other minerals	No known occurrences on tract. Slight possibility for oil and gas.	None	None	Good	

PRELIMINARY SITE SPECIFIC MATRIX ISLES MOUNTAIN TRACT

Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is $22 \mu\text{g}/\text{m}^3$. Violations exist at Craig	Annual emissions estimated at 985 tons/year increasing concentrations from 0-20 $\mu\text{g}/\text{m}^3$. Impact diminishes within 1 mile of tract	Significant	Good	Will be within standards
2. SO_2	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO}_x + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Levels approaching standard measured in Rio Blanco County (about 10 miles from tract)	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Levels approaching standard measured in Rio Blanco County	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PRELIMINARY SITE SPECIFIC MATRIX ISLES MOUNTAIN TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (39 miles), Dinosaur National Monument (44 miles) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Moffat County in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 100 miles SW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Colowyo strip mine (5 miles S), Empire Energy underground mine (4 miles N), proposed lease tract Bell Rock underground mine (3 miles N), proposed lease tract Empire Energy underground (2 miles NE).	Little or none. Increased TSP concentrations from individual mines will probably not interact	Probably insignificant	Good	-

PRELIMINARY SITE SPECIFIC MATRIX ISLES MOUNTAIN TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
12. Annual precipitation	11-13 inches	None	-	Good	-
13. Growing season >32°F	Approximately 94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 140 tons/year.	Significant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None		Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments																				
Paleontological resources ¹	None recorded to date of unique scientific value.	Possible destruction of fossils. Beneficial impact from increased exposure.	Low	Fair																					
<u>SOILS</u>																									
Soil erosion potential	<table border="0"> <tr> <td>Wind - Low</td> <td>25%</td> </tr> <tr> <td>Low-Mod.</td> <td>14%</td> </tr> <tr> <td>Mod.</td> <td>45%</td> </tr> <tr> <td>Mod.-High</td> <td>9%</td> </tr> <tr> <td>High</td> <td>7%</td> </tr> <tr> <td colspan="2"><hr/></td> </tr> <tr> <td>Water- Low</td> <td>8%</td> </tr> <tr> <td>Mod.</td> <td>34%</td> </tr> <tr> <td>Mod.-High</td> <td>9%</td> </tr> <tr> <td>High</td> <td>49%</td> </tr> </table>	Wind - Low	25%	Low-Mod.	14%	Mod.	45%	Mod.-High	9%	High	7%	<hr/>		Water- Low	8%	Mod.	34%	Mod.-High	9%	High	49%	Loss of soil by wind & water forces on 60 acres/yr. during mining operations. Adverse impact on air quality.	High ¹ Over 50% of mined area was rated mod-high for erosion by both water & wind.	High	¹ Significance of erosion by wind & water would be reduced by OSM regulations.
Wind - Low	25%																								
Low-Mod.	14%																								
Mod.	45%																								
Mod.-High	9%																								
High	7%																								
<hr/>																									
Water- Low	8%																								
Mod.	34%																								
Mod.-High	9%																								
High	49%																								
Soil reconstruction potential	<table border="0"> <tr> <td>Good - 0%</td> </tr> <tr> <td>Fair - 15%</td> </tr> <tr> <td>Poor - 85%</td> </tr> </table>	Good - 0%	Fair - 15%	Poor - 85%	Severe problems with revegetation and soil stabilization on 85% of stripplable area (1,020 acres).	High ¹	High	¹ Revegetation and stabilization would be difficult and costly on 85% of stripplable area due to steep slopes, shallow and rocky soils. Top dressing and surface stabilization would be needed to establish and maintain vegetation.																	
Good - 0%																									
Fair - 15%																									
Poor - 85%																									

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WATER RESOURCES</u>					
<u>Surface Water</u>					
Types of occurrence	All streams on the tract are ephemeral.	Ephemeral stream channels disturbed by mining would be reconstructed.	Very minor. No significant problems are anticipated.	Field observations	All disturbed channels would be reconstructed as required by OSM regulations.
Quantity	Runoff from tract probably averages 0.5-1.0 inch/yr. or about 150-300 ac-ft/yr.	Runoff to Yampa River would not be reduced by more than 40-75 ac-ft/yr. during mining.	Minor and short term. After reclamation, runoff should return to approximately premining rates.	Inferred from field observations and results of similar mining operations in northwestern Colorado.	
Quality	Water in reservoirs indicates that runoff contains 125-350 mg/l dissolved solids.	No significant effect during mining.	Minor and short term. After reclamation, runoff should return to approximately premining quality.	Inferred from field observations and water quality measurements in reservoirs on the tract.	No acid water problems are expected as a result of mining.
Salinity of receiving waters	No current salinity problem in Yampa River, but severe salinity problem in Colorado River. Dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of increased population and use of water in mining would increase salinity of Colorado River by 0.0008 percent by 1987 and by 0.002 percent by 1990 and thereafter.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases, consumptive use of water by mining, and effects of long term leaching of spoils aquifer.	Principal cause of long term increase in salinity is leaching of spoils in re-claimed mine area.
Importance to livestock and wildlife	Seven small reservoirs on tract provide seasonal water for livestock and wildlife.	Only one reservoir would be removed by mining.	Very minor. Sedimentation ponds would provide additional water during mining.	Field observations	Reservoir could be replaced after reclamation, if desired.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to agriculture	All agriculture on and adjacent to the tract is dryland farming.	None	None	Field observations	
Importance to people (individual and municipal supplies)	Surface runoff from the tract not used for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 41 ac-ft/yr by 1987 and 108 ac-ft/yr by 1990 and thereafter.	Minor impact on Yampa River, but would reduce flows in Colorado River by corresponding amount.	Moderate. Based on inferred population increases attributable to mining.	Any reduction in flow in the Colorado River is a significant impact.
Erosion and sedimentation	Tract appears to be moderately stable. Estimated sediment yield is 0.2-0.4 ac-ft/sq mi/yr	Changes in sediment yield as a result of mining and associated urbanization would be less than 0.1 ac-ft/yr.	Insignificant. Long term sediment yield would probably be no more than the premining rate.	Inferred from field observations and from effects of increased population.	
<u>Ground Water</u>					
Types of occurrence	Perched conditions in Bedrock aquifers above level of Sulphur Gulch and Ralston Draw and confined (artesian) conditions below that level. Small amount of unconfined water locally in alluvium. Most alluvium dry.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer. Perched conditions in mined areas and confined conditions in western part of tract would be replaced by unconfined conditions.	Would require future wells in the mined area to be about 150 feet deeper with correspondingly higher pumping lifts. New springs may form at lowest elevation of spoils at north edge of mined area.	Moderate. Inferred from field observations, well data, and geology of tract.	The combined yield of possible new springs probably would not exceed 50 gal/min (80 ac-ft/yr).

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity	Springs and wells on the tract yield less than 5 gal/min. Total ground water discharge from the tract is estimated to be no more than about 10 gal/min. (16 ac-ft/yr).	Probably insufficient inflow to the pit for mining operations.	Supplemental water for mine use (47-67 ac-ft/yr) must be obtained from surface runoff and of the Yampa River.	No quantitative data available for this area. Conclusions inferred from field observations and geology of tract.	Postmining discharge from the tract is expected to be about 65 ac-ft/yr more than before mining because of greater permeability of spoils.
Quality	Shallow bedrock aquifers and alluvium probably yield calcium, magnesium sulfate, bicarbonate water containing 500-1,500 mg/l dissolved solids. Deeper aquifers probably yield sodium, bicarbonate, sulfate water containing no more than 1,000 mg/l dissolved solids.	Leaching of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 2,500 mg/l and increase salt load to Colorado River by about 150 tons/yr.	Would have no significant effect on use of water by livestock and wildlife. Increased salt load to Colorado River is a significant impact.	Inferred from similar operations of other mines in northwestern Colorado.	See surface water for effect on salinity of Colorado River.
Importance to livestock and wildlife	Only one well and one spring on the tract provide water for livestock and wildlife.	The well would be destroyed by mining. The spring would not be destroyed, but the flow could be decreased during mining and increased after reclamation. New springs may form after reclamation.	Minor. Any interrupted supplies could be replaced by deeper wells. The increased pumping lift could be offset by use of windmills for power.	Field observations	
Importance to agriculture	All agriculture on or adjacent to the tract is dryland farming and is not dependent on ground water.	None	None	Field observations	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to people (individual and municipal supplies)	Ground water on or discharging from the tract is not currently used for any domestic supplies.	None	None	Field observations	
<u>VEGETATION</u>					
Presence of unique, unusual vegetation, types, associations, and T/E Plants	<i>Penstemon yampaensis</i> occurs along the Yampa River. The possibility of it being along this portion is good.	Possibility of destroying a proposed T/E plant population. Both as a result of the proposed action & cumulative regional action.	It would be insignificant if somewhere preservation measures are taken. But at this present time, nothing has been done to preserve the known T/E plant population & habitat.	CSV and CV herbarium, PIM at Ft. Collins.	
Ground Cover *Quantification of each specific type is not possible due to lack of data.	2 primary types: Sagebrush Mountain shrub * 2-2nd Degree types: grassland river bottom *	Disturbance: 60 AC - 1987 240 AC - 1990 540 AC - 1995 1,200 AC - 2007	Insignificant if reclamation procedures are followed.		
<u>WILDLIFE</u>					
Habitat Total - all types (No breakdown available)	<u>Acres</u> 3,722	<u>Acres Disturbed</u> 2,009 = HI neg	Lo neg	Good	
Populations	<u>Level of Use</u>				
Deer	Average	Lo neg	Lo neg	Good	
Elk	Low	Lo neg	Lo neg	Good	
Bald Eagle	High	Lo neg	No chg	Good	
Golden Eagle	Average	Lo neg	No chg	Good	

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of 50 percent or more; ^{1/} should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Populations (cont.) Ducks & Geese Brent blue heron Nongame birds & mammals Reptiles & amphibians Fisheries	<u>Level of Use</u> High Unknown Unknown Unknown Low	No chg No chg Not assessible Not assessible No chg	No chg No chg No chg No chg No chg	Good Good Poor Poor Poor	
<u>CULTURAL/HISTORICAL VALUES</u>	Approximately 1,700 acres completed on Class II & a Class III surveys. No prehistoric or historic sites located and recorded. One prehistoric isolated find was located and recorded.	10-15% probability of prehistoric sites being found on unsurveyed portions of ridges or as rock art on rock outcropping on slopes; 90% probability of historic sites along drainage bottoms and where access is available, 10% probability for remainder of tract.	5% probability of locating sites eligible to the National Register of Historic Places.	Good-- Excellent	
<u>RECREATION VALUES</u> Recreation	High pressure hunting area.	Loss of high quality big game hunting area.	Severe	Good	
VRM	Class III & IV	Severe disruption to vegetation & land form	Severe	Good	
<u>NOISE</u>	Open air agriculture	Introduce strip mining associated noise.	Minimal, limited number of residences.	Good	

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>TRANSPORTATION</u>					
Employee Transportation	1. S.H. 13	1. 13% increase in traffic accidents.	1. Moderate	1. 80% probability	
Product Transportation	1. S.H. 13	1. \$22,000 per year in road maintenance for S.H. 13.	1. High	1. 85% probability	
	1. DRGW railroad	2. Increased hazard rating at grade crossings.	2. Low	2. 90% probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: ILES MOUNTAIN

State: COLORADO

Legal description (township and range T5N, R92W, Sec. 3; Lot 17, Sec. 10; Lot 3, NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, S $\frac{1}{4}$, Sec. 11; NW $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 13; S $\frac{1}{4}$ NW $\frac{1}{4}$, or metes and bounds): SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 14; S $\frac{1}{4}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, S $\frac{1}{4}$, Sec. 15; All, Sec. 22; Lots 1, 3, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 23; N $\frac{1}{2}$, SE $\frac{1}{4}$, Sec. 24; All, Sec. 25, N $\frac{1}{2}$ N $\frac{1}{2}$

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	643	Low	Base: good (1977 Census) Projections: based on input-output model	Proposed action impact is low, but area will already be heavily impacted.
Hayden	<u>1,548</u>	<u>2,707</u>	<u>49</u>	Low		
Total	9,263	20,981	692	Low		
<u>ECONOMICS</u>						
(Moffat and Routt Counties)						
Employment						
Mining	1,001	2,060	140	Low	Base: medium (derived from input-output model) Projections: USGS and model	
Other	8,784	15,902	132	Low		
Total	9,785	17,962	272	Low		
Income (thousand)						
Mining	\$ 20,506	\$ 42,201	\$ 2,868	Low		
Other	88,728	164,454	<u>1,575</u>	Low		
Total	\$109,234	\$206,655	\$ 4,443	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
Counties Revenue Debt	(000) \$ 12,095 348	(000)				
Communities Revenue Debt	3,313 671					
School districts assessed valuation	200,183					
<u>AGRICULTURE</u>						
Moffat County Cropland Pasture land	(Acres) 242,103 904,291		(Acres) Loss of 20 Loss of 3,702	LOW LOW	Base: Medium (1974 Census of Agri- culture) Impacts: Visual estimates of present land use.	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+210	Low	Base: Good (DOE Publication and personal contacts with COG offices). Projections: Fair (Based on number of households projected by CSU I/O Model).	Trended environment will require a 105% increase in total number of housing units, development of this tract will mean an additional three percent increase.
Hayden	497	915	+ 16	Low		
Total	3667	7545	+226	Low		
SCHOOL CAPACITY						
Craig	2350	5976	+210	Medium	Base: Good (Personal contacts with each school). Projections: Fair (Assumes a continuation of 1976 student/population ratio).	Trended environment will increase student enrollment 116% by 1995 which will necessitate a 113% increase in school capacity. Development of this tract will require an additional three percent increase in school capacity.
Hayden	875	885	+ 16	Low		
Total	3225	6861	+226	Low		
HOSPITAL BED CAPACITY						
Moffat	30	46	+ 2	Medium	Base: Good (Personal contacts with each hospital). Projections: Good (Based on National Standards).	Trended environment will require a 50% increase in bed capacity, development of this tract will require an additional three percent increase.
Rutt	20	29	+ 0	None		
Total	50	75	+ 2	Low		

ILES MOUNTAIN TRACT, SECTION III, PAGE 4

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
POLICE OFFICERS						
Craig	17	31	+ 1	Low	Base: Good (Personal contacts with each department). Projections: Good (Based on National Standards).	Trended environment will necessitate an 80% increase in the number of police officers in the area; development of this tract would mean an additional six percent increase.
Hayden	3	5	+ 1	High		
Total	20	36	+ 2	Medium		
FIRE PUMPING CAPACITY						
Craig	2800	4127	+ 41	Low	Base: Good (Personal contacts with each department). Projections: Good (Based on National Standards).	Trended environment will necessitate a 10% increase in pumping capacity; development of this tract will mean an additional one percent increase.
Hayden	2500	1677	+ 12	Low		
Total	5300	5804	+ 53	Low		
WATER SYSTEM CAPACITY						
Craig	5.00	2.74	+ .10	Medium	Base: Good (Personal contact with each community's public works office). Projections: Fair (Based on National Standards).	Each communities system will easily be able to handle the increased demand resulting from the trended environment and development of this tract.
Hayden	.64	.41	+ 0	None		
Total	5.64	3.15	+ .10	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
SEWER SYSTEM CAPACITY						
Craig	.90	3.07	+11	Medium	Base: Good (Personal contacts with each community's public works office). Projections: Fair (Based on National Standards).	Trended environment will necessitate an overall 85% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional three percent increase. Nonetheless, Hayden's system will still be 54% below capacity.
Hayden	1.00	.45	+01	Low		
Total	1.90	3.52	+12	Low		
SOLID WASTE (Acres Needed Per Year)						
Craig	1.62	3.84	+13	Low	Base: Good (Personal contacts with each community's town hall). Projections: Fair (Based on National Standards).	Trended environment will require a 126% increase in the number of acres needed by 1995; development of this tract will require an additional three percent increase.
Hayden	.33	.57	+01	Low		
Total	1.95	4.41	+14	Low		
SOCIAL SERVICES						
Number of Public Assistance Cases						
Moffat	333	665	+ 19	Low	Base: Good (Colorado Department of Social Services). Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population).	Trended environment will result in a 78% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional two percent increase.
Routt	269	406	+ 1	Low		
Total	602	1071	+ 20	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school, and solid waste facilities will need expansion.)	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%	Additional	jobs will mean	Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90	an increase	in numbers of	Low		
Other	.17			Low		
Total	6.77%	minority	individuals, although	Low		
<u>Routt County</u>						
Spanish Surname	3.87%	in proportion	to the entire	Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05	population.		Low		
Other	.06			Low		
Total	4.03%			Low		

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: ILES MOUNTAIN

State: COLORADO

Legal description (township and range T5N, R92W, Sec. 3; Lot 17, Sec. 10; Lot 3, NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, S $\frac{1}{2}$, Sec. 11; NW $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 13; S $\frac{1}{2}$ NW $\frac{1}{4}$, or metes and bounds): SW $\frac{1}{4}$, W $\frac{1}{2}$ SW $\frac{1}{4}$, Sec. 14; S $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, S $\frac{1}{2}$, Sec. 15; All, Sec. 22; Lots 1, 3, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 23; N $\frac{1}{2}$, SE $\frac{1}{4}$, Sec. 24; All, Sec. 25, N $\frac{1}{2}$ N $\frac{1}{2}$

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	No			
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time,	Class III survey and evaluation of any sites.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No			
9. Federally listed endangered species	Yes	No		Bald eagle winter area.
10. State listed endangered species	No	No		
11. Eagle nests	Yes	No		Golden eagle nest.
12. Eagle roosts and concentration areas	Yes	No		Bald eagle concentration area.
13. Falcon cliff-nesting sites	No	No		
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	No		Deer and elk critical winter range. Gamefish buffer zone.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains.	Yes		Delineation of actual flood plain boundaries.	Flood plains of Post Oak Draw and Ralston Draw are unsuitable.
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	No alluvial valley floors on or immediately adjacent to tract. Closest alluvial valley floor is Yampa River Valley 0.25-0.5 mile north of tract.		None	Observations indicate that mining on the tract should not materially damage the essential hydrologic functions of the nearby Yampa River valley.
20. State proposed criteria	No			No input from state.

SITE-SPECIFIC MATRICES

WILLIAMS FORK MOUNTAINS

SITE-SPECIFIC SUMMARY MATRIX

I. COAL DATA (From Tract Delineation Report)

Tract name or number: WILLIAMS FORK MOUNTAINS

State: COLORADO

Legal description (township and range T5N, R9W, Sec. 4: All, Sec. 5: Lots 5-19, Tr. 46, Sec. 6: Lots 1-7, S $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 7: Lots 1, 2, or metes and bounds): NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 8: All, Sec. 9: Lots 1-13, Tr. 51, Sec. 10: Lots 1-6, 10, 12, 13, Tr. 46, Tr. 51, Sec. 16: Lots 1, 2, 5, 6, 7, Tr. 51
 Sec. 17: All, Sec. 18: SE $\frac{1}{4}$, Sec. 19: N $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 20: N $\frac{1}{2}$ N $\frac{1}{2}$, T5N, R9W, Sec. 1: All, Sec. 2: All, Sec. 3: All, Sec. 4: Lots 5-7, 10-12, 13-15, 18-20, Sec. 9: Lots 1-3, 6-8, Sec. 10: Lots 1-10, 15, 16, Sec. 11: All, Sec. 12: All, Sec. 13: Lots 1-5, Sec. 14: Lots 1-8

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Production rate (tons per year)	1,315,500				
Estimated mine life (years)	30				
Total reserves (tons in place)	46,431,000				
Recoverable reserves (tons)	39,466,000				
Recovery rate (percent)	85				
Type of coal (steam/metallurgical)	"A" Subbituminous Steam				
Sulfur content (percent)	.63				

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Projected work force (construction)	40-60				
Projected work force (mining)	100				
Surface ownership (Federal, State, private, etc.)	Federal 135.52 State 471.46 Private 9,471.73				
Status of surface owner consent and/or consultation	All affirmative or no reply				
Type of mine (surface/underground)	Surface				
Coal transportation needs					
Coal access needs	8-12 miles of access roads				
Coal markets					
Other as determined by Regional Coal Team					

SITE-SPECIFIC SUMMARY MATRIX

II. RESOURCE AND ENVIRONMENTAL CONSIDERATIONS

Tract name or number: WILLIAMS FORK MOUNTAINS

State: COLORADO

Legal description (township and range T5N, R59W, Sec. 4: All, Sec. 5: Lots 5-19, Tr. 46, Sec. 6: Lots 1-7, S $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 7: Lots 1, 2, or metes and bounds): NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 8: All, Sec. 9: Lots 1-13, Tr. 51, Sec. 10: Lots 1-6, 10, 12, 13, Tr. 46, Tr. 51, Sec. 16: Lots 1, 2, 5, 6, 7, Sec. 17: All, Sec. 18: SE $\frac{1}{4}$, Sec. 19: N $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 20: N $\frac{1}{2}$ N $\frac{1}{2}$, T5N, R90W, Sec. 1: All, Sec. 2: All, Sec. 3: All, Sec. 4: Lots 5-7, 10-12, 13-15, 18-20, Sec. 9: Lots 1-3, 6-8, Sec. 10: Lots 1-10, 15, 16, Sec. 11: All, Sec. 12: All, Sec. 13: Lots 1-5, Sec. 14: Lots 1-6

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>AIR QUALITY</u>					
<u>GEOLOGY AND MINERALS</u>					
Geologic hazards	Fault extends across north-east corner of tract-rotational fault. Dips range from 2 ^o to 16 ^o , steepening toward east. No known historic movement on fault.	None	Low	Good	
Potential For Other Minerals	No known occurrences on tract. Some potential for oil and gas.	None	Low	Good	

PRELIMINARY SITE SPECIFIC MATRIX WILLIAMS FORK TRACT
Section II, AIR QUALITY, Page 1a

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
1. Particulate matter (TSP)	Rural concentration is 22 $\mu\text{g}/\text{m}^3$. Violations exist at Craig	Annual emissions estimated at 1200 tons/year increasing emissions 0-20 $\mu\text{g}/\text{m}^3$. Impact diminishes within 1 mile of tract	Significant	Good	Concentrations from tract within standards. Combined concentrations from other proposed lease tracts may approach standards
2. SO_2	Very low levels (5-11 ppbv) at several locations N of Hayden (8-10 miles N of tract)	Very slight	Insignificant	Fair, no monitoring near tract	-
3. NO_x ($\text{NO}_x + \text{NO}_x$)	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-
4. HC	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
5. O_3	Unknown	Very slight	Insignificant	Fair, no monitoring near tract	-
6. CO	Estimated to be very low levels	Very slight	Insignificant	Fair, no monitoring near tract	-

PARELIMINARY SITE SPECIFIC MATRIX WILLIAMS FORK TRACT
(continued)

Section II, AIR QUALITY, Page 1b

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
7. PSD classes I II III	Flattop Wilderness (31 miles SE), Mount Zirkel (38 miles NE) All land not Class I None	Vistas may be slightly altered near tract	Insignificant	Fair	-
8. AQMA (Air Quality Maintenance areas)	Routt County in AQCR 12. Moffat County in AQCR 11	None	-	Good	-
9. NA (nonattainment areas)	All areas attainment or unclassified	None	-	Good	-
10. Visibility	Average visibility is 53.9 miles (Grand Junction, 110 miles SSW)	Very localized decreases in visibility. Probably no long range effect	Insignificant	Fair	-
11. Major sources of pollutants	TSP Utah International strip mine (3 miles NW), Hayden Gulch strip mine (1 mile E), proposed lease tract Hayden Gulch tract (adjacent) SO _x Colorado Ute (4 miles NE)	Increased TSP concentrations from individual mines may interact	Possibly significant	Good	-

PRELIMINARY SITE SPECIFIC MATRIX WILLIAMS FORK TRACT
(continued)

Section II, AIR QUALITY, Page 1c

Element	Present situation	Anticipated effect of leasing/development	Significance of anticipated impact	Data reliability	Comments
12. Annual precipitation	13-16 inches	None	-	Good	-
13. Growing season >32°F	Approximately 76-94 days	None	-	Good	-
14. Airflow patterns (surface)	Predominate winds from the SSW to W. Annual average wind-speed is 5.5 mph	Minor changes in localized wind pattern due to change in topography	Insignificant	Good	-
15. Peak winds	Winds greater than 12.5 mph 26.6 percent of the time	None	-	Good	-
16. Wind erosion potential	Moderate	Estimated at 75 tons/year	Significant	Moderately good	Revegetation of exposed areas required within two years
17. Inversions stability potential	Inversions occur seasonally 33 to 52% (Craig). Neutral and stable stability, 34 and 32%	None	-	Moderately good	-
18. Noise	Background levels from natural causes, about 20 dB	Possible levels as high as 130 dB	Significant	Good	Federal and state measures will mitigate impact

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Paleontological Resources	No significant occurrence reported on tract to date.	Possible destruction by mining. Beneficial impact by increased exposure.	Low	Fair	
<u>SOILS</u>					
Soil Erosion Potential	Wind - Data not available. Moderate 6% Water- Mod-High 10% High 34%	Loss of soil by wind and water on an exposed 600 acres/year during mining operations. Adverse impact on Air Quality.	High ¹ 50% of mined area rated moderate and high for erosion by water.	Low ²	¹ Significance of erosion potential would be reduced by OSMs regulations. ² Hoffat County survey is not complete. Data is available on only 1/2 of mined area.
Soil Reconstruction Potential	Good 0 Fair 0 Poor 50 %	Severe problems with revegetation and soil stabilization on 1,200 acres of mined area.	High ¹	Low	¹ Revegetation and stabilization would be difficult and costly on 1,200 acres, due to steep slopes shallow and clayey soils. Top dressing and surface stabilization would be needed to establish and maintain vegetation.
<u>WATER RESOURCES</u>					
Types of Occurrence	Five streams on tract are perennial. Others are largely ephemeral, although a few may be intermittent.	All stream channels disturbed by mining would be in upper reaches of watershed where flows are small. Disturbed channels would be reconstructed.	Minor and short term.	Low. No observations or data available for streams on 75 percent of tract.	All disturbed channels would be reconstructed as required by OSM regulations.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity ⁱ	Annual runoff probably does not greatly exceed 1 inch or a total of about 900 ac-ft from the tract.	Should reduce runoff to the Yampa and Williams Fork Rivers by less than 5 percent or about 40 ac-ft/yr. Flooding hazard should be minimal.	Minor and short term.	Low. Effects of development on surface water are largely inferred without benefit of field observations.	Annual runoff should return to approximately premining rates after completion of reclamation.
Quality	Good. Water in reservoirs indicates that runoff contains 150-750 mg/l dissolved solids with pH of 7.5-10.4.	No significant effect during mining. Leaching of spoils aquifer after reclamation could increase dissolved solids concentrations in base flow to as much as 1,000 mg/l.	Would increase salt load to Colorado River system by as much as 400 tons/yr	Inferred from field measurements of specific conductance of water samples and from results obtained at other mines in the area.	Increased salinity should have no significant impact on aquatic biology downstream.
Salinity of Receiving Waters	No current salinity problem in Yampa River. Severe salinity problems in Colorado River; dissolved solids concentration below Hoover Dam about 681 mg/l.	Effects of increased population and mining would increase salinity of Colorado River by 0.0003 percent by 1987, by 0.0008 percent by 1990 to end of mine life and by 0.0051 percent over the long term.	Any increase in the salinity of the Colorado River is regarded as a significant impact.	Based on inferred population increases and effects of long term leaching of spoils aquifer.	
Importance to Livestock and Wildlife	Perennial streams and at least 40 reservoirs on tract provide reliable source of water during most years.	Minimal effect on perennial streams. Approximately 8 reservoirs would be removed by mining.	Very minor. Sedimentation ponds should provide alternative source of water during mining.	Field observations on 25 percent of tract and 7½ minute quadrangle maps.	Reservoirs could be reconstructed after reclamation, if desired.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Importance to Agriculture	In so far as is known, all agriculture on areas to be disturbed by mining is dryland farming.	Little or no direct impact.	Minor. Small reduction in runoff during mining could slightly reduce water available for agriculture downstream.	Field observations on 25 percent of tract.	
Importance to People (Individual and Municipal Supplies)	Surface runoff from tract not used directly for individual or municipal supplies.	None on tract. Consumptive use of Yampa River water by increased population would be about 29 ac-ft/yr by 1987 and 74 ac-ft/yr by 1990 and thereafter.	Minor impact on Yampa River, but would reduce flow in Colorado River by corresponding amount.	Based on inferred population increases from mining.	Any reduction in flows in the Colorado River is a significant impact.
Erosion and Sedimentation	Tract generally stable in area that would be mined. Estimated sediment yield very small.	Changes in sediment yield as a result of mining and associated urbanization would be less than 0.1 ac-ft/yr.	Insignificant.	Field observations on 25 percent of tract.	
<u>Ground Water</u>					
Type of Occurrence	Confined (artesian) conditions in most bedrock formations. Deep wells in valleys in northern part of tract flow at land surface. Unconfined (water table) conditions in alluvium underlying most valley floors.	Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifer. Most alluvial aquifers should be minimally affected.	Would require future wells in mined areas to be 100-200 ft deeper with correspondingly higher pumping lifts. New springs may form at lowest elevation of spoils aquifer.	Inferred from field observations in 25 percent of tract, well and spring data, and geology of tract. Minimal data available for area not examined in the field.	Tract was expanded to include approximately four times more area than was examined in the field.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
Quantity	Numerous wells and springs on tract. Total ground water discharge from tract is estimated to be 150-200 gal/min.	Inflows to the pit would probably be sufficient for mining operations.	Use of ground water in mining is estimated to reduce discharge to Yampa and Williams Fork Rivers by no more than 30-40 ac-ft/yr.	Inferred from field observations and geology of tract.	Post mining ground water discharge should return to at least premining rates.
Quality	Water in bedrock and alluvium contains 380-1,460 mg/l dissolved solids. Water in shallow aquifers is probably calcium, magnesium, sulfate bicarbonate type. Water in deep aquifers is probably sodium bicarbonate type.	Leaching of spoils would probably increase dissolved solids concentrations in the mined areas to about 1,500-2,000 mg/l.	Minor impact on use of water in mined area by livestock and wildlife. However, would increase long term salt load to Colorado River system by as much as 400 tons/yr.	Inferred from similar operations at nearby mines and from field measurements of specific conductance of water samples.	See surface water for long term impact on salinity of Colorado River.
Importance to Livestock and Wildlife	Springs and perennial flow in larger stream valleys provide excellent water for livestock and wildlife.	Indeterminate number of springs, but at least 3 would be permanently disrupted by mining.	Moderate. Interrupted water supplies could be replaced by wells and by new springs expected to form at lowest elevation of spoils aquifers.	Largely inferred from field observations of part of tract and geology.	
Importance to Agriculture	Insofar as is known, all agriculture on areas to be disturbed by mining is dryland farming.	None	None	Low. No data are available for about 75 percent of tract.	
Importance to People (Individual and municipal supplies)	Only domestic supply is for ranch buildings in SW ¹ / ₄ Sec. 11, T38N, R90W. Source of water (well or spring) is not known.	Little or none.	Little or none.	Field observations	Mining operations should not significantly effect the only domestic water supply on the tract.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>VEGETATION</u>					
Presence of Unique, Unusual Vegetation, Types, Associations, and T/E Plants	There are no T/E plant species reported from the immediate area, a T/E survey has not been done on entire tract. There are no unusual, Vegetation types on the lease tract.	Possibility of destroying a T/E plant population as a result of the proposed action and cumulative regional development.	Significant, although if type locale could be protected in some way then the loss of some population would not be as significant.		CSU herbarium CU herbarium PIN (Plant info Network) at CSU CO Nat. Plant Society Working list, Federal Register.
Ground Cover	*3-1 ⁰ veg. types and 2-2 ⁰ * Mt. Shrub * Sagebrush * Grassland Aspen woodlands, River bottoms. Data is not available to quantify each of the vegetation types % Ground Cover-D/N/A.	Vegetation loss on 80 ac. each year as a result of the stripping 1978 - 80 ac.; 1990 - 160 ac.; 1995 - 560 ac.; 2017 - 2,400 ac. 400 ac. for offsite facilities.	Insignificant if reclamation holds.	Low. Not much of the lease area has had a survey.	
<u>WILDLIFE</u>					
Habitat total	Acres 10079	Area Disturbed 2017 2,400 low negative	Low negative	Good	
Populations	Level of Use				
Deer	Average	Low negative	Low negative	Good	
Elk	Average	Low negative	Low negative	Good	
Blue Grouse	Average	Low negative	No change	Good	
Sage Grouse	Low	Low negative	No change	Good	
Nongame Birds & Mammals	Unknown	Not assessible	No change	Poor	
Reptiles & Amphibian	Unknown	Not assessible	No change	Poor	

IMPACT EVALUATION RATING DEFINITIONS FOR WILDLIFE	
Term	Definition
High positive	Increase in parametric value of ^{1/} 50 percent or more; should be confirmable within three years.
Moderate positive	Increase in parametric value of 35 to 50 percent; should be confirmable within three to 10 years.
Low positive	Increase in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
No change	Increase or decrease in parametric value of less than 10 percent; not confirmable within useful period of time.
Low negative	Decrease in parametric value of 10 to 25 percent; not usually confirmable within 10 years.
Moderate negative	Decrease in parametric value of 25 to 50 percent; should be confirmable within three to 10 years.
High negative	Decrease in parametric value of 50 percent or more; should be confirmable within three years.

^{1/} Parameters considered are quantity of habitat and/or number of animals.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>WILDLIFE</u> Populations (cont.) Golden Eagle T/E Fisheries	Average None occurrence None occurrence	No change No change No change	No change No change No change	Good Good Good	No impact, if buffer zone not leased.
<u>CULTURAL/HISTORICAL VALUES</u>	Approximately 450 acres surveyed on a class II survey, 7 acres on a class III, and 660 acres on a judgemental reconnaissance survey. No prehistoric or historic sites/isolated finds located and recorded.	25-30% probability of prehistoric sites being found on ridges or knolls overlooking drainages, in saddles or as rock art/shelters in rock outcropping on slopes, 10% probability for remainder of tract; 90% probability for historic sites being found along drainage bottoms and where access is available, 10% probability for remainder.	20% probability of locating sites eligible to the National Register of Historic Places.	Good.~ Excellent	
<u>RECREATION VALUES INCLUDING VRM</u>	No public access. Some private hunting.	Displacement of private hunting.	Insignificant.	Good	
VRM	Class III & IV	Severe disruption to landscape.	Severe short term minimal long term.	Good	
NOISE	Some traffic and agricultural noise.	Introduce noise associated noise.	Minimal very few residences in area.	Good	If county road 33 is used for a haul road, impact more severe due to residential area on north end.

Element	Present Situation	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>OTHER FACTORS AS DETERMINED BY THE REGIONAL COAL TEAM</u> Employee Transportation	I. S. H. 394 + MCR 33	20% increase in traffic accidents	Moderate	80 % probability	
Product Transportation	S.H. 394 DRGW railroad	An increase in road maintenance. Increased grade crossing hazard rating.	Low Low	85% probability 90% probability	

SITE-SPECIFIC SUMMARY MATRIX

III. SOCIAL AND ECONOMIC CONSIDERATIONS

Tract name or number: WILLIAMS FOR MOUNTAINS

State: COLORADO

Legal description (township and range T5N, R59W, Sec. 4: All, Sec. 5: Lots 5-19, Tr. 46, Sec. 6: Lots 1-7, S₂NE₄, SE₄NE₄, E₂SW₄, SE₄, Sec. 7: Lots 1, 2, or metes and bounds): NE₄, E₂NE₄, Sec. 8: All, Sec. 9: Lots 1-13, Tr. 51, Sec. 10: Lots 1-6, 10, 12, 13, Tr. 46, Tr. 51, Sec. 16: Lots 1, 2, 5, 6, 7, Sec. 17: All, Sec. 18: SE₄, Sec. 19: N₂NE₄, NW₄NE₄, Sec. 20: N₂NE₄, T5N, R90W, Sec. 1: All, Sec. 2: All, Sec. 3: All, Sec. 4: Lots 5-7, 10-12, 13-15, 18-20, Sec. 9: Lots 1-3, 6-8, Sec. 10: Lots 1-10, 15, 16, Sec. 11: All, Sec. 12: All, Sec. 13: Lots 1-5, Sec. 14: Lots 1-8

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>POPULATION</u>						
Craig	7,715	18,274	365	Low	Base: Good (1977 Census) Projections: Based on input-output model	Proposed action impact is low, but area will already be heavily impacted
Hayden	1,548	2,707	110	Low		
Total	9,263	20,981	475	Low		
<u>ECONOMICS</u>						
(Moffat and Routt Counties)						
Employment						
Mining	1,001	2,060	100	Low	Base: Medium (derived from input-output model)	Projections: USGS and model
Other	8,784	15,902	86	Low		
Total	9,785	17,962	186	Low		
Income						
Mining	20,506	42,201	2,048	Low	Projections: USGS and model	
Other	88,728	164,454	985	Low		
Total	109,234	206,655	3,033	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development	Significance of Anticipated Impact	Data Reliability	Comments
<u>PUBLIC FINANCE</u>						
Countries						
Revenue	12,095					
Debt	348					
Communities						
Revenue	3,313					
Debt	671					
School districts assessed valuation	200,183					
<u>AGRICULTURE</u>						
Routt County	(Acres)		(Acres)			
Cropland	166,147		Loss of 200	Low	Base: Medium (1974 Census of Agriculture)	
Pasture land	484,238		Loss of 10,580	Low		

WILLIAMS FORK TRACT, SECTION III, PAGE 3

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
INFRASTRUCTURE						
Housing						
Craig	3170	6630	+119	Low	Base: Good (DOE Publication and personal contacts with COG offices). Projections: Fair (Based on number of households projected by CSU I/O Model).	Trended environment will require a 106% increase in total number of housing units, development of this tract will mean an additional two percent increase.
Hayden	497	915	+ 36	Medium		
Total	3667	7545	+155	Low		
SCHOOL CAPACITY						
Craig	2350	5976	+119	Low	Base: Good (Personal contacts with each school). Projections: Fair (Assumes a continuation of 1978 student/population ratio)	Trended environment will increase student enrollment 116% by 1995 which will necessitate a 113% increase in school capacity. Development of this tract will require an additional two percent increase in school capacity.
Hayden	875	885	+ 36	Medium		
Total	3225	6861	+155	Low		
HOSPITAL BED CAPACITY						
Moffat	30	46	+ 1	Low	Base: Good (Personal contacts with each hospital). Projections: Good (Based on National Standards).	Trended environment will require a 50% increase in bed capacity, development of this tract will require an additional one percent increase.
Rouff	20	29	+ 0	None		
Total	50	75	+ 1	Low		

WILLIAMS FORK TRACT, SECTION III, PAGE 4

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
POLICE OFFICERS						
Craig	17	31	+ 1	Low High Medfum	Base: Good (Personal contacts with each department). Projections: Good (Based on National Standards).	Trended environment will necessitate an 80% increase in the number of police officers in the area; development of this tract would mean an additional six percent increase.
Hayden	3	5	+ 1			
Total	20	36	+ 2			
FIRE PUMPING CAPACITY						
Craig	2800	4127	+ 37	Low Low Low	Base: Good(Personal contacts with each department). Projections: Good (Based on National Standards).	Trended environment will necessitate a 10% increase in pumping capacity; development of this tract will mean an additional one percent increase.
Hayden	2500	1677	+ 27			
Total	5300	5804	+ 64			
WATER SYSTEM CAPACITY						
Craig	5.00	2.74	+ .06	Low Low Low	Base: Good (Personal contact with each community's public works office). Projections: Fair (Based on National Standards).	Each communities system will easily be able to handle the increased demand resulting from the trended environment and development of this tract.
Hayden	.64	.41	+ .01			
Total	5.64	3.15	+ .07			

WILLIAMS FORK TRACT, SECTION III, PAGE 5

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
SEWER SYSTEM CAPACITY						
Craig	.90	3.07	+ .06	Low	Base: Good (Personal contacts with each community's public works office). Projections: Fair (Based on National Standards).	Trended environment will necessitate an overall 85% increase in the sewer system capacity (Craig's system will require a 241% increase); development of this tract will require an additional two percent increase. Nonetheless, Hayden's system will still be 53% below capacity.
Hayden	1.00	.45	+ .02	Medium		
Total	1.90	3.52	+ .08	Low		
SOLID WASTE (Acres Needed Per Year)						
Craig	1.62	3.84	+ .07	Low	Base: Good (Personal contacts with each community's town hall). Projections: Fair (Based on National Standards).	Trended environment will require a 125% increase in the number of acres needed by 1995; development of this tract will require an additional two percent increase.
Hayden	.33	.57	+ .02	Medium		
Total	1.95	4.41	+ .09	Low		
SOCIAL SERVICES						
Number of Public Assistance Cases						
Moffat	333	665	+ 11	Low	Base: Good (Colorado Department of Social Services). Projections: Fair (Assumes a continuation of the 1978 ratio of public assistance cases to population).	Trended environment will result in a 78% increase in the total number of public assistance cases in the area (a 100% increase in Moffat County); development of this tract would mean an additional one percent increase.
Routt	259	406	+ 2	Low		
Total	602	1071	+ 13	Low		

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
CULTURE AND WELL-BEING						
Craig	Fair (School capacity and sewer system need to be expanded)	Fair (School sewer, solid waste and fire pumping capacity will need to be expanded)	Low	Low	Good	
Hayden	Fair (Housing and hospital bed capacity need to be expanded)	Good (Hospital, housing, school, and solid waste facilities will need expansion.	Low	Low	Good	

Element	Present Situation	Trends in 1995	Anticipated Effect of Leasing/Development in 1995	Significance of Anticipated Impact	Data Reliability	Comments
NATIVE AMERICANS AND OTHER MINORITY GROUPS						
<u>Moffat County</u>						
Spanish Surname	5.63%	Additional jobs will mean an increase in numbers of minority individuals, although not necessarily an increase in proportion to the entire population.		Low	Base: Good (Colorado State Planning Division)	
Black	.07			Low		
American Indian	.90			Low		
Other	.17			Low		
Total	6.77%			Low		
<u>Routt County</u>						
Spanish Surname	3.87%			Low	Impacts: Past trends in energy impacted communities.	
Black	.05			Low		
American Indian	.05			Low		
Other	.06			Low		
Total	4.03%			Low		

SITE-SPECIFIC SUMMARY MATRIX

IV. UNSUITABILITY CRITERIA RESULTS

Tract name or number: WILLIAMS FORK MOUNTAINS

State: COLORADO

Legal description (township and range T5N, R59W, Sec. 4: All, Sec. 5: Lots 5-19, Tr. 46, Sec. 6: Lots 1-7, S $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 7: Lots 1, 2, or metes and bounds): NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 8: All, Sec. 9: Lots 1-13, Tr. 51, Sec. 10: Lots 1-6, 10, 12, 13, Tr. 46, Tr. 51, Sec. 16: Lots 1, 2, 5, 6, 7, Sec. 17: All, Sec. 18: SE $\frac{1}{4}$, Sec. 19: N $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 20: N $\frac{1}{2}$ N $\frac{1}{2}$, T5N, R90W, Sec. 1: All, Sec. 2: All, Sec. 3: All, Sec. 4: Lots 5-7, 10-12, 13-15, 18-20, Sec. 9: Lots 1-3, 6-8, Sec. 10: Lots 1-10, 15, 16, Sec. 11: All, Sec. 12: All, Sec. 13: Lots 1-5, Sec. 14: Lots 1-8

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	Yes	N/A possible to use except 4 or 5	Cost/mile to relocate existing line	ROW holder will likely refuse to move-cost prohibitive.
3. Buffer zones	No			
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific studies	No			
7. Historic lands and sites	Yes	Not applied due to lack of time.	Class III survey and evaluation of any sites.	

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
8. Natural areas	No	No		
9. Federally listed endangered species	No	No		
10. State listed endangered species	No	No		
11. Eagle nests	Yes ¹	No		1 Nest in Sec. 13, T5N, R90W S2NW4 is unsuitable - buffer zone.
12. Eagle roosts and concentration areas	No	No		
13. Falcon cliff-nesting sites	No	No		
14. Migratory birds	No	No		
15. State resident fish and wildlife	Yes	No		Deer and elk critical winter range migration route and production areas - coordination with DOW necessary.

¹New nest located 9-13-79. Not in MFP Supplement.

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
16. Flood plains	Yes	Yes, exception applied to Searcy Gulch	Actual delineation of floodplain boundary	Floodplains of Stoker Gulch, Daakin Gulch, Jeffway Gulch, & Spring Gulch are unsuitable after exceptions
17. Municipal watersheds	No			
18. National resource waters	No			
19. Alluvial valley floors	The bottoms of several of stream valleys on the tract are possible alluvial valley floors, but insufficient data are available to allow even a preliminary appraisal.		Final decision on alluvial valley floors and possible impacts on the water supply because of mining in the watershed must be evaluated by OSM.	Most mining operations would be along the mountain crest and in the upper valley reaches where any disturbance to the hydrologic function of the possible alluvial valley floors downstream would be minimal.
20. State proposed criteria	No			No input received from state

APPENDIX A

Federal Coal Management Program

The Federal Coal Management Program

A Narrative Description
Prepared by the
Office of Coal Leasing, Planning and Coordination
Office of the Assistant Secretary - Land and Water Resources

January 8, 1980

TABLE OF CONTENTS

	<u>PAGE</u>
FEDERAL COAL MANAGEMENT PROGRAM	414
I. Introduction	415
II. State, Public, and Industry Participation	416
State Participation	416
General Pubic Participation	416
Industry Participation	417
III. Setting Regional Goals and Leasing Targets	417
IV. Land Use Planning	420
High to Moderate Coal Potential	421
Unsuitability Criteria	421
Multiple Use Resource Management Decisions	425
Surface Owner Consultation	425
V. Other Considerations in the Land Use Planning Process .	425
Threshold Development Levels	425
Preferred Coal Leasing	425
VI. Activity Planning	426
Industry Expressions of Interest and	
Tract Delineation	426
Regional Tract Ranking, Selection, and	
Scheduling	427
Regional Environmental Impact Statement	428
VII. Pre-sale and Sale Procedures	428
Split Estate Leasing and Surface Owner Consent....	429
Consultation with Governors, Attorney General,	
and Indian Tribes	430
Fair Market Value	431
Maximum Economic Recovery	431
VIII. Special Leasing Opportunities	432
Small Business Set-Aside	432
Public Body Set-Aside	432
IX. Leasing on Application	432
X. Administration of Existing Leases and Preference	
Right Lease Applications (PRLA's)	433
Existing Leases	433
Preference Right Lease Applications (PRLA's)	435
XI. Special Start Up Considerations; Need for Leasing;	
and Program Implementation	435

TABLE OF CONTENTS (contd.)

	<u>PAGE</u>
SAMPLE TIME FRAME - Fiscal Year - Green River/Hams Fork Regional Leasing Schedule	438
Schematic Diagram of Federal Coal Management Program	439
LAND USE PLANNING - Activity Planning - Regional EIS Schedule - Interior Agency Involvement	440
GLOSSARY	441

Federal Coal Management Program

In May 1977, President Carter directed the Secretary of the Interior, Cecil D. Andrus, to establish a new Federal coal leasing program to assure the leasing and production of sufficient Federal coal to meet American energy needs while protecting other valuable natural resources such as wildlife, recreation areas, and agricultural land.

By law, Federal coal can only be made available in significant amounts through a process of competitive leasing. Competitive and preference right leasing of Federal coal were halted in 1971 because the then-existing leasing program had led to the leasing of substantial amounts of Federal coal, but had not resulted in increased production of coal. A 1975 effort to renew competitive coal leasing failed because of an inadequate environmental impact statement. Critics, including the State governments of those western states where most Federal coal is located, charged that the 1975 program, known as EMARS (Energy Minerals Activity Recommendation System), did not adequately consider how to select coal leasing areas that would minimize damage to farms, ranches, and the lands and waters that are most important to people and wildlife in the West.

In 1976, Congress passed the Federal Coal Leasing Amendments Act of 1976 (FCLAA), establishing specific rules to guide the development of Federal coal. In that same year, Congress enacted the Federal Land Policy and Management Act (FLPMA) requiring that the Bureau of Land Management (BLM) and the Department of the Interior (DOI) ensure that all Federal resource development decisions on public lands, including coal leasing, are made in cooperation with State and local governments as part of a comprehensive planning process. In 1978, Congress, with assistance and support from the Secretary and the President, enacted amendments to the FCLAA which are designed to make the 1976 law more workable for the mining industry.

In September 1977, a Federal court, acting on the lawsuit filed against the 1975 program, ordered that the program be halted until, as required by law, the possible environmental impacts could be described adequately. By this time, Secretary Andrus had already taken the first steps to carry out President Carter's order to develop a new and better system for leasing Federal coal. In April 1979, the BLM published a new, comprehensive environmental impact statement which analyzed the new preferred program for managing Federal coal as well as alternative management options.

Secretary Andrus, after studying the environmental analysis, made final decisions about the design of the new program in June 1979. Regulations (43 CFR 3400) putting the program in operation were issued July 19, 1979. The new program incorporates the requirements of the laws enacted in 1976 (as well as the 1978 amendments to the FCLAA) and the coal production policies of President Carter. Because of the greater efforts by the Department in analysis and in public participation, the new program is expected to remain free of the judicial restraints such as those that crippled the 1975 program.

The new program is supported by the western states which had objected to the earlier EMARS. For the first time in nearly a decade, Federal coal will be made systematically available for competitive leasing to meet America's coal needs.

I. INTRODUCTION

The Federal coal management program combines all major coal responsibilities of the Secretary of the Interior into one unified program in order to:

- A. Give the Nation greater assurance of being able to meet its national energy objectives.
- B. Provide a means to establish a more desirable pattern of coal development.
- C. Offer significant administrative advantages for the DOI.
- D. Increase competition in the coal industry.

The eight major elements of the new Federal coal management program are:

A. A planning system involving two steps: (1) land use planning, which includes close consultation with State and local governments, industry, and the public to decide which areas of Federal coal reserves will be considered potentially acceptable locations for coal production; and (2) activity planning to delineate, rank, and select for sale specific tracts of coal.

B. A system for evaluating the future national need for coal and for determining where production should be stimulated by the leasing of Federal coal.

C. Procedures for conducting sales and issuing leases.

D. Procedures for post-lease enforcement of terms and conditions.

E. Procedures for managing existing leases.

F. Procedures for processing existing preference right lease applications.

G. A strategy to integrate the environmental analysis requirements of the National Environmental Policy Act of 1969 into the new program.

H. Plans for a smooth start-up of the new program and, under limited circumstances, for offering lease sales in response to applications.

The major coal bearing areas of the continental United States have been divided into 12 coal regions. Eight of these regions contain significant reserves of Federal coal. These eight coal regions serve as the basic units

both on which the assessment of target levels for leasing will be centered and in which tracts will be ranked, selected, and scheduled for sale under the new Federal coal management program.

The following summary provides the reader with a basic overview of how the Federal coal management program will proceed in the eight regions containing significant amounts of Federal coal reserves and in areas outside of those eight regions.

II. STATE, PUBLIC, AND INDUSTRY PARTICIPATION

A variety of methods have been developed to provide for State, local, and industry participation in the Federal coal management program.

State Participation. States will be offered the opportunity to sign cooperative agreements which will enable them to participate directly in the land use planning process. The States may also recommend criteria to be added to the list of Federal unsuitability criteria and they may submit expressions of interest in potential coal tracts. Furthermore, a special consultation step will be provided to the States in setting regional production goals and leasing targets. The Governor will be consulted prior to any final decision to offer a tract for sale. The States will be asked to provide their views over the full spectrum of issues, including the interregional and cumulative regional social and economic impacts of coal development.

The States will be expected to participate actively and directly along with BLM personnel through membership on regional coal teams. Whenever possible, the regional coal teams serve as the general forum in which State participation occurs. In particular, these teams are the focal point for developing proposals and recommendations for Secretarial decision on the tracts selected and scheduled for sale and on regional production goals and leasing targets.

The activities of these teams provide the State Governors with an opportunity to discuss any potentially significant Federal decisions before they are made. The teams provide the citizens of each State, through their elected officials, with an authoritative forum for the airing of all interests and concerns.

General Public Participation. The public has several opportunities to participate directly and throughout the coal management decisionmaking process. Mandatory hearings are held on the land use plan recommendations either before final land use plan decisions are made or after draft regional environmental impact statements are completed. Comments will be solicited from the public at the beginning of the regional tract ranking, selection, and sale scheduling process. The public will have the opportunity to submit written comments and to participate in hearings on the regional lease sale environmental impact statement. The Secretary can also hold additional hearings if there is a general interest in the proposed sale and any issue exists which had not been thoroughly discussed at previous hearings. Besides the general public participation steps, there will be opportunities for

participation during the surface owner consultation and consent process.

In addition to these formal opportunities for public participation, anyone can submit general comments at any time in the process. When the Department believes it will serve the public's interest, additional public comment meetings will be held.

Industry Participation. Industry will bid for and produce the Federal coal, and industry can provide information to help determine where and when Federal coal should be leased. Industry participation will assure the earliest and most efficient production of all coal being developed in any given region.

Since industry is one of the three principal sources for coal information in the United States, industry is in a special position to make the Federal Government aware of the type, quality, quantity, and location of coal which should be considered for leasing. Industry can participate in the land use planning process and in the setting of DOI's regional production goals and leasing targets through all the same formal and informal channels available to the general public.

During land use planning, the coal industry can help identify high or medium potential coal resources; an area will be considered for further study if it is shown by company data to contain coal of medium potential for development. Industry will also be asked to explain why coal production in a particular area would be important enough to reduce or eliminate other resource uses. Mining companies may provide data (for example, about innovative mining or mitigation techniques) which could permit exceptions to the application of the unsuitability criteria. During the setting of regional production goals and leasing targets, industry can supply information on the overall demand for coal and on the extent to which the production potential from previously leased Federal reserves and non-Federal reserves will meet that demand.

III. SETTING REGIONAL GOALS AND LEASING TARGETS

The Secretary's June 1979 decisions included several decisions on regional leasing needs. Because circumstances determining the Nation's need for coal may change, coal forecasts are not often precise enough to permit competitive leasing on the basis of a single assessment of leasing needs. Therefore, a periodic reassessment of coal needs is incorporated as an integral part of the leasing system. The reassessment is conducted in a process which merges Department of Energy (DOE) regional production goals with advice from State and local governments, the coal industry, and other interests to determine leasing targets. The regional targets established by the Secretary are used by the regional coal teams at the point of regional tract selection to ensure that enough tracts are made available to meet target production levels.

The DOE focus is primarily on the energy needs of a healthy national economy and on national energy policy goals. DOE will consider the role of coal production in meeting those goals. In the goal and target setting process, the Secretary of Energy submits proposed DOE regional production goals to

the secretary of the interior. The supporting material for these proposed goals might include an indication of probable need for coal by major type. In determining regional goals for specific types of coal, the Secretary of the Interior is guided mainly by industry expressions of interest submitted at the start of the activity planning process.

The Secretary of the Interior will, within 60 days, comment to the Secretary of Energy on any potential conflicts or problems which the Interior Department foresees in the proposed DOE regional production goals. These comments will be based on the Interior Department's responsibilities for the management, regulation, and conservation of natural resources; the capabilities of Federal lands and Federal coal resources to meet those goals; and the national need for the coal, balanced against the environmental consequences of its development.

Within 30 days after receiving the Secretary of the Interior's comments, the Secretary of Energy will transmit to DOI final DOE national and suggested regional coal production goals. The secretary of the Interior will then look to the expertise and viewpoints of the regional coal teams as the major source of information and comment on the final DOE regional production goals and how they may affect leasing strategies and decisions. The Secretary will transmit the relevant DOE goal to each team. The team, in turn, will analyze the goal on the basis of its tract ranking and selection experience, its detailed knowledge of the region, and public comments it receives on the goal after publication in the Federal Register and, possibly, a hearing in the region. The team will report to the Secretary any adjustments it feels are necessary in the relevant DOE regional production goal and the reasons for those adjustments. The team will also provide the Secretary with a suggestion for a regional leasing target (on a reserve tonnage basis) for the next 4 year period.

Based on the recommendations of the teams and other information available to him, the Secretary of the Interior will adopt the final DOE regional production goals, either without change or after making adjustments to them. He will transmit the final goals to the Secretary of Energy and publish them in the Federal Register. The adopted goals will be used by the Department for long range coal management program planning, and will be made available to the States, local governments, and other entities for their use. The Secretary of the Interior will also adopt and publish, at the same time, preliminary regional leasing targets for logical mining units which would be composed of, or include, new Federal leases.

These preliminary regional leasing targets primarily reflect the difference between desired levels of production in the region without new Federal leasing. Federal and non-Federal coal that enters production because of past Federal leasing will also be considered in reaching the targets. Among other factors which may be affected by leasing decisions and which the Secretary considers in establishing preliminary regional leasing targets are competition within the industry and environmental problems associated with the existing pattern of leases and mines in each region.

The Secretary may call a national conference of the regional coal teams to discuss their individual recommendations. After publishing the final regional production goals and the preliminary regional leasing targets, the Secretary will consult directly with the Governors of the affected States to learn their views, particularly with respect to the relationship between the preliminary regional leasing targets and potential social and economic effects on the States and regions. After reviewing the information received through all of the above procedures, the Secretary will publish the final regional leasing targets in the Federal Register and transmit them to the regional coal teams.

The final regional production goals, and the preliminary and final regional leasing targets are used by the Federal and State Governments to set data gathering and planning priorities. This ensures that a sufficient number of tracts will be delineated in the future and that adequate site-specific information will be available to make the coal leasing process workable. The final regional leasing targets specifically guide the regional coal teams in the selection and ranking of tracts and assist them in the long range scheduling of proposed lease sales in their respective regions.

The regional tract ranking and selection process indicates the optimum tracts for the desired level of development and leads to analyses of the impacts of alternative lease sale schedules. These analyses can include alternatives for choosing a combination of tracts which will result in a leasing level above or below the level called for in the final regional leasing target for a particular region. Reasons for proposing leasing above or below the level called for in the final regional target are: (a) new information about industry interests; (b) special concerns of local communities or regions; (c) interest in special opportunity sales; (d) sales experience with the ongoing regional lease sale schedule; and (e) a desire on the part of a State to shift or disperse coal development patterns.

Any proposed Divergence above or below the final regional leasing target proposed by the regional coal team will be discussed and explained in detail in the draft regional lease sale environmental impact statement. Public comment will be specifically requested on the proposal in the public participation process. The secretary will specifically consider the analysis and any comments on the proposed divergence from the leasing target at the time he makes his decision on a lease sale schedule. In any case, an alternative which satisfies the regional leasing target must be considered.

The first time the process of determining regional leasing targets is conducted, the interregional analysis included in the programmatic environmental impact statement will be used as a basis for the decisions on the targets after providing for State consultation and public comment. The possibility of trade-offs in production goals and leasing targets between regions will be considered during the biennial process in which the production goals and leasing targets are set or revised.

In subsequent biennial revisions of regional production goals and leasing targets, information and analyses generated in the preceding regional tract ranking and selection process will provide useful information for the goal and target decisions. Those highly rated, but previously unselected, tracts will most likely serve as a pool for the selection of tracts to meet new regional production goals and leasing targets. If unchosen tracts remaining in one region are clearly superior to most of those remaining in another, interregional trade-offs in the setting of the new regional production goals will be considered. This overall interregional analysis of the tracts makes the development of regional production goals at this stage important. Biennial regional leasing targets derived from production goals will be used for either guiding new 4 year lease sale schedules or amending existing lease sale schedules after the first 2 years of their 4 year term.

IV. LAND USE PLANNING

The principal coal resource decision in land use planning is to determine where, from among the millions of acres of Federal coal lands, increased coal production will meet energy needs without unduly damaging agriculture, wildlife, recreation, or other resources and resource uses. These areas are identified by studying all Federal coal lands and determining which are most suitable for coal development.

A. Areas will be considered for leasing only if they have high to medium coal development potential as determined by the Geological Survey.

B. Some lands containing Federal coal will not be considered for leasing if they are judged unsuitable under criteria which are designed to protect the most environmentally sensitive lands.

C. Areas where leasing may take place will not include lands where other resources or uses are determined to be more important than coal production.

D. Where the Federal Government owns the coal, the coal would be surface mined and the land above the coal is owned by ranchers or farmers who are qualified surface owners, the coal will not be leased without the consent of the qualified landowner. Where surface mining of Federal coal would affect several landowners, a decision not to lease may be made if consultation with these surface owners shows a strong preference against coal development in the area.

The Department of the Interior currently estimates that 75 percent of the medium and high potential coal areas will remain in land use plans as areas acceptable for further consideration for coal leasing.

All potential resource users--such as ranchers, coal companies, other mineral producers, timber purchasers, and the general public--will have the opportunity to participate actively in the land use planning process.

What follows is an explication of the four steps or "screens" listed above.

High to Moderate Coal Potential. Only a portion of the coal resources within an area covered by a land use plan is likely to be potentially economic to mine. Rather than perform detailed studies of lands containing no economic coal, coal leases will be issued only within known recoverable coal resource areas (KRCRA's).

The major source of information for this determination will be the coal resource occurrence/coal development potential (CRO/CDP) maps and other related data made available by the Geological Survey. Coal companies, the States, or members of the public may submit coal geological and economic data during this early phase of planning. Where the information demonstrates at least a medium development potential for coal, the area will be considered for further review; otherwise, the land will not be considered further for coal leasing during the life of the land use plan or the updated plan.

Unsuitability Criteria. President Carter, in a May 24, 1977, memorandum, instructed the Secretary of the Interior to lease "only those areas where mining is environmentally acceptable and compatible with other land uses." The President further directed that the Department "scrutinize existing Federal coal leases and preference right lease applications to determine whether they show prospects for timely development in an environmentally acceptable manner, taking steps as necessary to deal with non-producing and environmentally unsatisfactory leases and applications.

In addition, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) required the Secretary to review Federal lands to determine whether they contain areas which are unsuitable for all, or certain types of, surface coal mining operations. SMCRA also contains a requirement for the States to undertake a similar program for non-Federal lands if they wish to assume primary regulatory authority under the Act. A list of standards to be used by the States is identified in Section 522 (a)(3) of the Act. These same standards must also be applied to Federal lands as well as private surface lands overlying Federal coal.

Criteria have been developed to implement SMCRA, other Federal laws, and the directives in the President's Environmental Message of May 23, 1979. The criteria, applied to medium and high potential coal lands, will aid the land managers in identifying those areas with key features, principally environmental, that cannot properly be protected if subjected to mining. These areas will not be given further consideration in the coal leasing planning process unless it is determined that stipulated methods of mining will provide adequate protection. Application of the unsuitability criteria will ensure that protection of the most sensitive and valuable environmental features of Federal lands is accomplished in a consistent, uniform, and objective manner so that coal development planning will be concentrated in areas where environmental conflicts are less likely to add delay, cost, or conflict to production efforts.

The unsuitability criteria can be divided into two categories: those which are required under Section 522 of SMCRA or other law (e.g., Federal land

system) and those which are discretionary under Section 522 or other law (e.g., land used for scientific studies.)

The unsuitability criteria will be fully applied during land use planning. The responsible official does not have the discretion to refrain from applying any criterion, but does have authority to decide that, in some cases, coal production can proceed without damaging the resources protected by the unsuitability standards.

The unsuitability criteria will not be applied to Federal lands which will be mined by underground mining methods unless such mining will produce surface effects on Federal lands to which a criterion applies. Surface effects include disturbance to surface occupancy, subsidence, fire, and other detrimental environmental impacts of underground mining which are manifested in the surface.

Specific exemption reflecting valid existing rights or substantial legal and financial commitments are incorporated, where appropriated, into the unsuitability criteria.

The unsuitability criteria (exceptions and exemptions not listed) protect the following lands and resource values:

A. All Federal land included in the following land systems or categories: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns, and villages.

B. Federal lands within rights-of-way or easements or included in surface leases for residential, commercial, industrial, or other public purposes, or federally-owned surface used for prime agricultural crop production.

C. Lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community, or institutional building.

D. Federal lands designated as wilderness study areas and under review by the Administration and the Congress for possible wilderness designation.

E. Scenic Federal lands designated by visual resource management analysis as Class I (areas of outstanding scenic quality or high visual sensitivity).

F. Federal lands under permit by the surface management agency that are being used for scientific studies involving food and fiber production, natural resources, or technology demonstrations and experiments (except where mining could be conducted in such a way as to enhance, not jeopardize, the purposes of the study).

G. All districts, sites, building, structures, and objects of historic, architectural, archaeological, or cultural significance on Federal lands which are included in, or eligible for, inclusion in the National Register of Historic Places, and an appropriate buffer zone around the outside boundary of the designated property.

H. Federal lands designated as natural areas or as National Natural Landmarks.

I. Federally-designated critical habitat for threatened or endangered plant or animal species and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented.

J. Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a State pursuant to State law as endangered or threatened.

K. An active bald or golden eagle nest site on Federal lands and an appropriate buffer zone around the nest site.

L. Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering.

M. Federal lands containing an active falcon (excluding kestrel) cliff nesting site and a buffer zone of Federal land around the nest site.

N. Federal lands which are high priority habitat for migratory a bird species of high Federal interest on a regional or national basis as determined jointly by the surface management agency and the Fish and Wildlife Service.

O. Federal lands which the surface management agency and the State jointly agree are fish and wildlife habitat for resident species of high interest to the State and which are essential for maintaining these priority wildlife species.

P. Federal lands in riverine, coastal, and special floodplains (100-year recurrence interval).

Q. Federal lands which have been committed by the surface management agency to use as municipal watersheds.

S. Federal lands identified by the surface management agency, in consultation with the State in which they are located, as alluvial valley floors where mining would interrupt, discontinue, or preclude farming.

T. Federal lands in a State to which is applicable a criterion (1) proposed by that State and (2) adopted by rulemaking by the Secretary.

The unsuitability criteria will be applied to new leases, as well as preference right lease applications. The criteria will be applied directly to the tract areas for the latter. For all other new leases, the procedures set forth below will be followed.

The responsible official of the Federal surface management agency will describe in the land use plan the results of the application of each of the unsuitability criteria to the medium and high potential coal lands in the planning area. Each instance in which a criterion is found to be applicable must be identified and the area which is excluded from further coal development consideration must be shown. If it is determined that conditions for an exception exist, the area to which the exception applies will be described, with discussion in detail of the reasons why the exception is being made, and what type of stipulations will be required in the lease or mining permit to ensure protection of the resource value covered by the criterion.

All coal lands not identified as unsuitable for all types of coal mining operation will be considered further in the land use planning process. Where underground mining of Federal coal will produce hydrologic or surface effects on land to which an unsuitability criterion applies, those lands will be considered unsuitable unless the conditions exist to permit an exception.

The unsuitability criteria will be applied to each existing non-producing lease upon submission of a mine plan by the lessee. The mine plan will be reviewed in light of the unsuitability criteria to determine which, if any, apply. If a criterion applies, the Department will evaluate whether the plan must be changed to eliminate the harmful effects which the criterion is designed to prevent. If no change can be made and some or all types of mining cannot take place consistent with the criterion, the Department will decide if it has the authority to apply that criterion to the lease. If the lessee has valid existing rights or has made substantial legal and financial commitments, the lease may be exempted, by statute, from complying with certain of the criteria depending on the course of authority for the criteria and the dates of commitments. If the Department finds that it has the authority to apply the criterion, mining will not be permitted.

SMCRA mandates that the Secretary of the Interior review all Federal lands for unsuitability, and allows citizens to petition for and against designation of lands as unsuitable. Consequently, under SMCRA, the Department has procedures to apply unsuitability criteria both as part of a comprehensive Federal lands review and as part of a petition process.

The Office of Surface Mining (OSM) has the responsibility to administer the statutory petition process. OSM will only make a formal designation of Federal lands as unsuitable in response to a petition to designate under Section 522(c) of SMCRA. Anyone can submit either of two kinds of petitions. One is a petition to designate land unsuitable for mining. The other is a petition to terminate a designation of unsuitability. Section 522 of SMCRA requires that the petitioner be adversely affected by potential mining of the lands in question and provide facts supporting the allegation. Petitions

submitted to OSM will be reviewed and forwarded with recommendations to the authorized surface management agency (e.g., BLM). A public hearing will then be held to present to the public the reviews of the OSM and the surface management agency. These reviews will describe (1) potential coal resources of the area; (2) the demand for coal resources; and (3) the impact of such designation on the environment, the economy, and the supply of coal. A decision to designate land unsuitable, to reject the petition, or to terminate a prior designation will occur within 60 days of the hearing.

Multiple Use Resource Management Decisions. Although many major conflicts between coal and other resources will be addressed during the application of the unsuitability criteria, some significant resource-balancing decisions will remain. These other resource trade-offs will be considered and acted upon after application of the unsuitability criteria. This stage in the land use planning process will determine the site-specific resource values or uses of greater importance than coal development. This process will also determine when other resources and uses (e.g., grazing, recreation, community development) may be temporarily or permanently reduced to allow for coal leasing and production.

Surface Owner Consultation. Section 714(d) of SMCRA requires the Secretary to consult during the planning process with private owners of the surface estate overlying Federal coal being considered for leasing. In order to minimize disturbance to land owners from surface coal mining of Federal coal deposits and to assist in the preparation of comprehensive land use plans required by the Mineral Leasing Act of 1920, as amended, the Department will, to the maximum extent practicable, refrain from leasing coal deposits for development by methods other than underground mining in areas where a significant number of qualified surface owners state a preference against the offering of deposits for lease. Although portions of these areas might still be designated as acceptable for further consideration for coal leasing, the land use plan will contain the recommendation that no leasing take place in the areas unless there are no acceptable alternative local areas available to meet the leasing target for the entire coal region.

V. OTHER CONSIDERATIONS IN THE LAND-USE PLANNING PROCESS

The following processes provide a framework for defining areas for further consideration for coal leasing.

Threshold Development Levels. In the land use plan, the responsible official can establish development levels within areas where Federal coal may be leased. Thresholds will be used to control impacts which depend on an overall development level rather than on site-specific effects. For example, to protect a local economy, leasing could be held at a level that would assure a gradual, rather than a sudden, growth in mining-induced population; this would give local communities the opportunity to plan for growth. Such leasing thresholds would be established through coordination with local and State officials. Or, if the total population of a deer herd or other wildlife population would be unacceptably reduced by the effects of coal production

above a certain level, leasing schedules could help keep coal production in balance with desired wildlife populations.

Preferred Coal Leasing. Within the areas identified as acceptable for further consideration for coal leasing, the land use plan may identify preferred coal leasing areas. This will be done when available coal demand data suggest that the areas acceptable for further consideration for leasing clearly will yield more coal than will be needed before the land use plan is likely to be reviewed. Preferred areas will be identified by employing available socioeconomic, environmental, and economic data. These preferred area identifications do not commit the regional coal teams to any particular selection of tracts during activity planning.

VI. ACTIVITY PLANNING

During activity planning, tracts will be delineated and selected for sale from the areas designated in the land use plan as acceptable for further consideration for leasing. There are two major parts in this stage of planning. The first is receipt of industry expressions of interest and delineation of potential tracts in each land use planning area. The second phase is tract ranking, selection, and scheduling and will normally be conducted over the entire coal region encompassing many land use planning areas.

Federal/State regional coal teams (RCT) will be established for each of the major multi-State coal regions. The RCT consists of a BLM representative and a State Governor's representative from each State within the region, and a chairperson appointed by the BLM Director. The team: (1) reviews all tract delineation and site-specific analysis work; (2) is responsible for the tract ranking, selection, and scheduling process; and (3) serves as the forum for Federal/State coal management discussions.

Industry Expressions of Interest and Tract Delineation. Although preliminary tract delineation will be done by the authorized surface management agency, industry will be requested to submit expressions of interest in specific coal areas. In addition to industry, any individual, State, or public body may respond when the Secretary issues a call for expressions of leasing interest. A call for expressions of interest will be made only after areas acceptable for further consideration for coal leasing are identified in the BLM land use planning process.

Public inspection and copying of information submitted with the expressions of leasing interest will be permitted in accordance with Departmental regulations. Qualified proprietary data will be safeguarded at the company's request.

Notice of each request for expressions of leasing interest will be published in the Federal Register and at least one newspaper of general circulation in each affected State in the coal region. This notice of request will specify the area or areas involved, information required, the period of time within

which expressions may be submitted, where to write for further information, and where to submit the expressions.

In delineating tracts, the following factors will be among those considered: (1) expressions of interest, (2) technical coal data, (3) maximum economic recovery calculations and logical mining units, (4) surface ownership, (5) preliminary regional leasing targets, and (6) guidance from the regional coal teams.

Regional Tract Ranking, Selection, and Scheduling. In the months before the leasing schedule is established, all available preliminary tracts and tract profile information will be reviewed. Data insufficiencies will be noted and, where time permits, remedied so that each tract will have the coal resource, socioeconomic, and environmental profile needed for ranking. Also, additional unsuitability analysis may be conducted at this stage for lands that were found in the land use planning process to be acceptable pending further study. Any resulting decisions from this unsuitability analysis will be made public. In addition, tract-specific stipulations may be written at this time. The stipulations must be detailed, must comply with SMCRA, and will be subject to change in response to new information contained in the mining plan.

Every 2 or 4 years, the Director of BLM will formally begin the regional tract ranking and selection process. Ranking will be on a coal region-wide basis, and regional comparisons will be based on specific lease tracts. In the ranking process, factors relating to coal economic, ease of reclamation, proximity to existing transportation facilities, class of surface ownership (Federal or non-Federal), and socioeconomic and other environmental concerns will be employed. Ranking will be for general levels of acceptability only. The regional coal teams are expected to emphasize those factors of importance to the region. The ranked tracts will be compared with the regional leasing target, and a set of tracts will be selected on a preliminary basis for a proposed lease sale schedule. Since the potential environmental and social impacts resulting from development of any tracts in the same area are cumulative, the selection of the first tract might preclude selection, or lower the priority of, other highly ranked tracts.

Accordingly, as selections of individual tracts are made, the original rankings of the remaining tracts might be altered so that the final tracts selected will not necessarily correspond directly to the order in which the individual tracts were originally ranked. The number of tracts proposed will depend on the type of bidding system used (intertract or single tract bidding) and the tonnage targeted for lease. The selected tracts will then be placed in a proposed regional lease sale schedule.

Ranking or selection decisions to cluster or disperse leasing patterns within a region may be made based on economic, social, or environmental considerations in the region.

The tract ranking and selection process will be conducted in close coordination with the Governors of the States comprising the region.

Consultation with all affected Federal surface management agencies and Indians and other Federal and State agencies with expertise of relevance to the process will also be sought. The RCT will help accomplish this coordination and consultation. Each RCT will consider and suggest policy for setting regional production goals and leasing targets, tract delineation, and site-specific analysis in its region. It will review tract ranking and will establish proposed tract selections and sale schedules. Alternatives will be analyzed in the regional lease sale environmental impact statement and then will be recommended to the Secretary. If any State representative disagrees with the proposed ranking decisions or selection and scheduling of tracts for lease sale resides with the Secretary upon completion of the Regional Lease Sale EIS.

A notice of intent to rank and select tracts to be included in a proposed regional lease sale schedule will be published in the Federal Register and in selected general distribution newspapers within the coal region at least 15 days before the ranking process begins. The notice will contain a description of the tracts to be ranked and procedures to be followed by interested parties who wish to be involved in the process. Also, one more call for surface owner consent filings may be made for the tracts to be ranked.

Detailed profile information on each of the ranked tracts will be available for inspection in the Bureau of Land Management offices in the coal region. Those parties interested in commenting on the results of the tract ranking and selection process will have the opportunity to do so in the regional lease sale environmental impact statement process before any final decision is made by the Secretary to adopt a lease sale schedule or to hold a lease sale encompassing any of the selected tracts.

Regional Environmental Impact Statement. It is the intent of the Department that the environmental impact statement (EIS) be closely integrated with the coal activity planning process. This will be done by using the decision and analysis documents developed during the delineation, site-specific and cumulative analyses, ranking, selection, and scheduling phase as the basis for the EIS and by incorporating these documents into the EIS either by reference or by direct inclusion. Some special, additional, work will be needed to complete the EIS, but this work is not expected to be substantial. The procedure outlined above is designed to comply with the Council on Environmental Quality regulations for the preparation of EIS's, as well as furthering the Department's goal of providing a more complete description of the actions that have been, and may yet be, taken for Federal coal leasing.

VII. PRE-SALE AND SALE PROCEDURES

From the time a tract is selected for sale at the conclusion of the activity planning stage until a lease can be issued, a series of actions will be required to meet various statutory and administrative requirements. Sales will occur using either a single tract sale system or an intertract sale system. In the individual tract sale method, bidders compete against one another for any given tract. The highest bidder in any sale will be offered

the tract provided the bid meets the Government's minimum acceptable bid, passes the Attorney General's antitrust review, and meets all other requirements of the applicable laws and regulations.

In intertract sales, more tracts will be offered than are intended to be awarded, with only the highest bids (above fair market value) per ton of coal for the desired number of tracts accepted. Intertract lease sales are designed to encourage competition for all tracts in an area when competition for individual tracts may be lacking.

Split Estate Leasing and Surface Owner Consent. Under the original homestead laws, ranchers and farmers were granted both the surface and mineral rights to their land, but later homestead laws provided for retention of some or all of the mineral estate by the Federal Government. The majority of split estates involving federally-owned mineral rights originated from settlements that took place under these later homestead laws. The retained mineral estate included the right to enter and mine at any time in the future. The private owner of the surface estate did not have the power to prevent mining, although he or she was guaranteed some degree of indemnification for damage.

Section 714 of the SMCRA provides that, in cases where Federal coal is overlain by private land owned and lived on by qualified homeowners or owned by qualified farmers and ranchers, the Secretary may not issue a coal lease for surface mining unless the land owner has granted, in writing, valid consent to conduct such mining operations. Members of this special class of surface owners are defined as persons who:

- o Hold legal or equitable title to the land surface; and
- o Have their principal place of residence on the land or personally conduct farming or ranching operations on the land or receive a significant portion of their income from farming or ranching the land; and
- o Have met these two conditions for at least 3 years prior to granting their consent or refusal to consent.

The amount of Federal coal underlying private surface owned by surface owners as defined in Section 714 is relatively small, but the requirement that landowners' consent be obtained prior to leasing that coal is expected to be significant in determining some local patterns of Federal coal development.

This provision of SMCRA does stipulate that Federal coal underlying private surface is to be leased in accordance with the Mineral Leasing Act of 1920, as amended. The Act requires the Secretary to regulate the leasing process to meet the two purposes of ensuring that leases be sold by competitive bidding and that fair market value be received for the coal. Specifically, the Secretary may monitor surface owner consents to ensure that their form and financial terms do not substantially affect fair market value or the competitive nature of the lease sale. Should these terms threaten the public

interest, the Secretary may decline to proceed with that lease sale or to award the lease if the sale has already been held.

Industry will be responsible for acquiring surface owner consent. Consents must be filed with the BLM up to 30 days prior to the publication of the sale notice. The consents, to be valid, must be transferable. A surface owner consent agreement will be considered transferable only if it provides that (1) the payment for the consent is to be made by the successful bidder or (2) the successful bidder is permitted to reimburse, for the purchase price of consent, the company which first obtained the consent. If no filing of consent is made on a tract prior to the sale announcement, the tract will not be offered for sale.

The surface owner may file a written refusal to consent at the local BLM office any time after completion of the encompassing comprehensive land use plan, thereby disqualifying the coal under the surface owner's land from further leasing consideration. The refusal will be binding during the life of the land use plan or until the ownership of the surface estate changes.

Upon revision of the land use plan, the surface owner will be notified that the prior written submission has expired and will be given the opportunity to submit another statement. Also, whenever industry or other groups notify the BLM of a surface owner who has refused to provide consent to a potential consent purchaser, that owner will be given an opportunity to submit a statement of refusal to consent.

Consents given prior to the enactment of SMCRA were validated under Section 714 regardless of the consent terms. The Department, of course, did not then require that these contain provisions for their transferability. To ensure competitive sales, tracts which are selected for sale and which include areas covered by consents given prior to the enactment of SMCRA will be offered for sale individually only if the consents are determined to be transferable. If pre-existing consents are determined to be non-transferable, the tract will not be offered for sale unless it is included in an intertract sale.

Consultation with Governors, Attorney General, and Indian Tribes. Prior to setting a regional coal lease sale schedule, the Secretary will consult with the Governor of each State in which tracts for lease are located, the U. S. Attorney General, and any Indian Tribes that would be affected by any of the lease proposals being considered. The Secretary

will ask each of the parties to comment in a specified period of time before issuing the final sale schedule. A specific procedure for consultation with a State Governor when a lease proposal is for surface mining within the boundaries of any National Forest within that State is required by the FCLAA and is incorporated in the coal management regulations.

Fair Market Value. The Mineral Leasing Act of 1920, as amended by the FCLAA, specifically mandates that, "No bid shall be accepted which is less than the fair market value, as determined by the Secretary, of the coal subject to the lease." The basic methods for evaluating fair market value are comparable sales analysis and discounted cash flow analysis. The discounted cash flow analysis involves calculating annual costs and income resulting from the development of a property under realistic conditions. Comparable sales analysis is an appraisal approach in which the value of coal is based on prices paid in actual market transactions.

Before the Department makes any determination, industry and the public will be given the opportunity to comment on fair market value considerations for any tract being offered for sale (especially on the values that should go into the fair market value determination) as well as on the related decision of maximum economic recovery.

The DOI must also determine the bidding method for Federal coal lease sales. The Department, in cooperation with DOE, will experiment with alternate bidding methods, adopting those which are most successful. Among those suggested are:

- o Direct or deferred bonus bidding. Cash payment is offered for the proposed lease. (The Federal Coal Leasing Amendments Act of 1976 requires half of all sales to be by deferred bonus bid.)
- o Variable royalty bidding. Bids are placed in the form of royalty rates based on a percentage of the value of the coal recovered (usually a small cash down payment is also required).
- o Sliding scale royalty bidding. Cash payment is offered for the proposed lease, but the amount of the royalty paid is varied in proportion to the value of the coal produced.

In addition, DOE intends to study the possibility of using a profit sharing method. In this case, the government essentially becomes a partner in the coal enterprise and receives a bid which offers a percentage of profits.

Maximum Economic Recovery. The Federal coal management regulations require maximum economic recovery (MER) of Federal coal on all new Federal coal leases. MER will be calculated for leases on the basis of marginal cost equaling marginal revenue--just as is done by industry to determine the most profitable plan for mining the coal. The preliminary MER will be published in the lease sale notice to assist coal producers in preparing their bids. Final MER will be determined by the mining supervisor after lease exploration.

be published in the lease sale notice to assist coal producers in preparing their bids. Final MER will be determined by the mining supervisor after lease exploration.

VIII. SPECIAL LEASING OPPORTUNITIES

In response to the FCLAA and the Small Business Act of 1953, as amended, the Department will reserve and offer a reasonable number of coal lease tracts as special leasing opportunities. These opportunities will be provided through special lease sales where public bodies will bid only against public bodies and small business concerns only against other small businesses.

Small Business Set-Aside. In the interest of assisting and protecting small business enterprises and providing a wider opportunity for competition in the coal industry, the DOI and the Small Business Administration have agreed through a Memorandum of Understanding (MOU) to set-aside coal leasing tracts for sale to small businesses only. During tract delineation, the SBA together with the DOI will review lands being considered as potential lease tracts and will indicate possible locations of Federal coal lease tracts to be set aside. Every effort will then be made to hold a set-aside sale where SBA officials, in consultation with DOI, expect good participation by small businesses. It is the official policy of the SBA and the DOI to encourage and promote participation by minority small business and economically disadvantaged concerns in the small business set-aside sales. The set-aside tracts will be reserved and first offered for lease through competitive bidding only to entities defined by SBA as small businesses.

Public Body Set-Aside. After the ranking and selection process, the Secretary may designate and schedule one or more coal lease tracts for special opportunity lease sales for public bodies if a public body, through submission of an expression of leasing interest, requests that a special opportunity lease sale be held. With the submission of this request, the public body must provide evidence of its qualifications to participate in a special opportunity sale. Public bodies are non-profit, consumer-owned utilities, such as rural electric cooperatives, municipally owned utilities, and Federal, State and local agencies.

IX. LEASING ON APPLICATION

The bulk of the competitive coal leasing to be done by the Department will be through the activity planning process outlined in section V. However, there are two situations where a limited amount of competitive coal leasing will be done in response to applications. The first involves applications within the designated western production regions where activity planning will occur. In this situation (emergency leasing), leasing in response to applications. The first involves applications within the designated western production regions where activity planning will occur. In this situation (emergency leasing), leasing in response to applications will be considered in cases where:

A. Federal coal is needed within 3 years to maintain an existing mining operation at the average annual level of production or where a new contracted level of production is required or;

B. If the coal deposit is not leased it will be bypassed for the foreseeable future and, if leased, some portion of the tract applied for will be utilized within 3 years, as substantiated by the proposed production levels stated in a mining sequence plan; and;

C. The need for the coal deposit resulted from circumstances that were beyond the control of the applicant or for which he could not have reasonably foreseen and planned.

All decisions for leasing in response to applications must be consistent with the appropriate land use plan or analysis and the unsuitability criteria. Only 8 years of reserves will be offered. The emergency leasing system will not be substituted for the procedures required in the full decision-making cycle and should become less significant with the passage of time. Applications which are not compatible with existing land use plans for the area will be rejected.

The second situation where applications will be accepted is for coal areas outside of the western production regions and within the mid-western and eastern production regions where limited Federal land ownership makes activity planning impractical. The areas applied for will be subject to land use planning and environmental analyses. If compatible with such analyses, competitive lease sales will be held in response to the applications.

X. ADMINISTRATION OF EXISTING LEASES AND PREFERENCE RIGHT LEASE APPLICATIONS (PRLA's)

A significant element of the Department's Federal coal management program is the administration of existing coal leases and preference right lease applications. The amount of coal involved is considerable. As of September 30, 1979, there were 546 Federal coal leases estimated to contain 16.2 billion tons of recoverable coal and 176 preference right lease applications which contain an estimated 5.7 billion tons of recoverable coal.

Existing Leases. The new planning requirements and unsuitability criteria will be applied to all non-producing leases. However, the DOI will await the submission of a mining plan by the lessee before deciding the desirability of lease development. (This does not preclude evaluation as part of the normal planning process if the lease is situated within an area undergoing planning.) The mine plan will be reviewed in light of unsuitability criteria to determine which, if any, apply. If any criterion applies, the specific criterion and any exception to it which the conditions permit to be applied will be identified. If a criterion does not apply and the conditions do not permit an exception, a further decision will be made on whether the land is exempt from the criterion because of the source of the authority for the provisions of the

source of the authority for the provisions of the criterion. All unsuitability studies will include public hearings before any final assessments are adopted as part of a land use plan or environmental analysis on a mine plan.

The DOI, in 1976, established diligence regulations for all leases issued prior to the FCLAA. These rules require the production of 2 1/2 percent of the lease reserves by June 1, 1986 (diligent development), and 1 percent of the lease reserves every year after achieving diligent development (continued operation). In order to assure that these obligations are understood by all holders of these 528 leases, GS has notified them about the tonnages of coal necessary to meet these obligations, and the BLM will request that each lessee expressly agree to the applicability of these requirements by signing a revision to its lease that incorporates these requirements. These obligations will be enforced by considering cancellation of non-producing leases in 1986. These obligations superseded any and all production obligations in the existing leases. If a significant number of lessees resist this principle, however, the Secretary may consider action to enforce the existing lease terms before 1986 against those lessees who do not sign the lease revision.

Leases are subject to readjustment at the end of the current 20th lease year and each 10 year period thereafter. Lease royalties will be readjusted to conform to FCLAA and the regulation, i.e., not less than 12 1/2 percent for coal mined by surface mining methods and 8 percent for underground mined coal. Where the lessee can demonstrate that underground mining is uneconomical at 8 percent, the lease royalty may be reduced to not less than 5 percent. In addition, at the time of readjustment, leases will be made expressly subject to the diligence requirements and any special stipulations that are determined to be necessary.

When considering lease assignments, the following review processes will be adhered to:

A. All lessees who received their leases through assignments in the last 5 years will be notified and required to disclose, within 90 days after notification, the financial terms of the assignment.

B. New assignments will not be approved unless the financial terms of the assignment are disclosed.

C. Information received on assignments will be analyzed to determine whether the current requirement of a 50 percent limitation on overriding royalties should be changed.

D. All assignments will be sent to the Department of Justice for antitrust review.

E. An assignment will not be approved except when it meets the same competitive bid standards as the Department has for other leases.

F. Assignments which have been filed and are for non-producing leases will receive the highest priority for processing.

G. The DOI will seek regulatory authority, through DOE, to require all assignees to submit a definite plan for meeting diligence as a condition for approval of the assignment.

Preference Right Lease Applications (PRLA's). Until the early 1970's, the Federal Government issued prospecting permits to interested parties to explore for coal in areas where workable deposits were not known to exist. By demonstrating that the permit area contained commercially valuable coal, a prospecting permit holder could apply for and obtain a lease to mine the deposit. Such lease applications were called preference right applications (PRLA's), and leases were issued without competition. Under the FCLAA, such noncompetitive coal leases are no longer permitted, subject to valid existing rights.

Under the new Federal coal management program, a company with a pending application for a preference right lease shall be entitled to a noncompetitive coal lease if the applicant can demonstrate that commercial quantities of coal on the prospecting permit lands were discovered within the terms of the permit, other requirements having been met. As a matter of policy, the Department shall complete the processing of all preference right lease applications by December 1, 1984.

PRLA processing steps involve:

A. Initial showing. The applicant must submit to BLM the quantity and quality of the reserves discovered within the boundaries of the prospecting permit.

B. Preference right lease applications will be processed in the cycle of ongoing comprehensive land use plans. If the applicant can show that processing the application in the normal cycle of land use planning will cause substantial hardship, the DOI will, if possible, advance the time on processing the application.

C. After the applicant has completed the initial showing, the BLM will conduct an environmental analysis of the PRLA which will involve either an environmental assessment or an environment impact statement.

D. Upon completion of the environmental analysis, which includes application of unsuitability criteria, the BLM will request a final showing by the applicant consistent with the regulations. Upon approval, a lease will be issued.

XI. SPECIAL START UP CONSIDERATIONS; NEED FOR LEASING; AND PROGRAM IMPLEMENTATION

It will not be possible to carry out all aspects of the Federal coal management program until 1984 in most cases, and 1986 in others, due to

budget constraints and personnel ceilings. The Secretary has determined that lease sales must be held beginning in January 1981 to assure development of sufficient coal to meet the President's domestic energy production goals. Competitive leasing during the transitional period will not include all the planning elements of the new Federal coal management program.

The principal differences between the mature program and start-up procedures are:

A. During the transition period, existing land use plans must be supplemented with the application of the unsuitability criteria and surface owner consultation; a cut-off date, after which activity planning will not be initiated on land use plans that are in less than full compliance with BLM land use planning regulations under FLPMA was established, and a reasonable basis on which to proceed to tract delineation, evaluation, ranking, and scheduling for sale must be provided.

B. The notice of intent to rank tracts will be issued immediately prior to initiation of ranking.

C. The first regional lease sale environmental impact statements will address a 2 year rather than a 4 year lease sale schedule.

The earliest that coal lease sales must take place in order to meet regional production needs is early 1981. Regions presently designated for early leasing are the Powder River, Green River/Hams Fork, Uinta-Southwestern Utah, and Southern Appalachian Coal Regions.

As described in part III, the Federal coal management program uses regional leasing targets derived from coal production and mine projections to ensure that future coal needs will be met. Based on the projections then available, the Secretary announced tentative targets in three regions and directed that preparations for leasing begin in a fourth. The lease sale time frames and leasing targets for each region are indicated below.

Green River/Hams Fork. A January, 1981 lease sale date was established with a tentative leasing target of 531 million tons. The leasing target will be set to achieve 1985 through 1987 production levels, with no mid-1986 excess capacity.

Uinta-Southwestern Utah. A July, 1981 lease sale date was established with a tentative leasing target being that of the medium level DOE production (109 million tons). The final leasing target will be set to achieve 1985 through 1990 production levels with no excess capacity. Public comment on the tentative leasing target will be requested prior to final target selection.

Powder River. An early 1982 lease sale date was established with a tentative leasing target of 621 million tons, plus an additional 25 percent to allow greater flexibility and to promote competition. The final leasing target will

be set to achieve 1985 through 1987 production levels, with high mid-1986 excess capacity assumed. Public comment on the tentative leasing target will be requested prior to the final target selection.

Southern Appalachia. The Secretary directed preparation and environmental analysis for a July, 1981 lease sale. No leasing target was established.

NOTE: All the leasing targets listed above are under study and are based on ongoing efforts of the RCT's and their recommendations to the Secretary.

For more detailed information about the Federal Coal Management Program, copies of the Final Environmental Statement on the program are available from:

Office of Coal Management
Bureau of Land Management
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

For information about specific Federal coal management activity in your State, write to the State Director, Bureau of Land Management:

701 "C" Street, Box 13
Anchorage, Alaska 99513

Colorado State Bank Building
Room 700, 1600 Broadway
Denver, Colorado

222 N. 32nd Street
P.O. Box 30157
Billings, Montana 59107

U.S. Post Office Federal Building
South Federal Place
Box 1449
Santa Fe, New Mexico 87501

University Club Building
136 East South Temple
Salt Lake City, Utah 84111

2515 Warren Avenue
P.O. Box 1828
Cheyenne, Wyoming 82001

Denver Federal Center
Building 50
Denver, Colorado 80225

or, in the eastern United States,

350 South Pickett Street
Alexandria, Virginia 22304

SAMPLE TIME FRAME - FISCAL YEAR - GREEN RIVER - HAMS FORK REGIONAL LEASING SCHEDULE *

PLANNING AND ES COMPONENTS	1979 FISCAL YEAR				1980 FISCAL YEAR												1981 FISCAL YEAR						
	JUN 79	JUL 79	AUG 79	SEP 79	OCT 79	NOV 79	DEC 79	JAN 80	FEB 80	MAR 80	APR 80	MAY 80	JUN 80	JUL 80	AUG 80	SEP 80	OCT 80	NOV 80	DEC 80	JAN 81	FEB 81	MAR 81	
PLANNING UPDATE - UNSUITABILITY CRITERIA	■																						
EXPRESSIONS OF INTEREST		■	■																				
TRACT DELINEATION				■																			
TRACT SITE SPECIFIC ANALYSIS					■																		
TRACT RANKING						■																	
TRACT SELECTION, SCHEDULING & ANALYSIS							■	■	■														
REGIONAL ES										■	■												
DES PRINTING & DISTRIBUTION											■	■											
PUBLIC REVIEW PERIOD												■	■	■									
PFES, DEVELOPMENT & REVIEW														■	■								
FES PRINTING & DISTRIBUTION															■	■							
LOG REVIEW, GOVERNOR'S CONSULTATION																■	■						
SECRETARIAL REVIEW AND DECISION ON ES																	■	■					
PRE-LEASE SALE ACTIVITIES																		■	■	■			
LEASE SALES BEGINS																					■	■	

* These dates, except for the October 15, 1980 and January 15, 1981, dates, are best estimates and may be subject to change.

LAND USE PLANNING:

- a) Identify Coal Lands
- b) Unsuitability Findings
- c) Resource Tradeoffs
- d) Surface Owner Consultation

MANAGEMENT OF:

- a) Existing Leases
- b) PRLAs
- c) Emergency Leases
- d) Exploration Licenses
- e) Exchanges

ACTIVITY PLANNING:

- a) Preliminary Tract Identification
- b) Tract Ranking & Proposed Tract Selection Scheduling within Regions
- c) Regional Sale EISS

REGIONAL PRODUCTION GOALS AND LEASING TARGETS

- a) DOE Regional Production Goals
- b) RCT Recommends Regional Leasing Targets Based on DOE Goals
- c) Secretary Adopts Regional Leasing Targets

SALES:

- a) Decision by Secretary on Selection and Scheduling of Tracts for Sale
- b) Notice of Sale
- c) Lease Sale

Land Use Planning - Activity Planning - Regional EIS Schedule - Interior Agency Involvement *

Dates	Completion	Description of Action	Agency Involvement
Begin	Completion		
Nov. 1978	July 6, 1979	Planning Update - Unsuitability Criteria	BLM; FWS
July 10, 1979	Aug. 24, 1979	Expressions of Interest	BLM
Sept. 1, 1979	Sept. 30, 1979	Tract Delineation	GS; BLM
Oct. 1, 1979	Oct. 30, 1979	Tract Site-Specific Analysis	BLM; GS; OSM
Nov. 1, 1979	Nov. 30, 1979	Tract Ranking	BLM; GS; FWS; OSM
Dec. 1, 1979	Mar. 7, 1980	Tract Selection, Scheduling & Analysis	BLM; GS; FWS; OSM
Mar. 8, 1980	Apr. 15, 1980	Regional EIS	BLM; GS; FWS; OSM; HC & RS; BR; BIA
Apr. 16, 1980	May 7, 1980	DEIS Printing and Distribution	BLM
May 8, 1980	July 7, 1980	Public Review Period	BLM; GS; FWS; OSM; HC & RS; BR; BIA
July 8, 1980	Aug. 7, 1980	PFEIS Development & Review	BLM; GS; FWS; OSM; HC & RS; BR; BIA; Dept.
Aug. 8, 1980	Aug. 31, 1980	FEIS Printing and Distribution	BLM
Sept. 1, 1980	Sept. 30, 1980	DOE Review, Governor's Consultation	BLM
Oct. 1, 1980	Oct. 15, 1980	Secretarial Review Decision on FEIS	Secretary's Office
Oct. 16, 1980	Jan. 15, 1981	Pre-Lease Sale Activities	BLM, GS
Jan. 15, 1981		Lease Sale Begin	BLM

These dates, except for the Oct. 15, 1980 and Jan. 15, 1981 dates, are best estimates, and may be subject to change as the EIS Preparation Plan is developed. They apply only to the Green River-Hams Fork Region.

GLOSSARY

Activity Planning--means the process of delineating, ranking, selecting, and scheduling tracts of Federal land that were found acceptable for further consideration for competitive leasing during land use planning.

Bureau of Land Management (BLM)--is the Nation's largest land manager. It administers lands in Federal ownership under multiple-use principles in the public interest. BLM is responsible for issuing coal leases and conducting land use planning in the Federal coal management program.

CRO/CDP Maps (Coal resource occurrence/coal development potential maps)--USGS maps covering areas of significant coal potential at a scale of 1:24,000, and providing extensive detail on coal thickness, quality, and development potential.

Energy Minerals Activity Recommendation System (EMARS)--The 1975 coal management program was made up of three phases: (1) nomination and programming, (2) scheduling, and (3) leasing.

Federal Coal Leasing Amendments Act 1976 (FCLAA)--Law specifying rules to guide the development of coal.

Federal Lands--means lands owned by the United States, without reference to how the lands were acquired or which agency administers the lands, including mineral estate or coal estate underlying private surface, excluding lands held by the United States in trust for Indians, Aleuts, or Eskimos, and lands within the boundaries of Federal Indian Reservations.

FLPMA (Federal Lands Policy and Management Act (1978))--Law specifying how the BLM and the DOI are to assure that all Federal resource development decisions in public lands are made in cooperation with State and local government.

KRCRA (Known Recoverable Coal Resource Areas)--are minimum USGS designations of land areas that contain coal meeting minimum standards of quantity, quality, and extent. These standards generally reflect accepted mining practices in the districts the KRCRA's are part of.

Land Management Planning--means those land use planning and decisionmaking processes conducted by the BLM pursuant to the Federal Land Policy and Management Act and the Federal Coal Leasing Amendments Act, and by the Forest Service pursuant to the National Forest Management Act.

Lease--means a Federal coal lease or license to mine issued under the coal leasing provisions of the mineral leasing laws which authorized the exploration for, or extraction of, coal only under an approved exploration or mining plan.

Lease stipulations--means a Federal coal lease or license to mine issued under the coal leasing provisions of the mineral leasing laws which authorizes the exploration for, or extraction of, coal only under an approved exploration or mining plan.

Lease stipulations--means additional requirements which are added to the printed provisions contained in the standard Federal coal lease form.

NRDC vs Hughes--Lawsuit filed against the 1975 EMARS program claiming that the environmental impacts described in the EIS were inadequate.

Office of Surface Mining (OSM)--is responsible for establishing minimum national standards for regulating surface effects of coal mining, and for assisting States implementing regulatory programs. OSM also promotes reclamation of previously mined lands.

Preference Right Lease Applications (PRLA's)--until the early 1970's the Federal Government issued prospecting permits to interested parties to explore coal in areas where economically valuable deposits were not known to exist. By demonstrating that the permit area contained commercially valuable coal, a prospecting permit holder could apply for, and obtain, a lease to mine the deposit. Such lease applications were called preference right lease applications (PRLA's) and leases were issued without competition. Under the Federal Coal Leasing Amendments Act of 1976, noncompetitive coal leases are no longer permitted, subject to valid existing rights.

Qualified Surface Owner--holds legal or equitable title to the land surface; and has their principal place of residence on the land or personally conducts farming or ranching operations on the land or receives a significant portion of their income from farming or ranching the land; and has met these two conditions for at least 3 years prior to granting their consent.

Regional Coal Team--means a specific coal production region's Federal/State Team which pursuant to 43 CFR 3400.4(b) shall consider and suggest policy for regional leasing target setting, tract delineation, and site-specific analysis in the coal production region; guides and reviews tract ranking; and conducts the selection and sale scheduling process in order to recommend regional lease sale alternatives to be analyzed in the Regional Lease Sale Environmental Impact Statement and to be recommended to the Secretary.

Small Business--any firm bidding to lease Government land for purposes of coal mining is classified as small if:

1. It is independently owned and operated;
2. It is not dominant in its field of operation;
3. Together with its affiliates, its number of employees does not exceed 250 persons;

4. It maintains management and control of the actual mining operations at the tract; and
5. Any transfer of the lease from the holder of the original set-aside must be another small business within the meaning of the paragraph.

Surface Mining Control and Reclamation Act 1977--Law specifying rules to guide mining and reclamation.

Tract--means a defined area of land which will logically be proposed as a single lease offering. At the preliminary tract stage, the exact boundaries of tracts would still be subject to adjustment based on subsequent analysis.

APPENDIX B

Water Resources

COMPUTATION OF CONSUMPTIVE USE OF WATER AS A RESULT OF LEASING
AND DEVELOPMENT OF NEW FEDERAL COAL

1. Estimated net discharge in the North Platte or the Yampa River without leasing and development of new Federal coal is listed in Table 3-8 or 3-9 for each time frame addressed in this analysis.
2. Increased municipal and rural use of water was obtained by multiplying the increased population in the respective watersheds for each alternative and each time frame by an assumed consumptive use of 125 gal/day/person. This value was obtained by subtracting an estimated sewage effluent of 75 gal/day/person from a treated water supply of 200 gal/day/person.
3. Consumptive use of water by new mines was obtained from the site-specific analyses. Premining ground-water and surface water reaching the principal streams was estimated for each tract from field observations and available hydrologic data. Changes in this natural water yield from each tract were estimated for each of the time frames. Yields from surface-mined areas generally decreased during the period of mining whereas yields from underground mines increased because of dewatering deep aquifers.
4. Calculated changes in consumptive use were subtracted from the trended base (net discharge without leasing) to obtain the net discharge with new mines. Results of computations are summarized in Tables B-2 and B-3.

COMPUTATION OF CHANGES IN SALT LOAD AS A RESULT OF LEASING
AND DEVELOPMENT OF NEW FEDERAL COAL

1. Estimated total salt load in the North Platte or the Yampa River without leasing and development of new Federal coal is listed in Table 3-8 or 3-9 for each time frame addressed in this analysis.
2. Increased salt load from municipal wastes was computed from the assumptions that sewage effluent would be 75 gal/day/person and the increase in dissolved solids concentration in the effluent would be 200 mg/L.
3. The estimated change in salt load from the new mines was obtained from the site-specific analyses. Estimates of increased or decreased salt load for each time frame was based on the inferred change in ground-water and surface-water discharged from the tract as a result of mining and the expected change in dissolved solids concentrations in water leaving the tract. As a general rule, salt load tended to decrease during the period of mining because of use of water by mining operations and to increase on completion of mining over the long term because of the increased vertical permeability and leaching of spoils materials.
4. The reduction in salt load in water consumed by the increased population was computed from the assumptions that the increased consumptive use would be 125 gal/day/person and that average dissolved solids concentration would be 300 mg/L in the North Platte watershed and 175 mg/L in the Yampa watershed.
5. Calculated changes in salt load from the above procedures were subtracted from the trended base (salt load without leasing) to obtain the total load with the new mines. Results of computations are summarized in Tables B-2 and B-3.

COMPUTATION OF CONSUMPTIVE USE OF WATER AS A RESULT OF LEASING
AND DEVELOPMENT OF NEW FEDERAL COAL

1. Estimated net discharge in the North Platte or the Yampa River without leasing and development of new Federal coal is listed in Table 3-8 or 3-9 for each time frame addressed in this analysis.
2. Increased municipal and rural use of water was obtained by multiplying the increased population in the respective watersheds for each alternative and each time frame by an assumed consumptive use of 125 gal/day/person. This value was obtained by subtracting an estimated sewage effluent of 75 gal/day/person from a treated water supply of 200 gal/day/person.
3. Consumptive use of water by new mines was obtained from the site-specific analyses. Premining ground water and surface water reaching the principal streams was estimated for each tract from field observations and available hydrologic data. Changes in this natural water yield from each tract were estimated for each of the time frames. Yields from surface-mined areas generally decreased during the period of mining whereas yields from underground mines increased because of dewatering deep aquifers.
4. Calculated changes in consumptive use were subtracted from the trended base (net discharge without leasing) to obtain the net discharge with new mines. Results of computations are summarized in Tables B-2 and B-3.

COMPUTATION OF CHANGES IN SALT LOAD AS A RESULT OF LEASING
AND DEVELOPMENT OF NEW FEDERAL COAL

1. Estimated total salt load in the North Platte or the Yampa River without leasing and development of new Federal coal is listed in Table 3-8 or 3-9 for each time frame addressed in this analysis.
2. Increased salt load from municipal wastes was computed from the assumptions that sewage effluent would be 75 gal/day/person and the increase in dissolved solids concentration in the effluent would be 200 mg/L.
3. The estimated change in salt load from the new mines was obtained from the site-specific analyses. Estimates of increased or decreased salt load for each time frame was based on the inferred change in ground water and surface water discharged from the tracts as a result of mining and the expected change in dissolved solids concentrations in water leaving the tracts. As a general rule, salt load tended to decrease during the period of mining because of use of water by mining operations and to increase on completion of mining over the long term because of the increased vertical permeability and leaching of spoils materials.
4. The reduction in salt load in water consumed by the increased population was computed from the assumptions that the increased consumptive use would be 125 gal/day/person and that average dissolved solids concentration would be 300 mg/L in the North Platte watershed and 175 mg/L in the Yampa watershed.
5. Calculated changes in salt load from the above procedures were subtracted from the trended base (salt load without leasing) to obtain the total load with the new mines. Results of computations are summarized in Tables B-2 and B-3.

COMPUTATION OF DISCHARGE WEIGHTED AVERAGE DISSOLVED SOLIDS
CONCENTRATION IN THE NORTH PLATTE AND YAMPA RIVERS

1. Computations were made using the following formula:

$$C = L/D \times 735.3$$

where: C = Discharge weighted average dissolved solids concentration in mg/L

L = Total annual salt load of river in tons.

D = Net annual discharge in acre-feet.

2. Results of computations are summarized in Tables B-2 and B-3

COMPUTATION OF DISCHARGE WEIGHTED AVERAGE DISSOLVED SOLIDS
CONCENTRATION IN THE COLORADO RIVER AT IMPERIAL DAM

1. Computations were made using the following formula, which was developed by the Water and Power Resources Service (formerly the Bureau of Reclamation), Colorado River Water Quality Office:

$$C = \frac{6,900 [(9,613.1 - y)/(8,541.2 - x)] + 343}{5,700} \times 735.3$$

where: C = Discharge weighted average dissolved solids concentration in mg/L.

x = Annual volume of water removed by project in 1,000 acre-feet.

y = Annual salt load removed by project in 1,000 tons.

2. In the absence of any upstream change in discharge or salt load where x and y = 0, C = 1,046.05 mg/L. It is emphasized that the value of C is carried to two decimal places only because that level of computational accuracy is necessary to show the small effect of leasing new Federal coal in the Yampa watershed on the salinity of the Colorado River at Imperial Dam. In fact, it is very doubtful that current measurement techniques could detect changes in salinity in the lower Colorado River of less than several milligrams per liter.

3. Results of computations are summarized in Table B-3.

TABLE B-1

DRAINAGE BASINS IN THE STUDY AREA

Station Number	Station Name	State	Location	Section	Township	Range
NORTH PLATTE RIVER AND SEPARATION CREEK BASINS						
06620000	North Platte River near Northgate	CO	SW 1/4 SE 1/4	11	11 N.	80 W.
06630000	North Platte River near Sinclair	WY	SW 1/4 SW 1/4	13	22 N.	86 W.
06611100	Grizzly Creek near Spicer	CO	NW 1/4 NE 1/4	14	6 N.	81 W.
06611300	Grizzly Creek near Hebron	CO	SE 1/4 SE 1/4	20	7 N.	80 W.
06611800	Little Grizzly Creek above Coalmont	CO	SW 1/4 SE 1/4	17	7 N.	81 W.
06614800	Michigan River near Cameron Pass	CO	S 1/2	12	6 N.	76 W.
06616000	North Fork Michigan River near Gould	CO	SE 1/4 NW 1/4	27	7 N.	77 W.
06622700	North Brush Creek near Saratoga	WY	SE 1/4 NW 1/4	8	16 N.	81 W.
06623800	Encampment River above Hog Park Creek	WY	NE 1/4 SW 1/4	10	12 N.	84 W.
06625000	Encampment River at mouth	WY	NE 1/4 NW 1/4	3	15 N.	83 W.
06635000	Medicine Bow River near Hanna	WY	SE 1/4 NW 1/4	34	24 N.	81 W.
06634990	Hanna Draw near Hanna	WY	SW 1/4 NE 1/4	34	24 N.	81 W.
06630300	Big Ditch near Coyote Springs	WY	SE 1/4 NW 1/4	23	23 N.	83 W.
06630330	North Ditch near Coyote Springs	WY	SE 1/4 SW 1/4	19	23 N.	83 W.
09216527	Separation Creek near Riner	WY	SE 1/4 SW 1/4	32	20 N.	90 W.
YAMPA RIVER SUBBASIN						
09239500	Yampa River at Steamboat Springs	CO	NW 1/4 NE 1/4	17	6 N.	84 W.
09244410	Yampa River near Hayden	CO	NW 1/4 SW 1/4	9	6 N.	87 W.
09251000	Yampa River near Maybell	CO	SE 1/4 NW 1/4	2	6 N.	95 W.
09241000	Elk River at Clark	CO	NW 1/4 NW 1/4	27	9 N.	85 W.
09245000	Elkhead Creek near Elkhead	CO	NW 1/4 NE 1/4	8	8 N.	88 W.
09249200	S. Fk. Williams Fk. River near Pagoda	CO	NE 1/4 SE 1/4	24	3 N.	90 W.
09243700	Middle Creek near Oak Creek	CO	SW 1/4 SW 1/4	13	5 N.	86 W.
09243800	Foidel Creek near Oak Creek	CO	NW 1/4 SW 1/4	31	5 N.	86 W.
09243900	Foidel Creek at mouth	CO	SE 1/4 SE 1/4	14	5 N.	86 W.
09250400	Good Spring Creek at Axial	CO	SW 1/4 NE 1/4	26	4 N.	93 W.
09250510	Taylor Creek at mouth	CO	NW 1/4 SW 1/4	14	4 N.	93 W.
09250600	Wilson Creek near Axial	CO	NW 1/4 SW 1/4	14	4 N.	93 W.
09250610	Jubb Creek near Axial	CO	SE 1/4 SE 1/4	16	4 N.	93 W.

TABLE B-2

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
NORTH PLATTE RIVER SUBBASIN - 1987

Supply, Consumption, and Quality Categories	No Action	Low Development	Median Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	877,300	877,300	877,300	877,300	877,300
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 269	- 269	- 269	- 269
New mines (ac-ft) 3/	0	0	0	0	0
Total projected consumptive use (ac-ft)	0	- 269	- 269	- 269	- 269
Net discharge with new mines (ac-ft)	877,300	877,031	877,031	877,031	877,031
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	323,330	323,330	323,330	323,330	323,330
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 44	+ 44	+ 44	+ 44
New Mines (tons) 3/	0	0	0	0	0
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 110	- 110	- 110	- 110
Net increase (+) or decrease (-) in salt load (tons)	0	- 66	- 66	- 66	- 66
Total salt load with new mines (tons)	323,330	323,264	323,264	323,264	323,264
Discharge weighted average dissolved solids in the					
North Platte River above Seminole Dam (mg/L)	271.00	271.02	271.02	271.02	271.02
Inc. in diss. solids in the N.P. Riv. above Seminole Dam (mg/L)	0	0.02	0.02	0.02	0.02

1/ From table 3-B.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 300 mg/L.

TABLE B-2, (con't)

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
NORTH PLATTE RIVER SUBBASIN - 1990

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	877,200	877,200	877,200	877,200	877,200
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 256	- 256	- 256	- 256
New mines (ac-ft) 3/	0	- 89	- 89	- 89	- 89
Total projected consumptive use (ac-ft)	0	- 345	- 345	- 345	- 345
Net discharge with new mines (ac-ft)	877,200	876,855	876,855	876,855	876,855
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	323,240	323,240	323,240	323,240	323,240
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 42	+ 42	+ 42	+ 42
New Mines (tons) 3/	0	- 120	- 120	- 120	- 120
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 104	- 104	- 104	- 104
Net increase (+) or decrease (-) in salt load (tons)	0	- 182	- 182	- 182	- 182
Total salt load with new mines (tons)	323,240	323,058	323,058	323,058	323,058
Discharge weighted average dissolved solids in the North Platte River above Seminole Dam (mg/L)	270.95	270.91	270.91	270.91	270.91
Inc. in diss. solids in the N.P. Riv. above Seminole Dam (mg/L)	0	- 0.04	- 0.04	- 0.04	- 0.04

1/ From table 3-B.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 300 mg/L.

TABLE B-2, (cont)

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
NORTH PLATTE RIVER SUBBASIN - 1995

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	877,000	877,000	877,000	877,000	877,000
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 260	- 260	- 260	- 260
New mines (ac-ft) 3/	0	- 187	- 187	- 187	- 187
Total projected consumptive use (ac-ft)	0	- 447	- 447	- 447	- 447
Net discharge with new mines (ac-ft)	877,000	876,553	876,553	876,553	876,553
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	323,200	323,200	323,200	323,200	323,200
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 42	+ 42	+ 42	+ 42
New Mines (tons) 3/	0	- 272	- 272	- 272	- 272
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 106	- 106	- 106	- 106
Net increase (+) or decrease (-) in salt load (tons)	0	- 336	- 336	- 336	- 336
Total salt load with new mines (tons)	323,200	322,864	322,864	322,864	322,864
Discharge weighted average dissolved solids in the					
North Platte River above Seminole Dam (mg/L)	270.98	270.84	270.84	270.84	270.84
Inc. in diss. solids in the N.P. Riv. above Seminole Dam (mg/L)	0	- 1.14	- 1.14	- 1.14	- 1.14

1/ From table 3-B.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 300 mg/L.

TABLE B-2, (con't)

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
NORTH PLATTE RIVER SUBBASIN - LONG TERM

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	877,000	877,000	877,000	877,000	877,000
Projected consumptive uses:					
Municipal and Rural (ac-ft) 2/	0	- 260	- 260	- 260	- 260
New mines (ac-ft) 3/	0	+ 26	+ 26	+ 26	+ 26
Total projected consumptive use (ac-ft)	0	- 234	- 234	- 234	- 234
Net discharge with new mines (ac-ft)	877,000	876,766	876,766	876,766	876,766
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	323,200	323,200	323,200	323,200	323,200
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 42	+ 42	+ 42	+ 42
New Mines (tons) 3/	0	+ 580	+ 580	+ 580	+ 580
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 106	- 106	- 106	- 106
Net increase (+) or decrease (-) in salt load (tons)	0	+ 516	+ 516	+ 516	+ 516
Total salt load with new mines (tons)	323,200	323,716	323,716	323,716	323,716
Discharge weighted average dissolved solids in the					
North Platte River above Seminoe Dam (mg/L)	270.98	271.48	271.48	271.48	271.48
Inc. in diss. solids in the N.P. Riv. above Seminoe Dam (mg/L)	0	0.50	0.50	0.50	0.50

1/ From table 3-8.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 300 mg/L.

TABLE B-3
ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
YAMPA RIVER SUBBASIN - 1987

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	1,004,200	1,004,200	1,004,200	1,004,200	1,004,200
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 157	- 226	- 448	- 511
New mines (ac-ft) 3/	0	+ 95	+ 95	+ 95	+ 25
Total projected consumptive use (ac-ft)	0	- 62	- 131	- 353	- 486
Net discharge with new mines (ac-ft)	1,004,200	1,004,138	1,004,069	1,003,847	1,003,714
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	243,510	243,510	243,510	243,510	243,510
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 26	+ 37	+ 73	+ 83
New Mines (tons) 3/	0	+ 100	+ 100	+ 100	+ 72
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 34	- 49	- 97	- 111
Net increase (+) or decrease (-) in salt load (tons)	0	+ 92	+ 88	+ 76	+ 44
Total salt load with new mines (tons)	243,510	243,602	243,598	243,586	243,554
Dsch. weighted avg. diss. solids in Yampa River (mg/L)	178.30	178.39	178.39	178.42	178.42
Increase in dissolved solids in the Yampa River from development of new Federal coal (mg/L)	0	0.08	0.09	0.12	0.12
Discharge weighted average dissolved solids in the Colorado River at Imperial Dam (mg/L)	1,046.05	1,046.07	1,046.08	1,046.10	1,046.11
Increase in dissolved solids in the Colorado River at Imperial Dam from development of new Federal coal (mg/L)	0	0.02	0.03	0.05	0.06

1/ From table 3-9.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 175 mg/L.

TABLE B-3, (con't)

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
YAMPA RIVER SUBBASIN - 1990

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	1,001,800	1,001,800	1,001,800	1,001,800	1,001,800
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 201	- 343	- 668	- 831
New mines (ac-ft) 3/	0	+ 415	+ 415	+ 385	+ 265
Total projected consumptive use (ac-ft)	0	+ 214	+ 72	- 283	- 566
Net discharge with new mines (ac-ft)	1,001,800	1,002,014	1,001,872	1,001,517	1,001,234
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	246,650	246,650	246,650	246,650	246,650
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 33	+ 56	+ 109	+ 136
New Mines (tons) 3/	0	+ 425	+ 425	+ 395	+ 324
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 44	- 75	- 145	- 181
Net increase (+) or decrease (-) in salt load (tons)	0	+ 414	+ 406	+ 359	+ 279
Total salt load with new mines (tons)	246,650	247,064	247,056	247,009	246,929
Disch. weighted avg. diss. solids in Yampa River (mg/L)	181.04	181.30	181.32	181.35	181.34
Increase in dissolved solids in the Yampa River from development of new Federal coal (mg/L)	0	0.26	0.28	0.31	0.30
Discharge weighted average dissolved solids in the Colorado River at Imperial Dam (mg/L)	1,046.05	1,046.07	1,046.09	1,046.12	1,046.15
Increase in dissolved solids in the Colorado River at Imperial Dam from development of new Federal coal (mg/L)	0	0.02	0.04	0.07	0.10

1/ From table 3-9.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 175 mg/L.

TABLE B-3, (con't)

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
YAMPA RIVER SUBBASIN - 1995

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o loas. & dev. of new Fed. coal (ac-ft) 1/	1,000,200	1,000,200	1,000,200	1,000,200	1,000,200
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 201	- 343	- 668	- 831
New mines (ac-ft) 3/	0	+ 415	+ 415	+ 385	+ 265
Total projected consumptive use (ac-ft)	0	+ 214	+ 72	- 283	- 566
Net discharge with new mines (ac-ft)	1,000,200	1,000,414	1,000,272	999,917	999,634
SALT LOAD:					
Net salt load w/o loas. & dev. of new Fed. coal (tons) 1/	248,340	248,340	248,340	248,340	248,340
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 33	+ 56	+ 109	+ 136
New Mines (tons) 3/	0	+ 425	+ 425	+ 395	+ 324
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 44	- 75	- 145	- 181
Net increase (+) or decrease (-) in salt load (tons)	0	+ 414	+ 406	+ 359	+ 279
Total salt load with new mines (tons)	248,340	248,754	248,746	248,699	248,619
Disch. weighted avg. diss. solids in Yampa River (mg/L)	182.57	182.83	182.85	182.88	182.88
Increase in dissolved solids in the Yampa River from development of new Federal coal (mg/L)	0	0.26	0.28	0.31	0.31
Discharge weighted average dissolved solids in the Colorado River at Imperial Dam (mg/L)	1,046.05	1,046.07	1,046.09	1,046.12	1,046.15
Increase in dissolved solids in the Colorado River at Imperial Dam from development of new Federal coal (mg/L)	0	0.02	0.04	0.07	0.10

1/ From table 3-9.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 175 mg/L.

TABLE B-3, (con't)

ESTIMATED ANNUAL CONSUMPTIVE WATER USE AND WATER QUALITY AT THE ALTERNATIVE LEVELS
OF NEW FEDERAL COAL DEVELOPMENT
YAMPA RIVER SUBBASIN - LONG TERM

Supply, Consumption, and Quality Categories	No Action	Low Development	Medium Development	High Development	Maximum Development
WATER SUPPLY:					
Net discharge w/o leas. & dev. of new Fed. coal (ac-ft) 1/	1,000,200	1,000,200	1,000,200	1,000,200	1,000,200
Projected consumptive uses:					
Municipal and rural (ac-ft) 2/	0	- 201	- 343	- 668	- 831
New mines (ac-ft) 3/	0	+ 45	+ 45	+ 55	+ 119
Total projected consumptive use (ac-ft)	0	- 156	- 298	- 613	- 712
Net discharge with new mines (ac-ft)	1,000,200	1,000,044	999,902	999,587	999,488
SALT LOAD:					
Net salt load w/o leas. & dev. of new Fed. coal (tons) 1/	248,340	248,340	248,340	248,340	248,340
Projected sources of increased salt load:					
Municipal wastes (tons) 4/	0	+ 33	+ 56	+ 109	+ 136
New Mines (tons) 3/	0	+ 265	+ 265	+ 355	+ 1,105
Reductions in salt load from:					
Consumptive use of water by people (tons) 5/	0	- 44	- 75	- 145	- 181
Net increase (+) or decrease (-) in salt load (tons)	0	+ 254	+ 246	+ 319	+ 1,060
Total salt load with new mines (tons)	248,340	248,594	248,586	248,659	249,400
Dsch. weighted avg. diss. solids in Yampa River (mg/L)	182.57	182.78	182.80	182.91	183.48
Increase in dissolved solids in the Yampa River from development of new federal coal (mg/L)	0	0.21	0.23	- 0.34	0.91
Discharge weighted average dissolved solids in the Colorado River at Imperial Dam (mg/L)	1,046.05	1,046.10	1,046.11	1,046.16	1,046.25
Increase in dissolved solids in the Colorado River at Imperial Dam from development of new Federal coal (mg/L)	0	0.05	0.06	0.11	0.20

1/ From table 3-9.

2/ Assumes consumptive use of 125 gal/day/person. Treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person.

3/ From Site Specific Analyses.

4/ Based on 75 gal sewage/day/person and increase in dissolved solids concentration of 200 mg/L.

5/ Based on dissolved solids concentration of 175 mg/L.

COMPUTATION OF CHANGE IN SEDIMENT YIELD AS A RESULT
OF LEASING AND DEVELOPMENT OF NEW FEDERAL COAL

1. Acreages disturbed onsite and offsite for tracts included in the various alternatives are listed in Table 2-6, Section 2.
2. The premining sediment yield for areas disturbed on each tract was approximated by multiplying the total area disturbed by the estimated unit sediment yield obtained by using the Pacific Southwest Inter-Agency Committee (PSIAC 1968) method (see attached summary of this method).
3. The premining sediment yield for areas disturbed offsite in each state was approximated by multiplying the area times the average unit sediment yield for all tracts in the respective states. The average unit sediment yield used in these computations was 1.2 tons/acre in Wyoming and 0.63 tons/acre in Colorado.
4. Sediment yield from disturbed areas onsite for the time frames addressed in this analysis was approximated by first calculating annual runoff from the affected areas using unit runoff data reported in the site specific analyses and then by assuming that this runoff would carry no more than 30 mg/L suspended sediment load.
5. Sediment yield from disturbed areas offsite for the respective time frames was approximated from the assumptions listed in Section 4, Erosion and Sedimentation.
6. The net increase or decrease in sediment yield for each alternative and each time frame in the respective watersheds was then obtained by calculating the difference between the premining sediment yield and the yield as a result of mining. Results of these computations are presented in Tables B-4 and B-5.

USE OF THE PACIFIC SOUTHWEST INTER-AGENCY COMMITTEE (PSIAC 1968)
METHOD FOR ESTIMATING PREMINING SEDIMENT YIELD FROM PROPOSED LEASE TRACTS

The method utilizes a rating chart (Table B-6) that assigns points, as indicated in parentheses, to selected watershed characteristics such as surface geology, soils, climate, etc. Under surface geology, for example, very hard resistant rocks would be assigned a rating of 0, whereas soft erodible marine shales would receive a rating of 10. Rocks between these extremes would be rated somewhere between 0 and 10, depending on the judgment of the individual using the method.

After each of the factors from A to I in Table B-6 is assigned a rating, the values are totaled algebraically, and the result is classified into five categories as follows:

<u>Classification</u>	<u>Rating</u>	<u>Sediment Yield (ac-ft/sq mi)</u>
1	>100	3.0
2	75-100	1.0 - 3.0
3	50-75	0.5 - 1.0
4	25-50	0.2 - 0.5
5	0-25	<0.2

In most instances high values for the A through G factors (Table B-6) should correspond to high values for the H and/or I factors.

An example of the use of the rating chart (Table B-6) is as follows:

A watershed of 15 square miles in western Colorado has the following characteristics and sediment yield levels:

<u>Factors</u>	<u>Sediment Yield Level</u>	<u>Rating</u>
A. Surface geology	Marine shales	10
B. Soils	Easily dispersed, high shrink-swell characteristics	10
C. Climate	Infrequent convective storms, freeze-thaw occurrence	7
D. Runoff	High peak flows; low volumes	5
E. Topography	Moderate slopes	10
F. Ground cover	Sparse, little or no litter	10
G. Land use	Intensively grazed	10
H. Upland erosion	More than 50% rill and gully erosion	25
I. Channel erosion	Occasionally eroding banks and bed but short flow duration	<u>5</u>
	Total	92

This total rating of 92 would indicate that the sediment yield is in Classification 2. This compares with a sediment yield of 1.96 acre-feet per square mile as the average of a number of measurements in this area.

L. M. Shown, U. S. Geological Survey, Denver, Colorado (personal communication) has prepared a graph (figure B-1) showing the relationship between the PSIAC rating and estimated sediment yield. For convenience, Shown's graph was used in this analysis to obtain a single value for estimated sediment yield. It is emphasized, however, that the value obtained is approximate only and may be in error by 25 percent or more. To convert acre-feet to tons, multiply acre-feet of sediment by 1,525.

TABLE B-4

ANNUAL SEDIMENT YIELD AT ALL ALTERNATIVE LEVELS OF NEW FEDERAL COAL DEVELOPMENT
NORTH PLATTE RIVER BASIN

Type of Disturbance	Area Disturbed (acres)			Premining Sediment Yield (tons)			Sediment Yield as a Result of Disturbance (tons)			Net Increase (+) or Decrease (-) in Sdmt Yield (tons)		
	1987	1990	1995	1987	1990	1995	1987	1990	1995	1987	1990	1995
Onsite (mining and facilities)	493	2,392	5,549	692	2,997	6,822	1	3	7	-691	-2,994	-6,815
Offsite (facilities, roads, powerlines, etc.)	1,164	1,396	1,396	1,374	1,648	1,648	2,747	2,608	2,059	+1,373	+960	+411
Housing Infrastructure	147	162	203	174	192	239	347	209	202	+173	+17	-37
Total	1,804	3,950	7,148	2,240	4,837	8,709	3,095	2,820	2,268	+855	-2,017	-6,441

TABLE B-5

ANNUAL SEDIMENT YIELD AT ALL ALTERNATIVE LEVELS OF NEW FEDERAL COAL DEVELOPMENT
YAMPA RIVER SUBBASIN

Type of Disturbance	Area Disturbed (acres)			Premining Sediment Yield (tons)			Sediment Yield as a Result of Disturbance (tons)			Net Increase (+) or Decrease (-) in Sdmt Yield (tons)		
	1987	1990	1995	1987	1990	1995	1987	1990	1995	1987	1990	1995
Low Development												
Onsite (mining and facilities)	0	228	938	0	77	324	0	0.1	1	0	-77	-323
Offsite (facilities, roads, powerlines, etc.)	732	732	732	461	461	461	922	692	461	+461	+231	0
Housing Infrastructure	93	123	123	59	77	77	117	96	48	+58	+19	-29
Total	825	1,083	1,793	520	615	862	1,039	788	510	+519	+173	-352
Medium Development												
Onsite (mining and facilities)	600	1,048	2,033	144	274	587	1	1	3	-143	-273	-584
Offsite (facilities, roads, powerlines, etc.)	992	992	992	625	625	625	1,250	937	625	+625	+312	0
Housing Infrastructure	142	224	224	90	141	141	179	192	96	+89	+51	-45
Total	1,734	2,264	3,249	859	1,040	1,353	1,430	1,130	724	+571	+90	-629

TABLE B-5, (con't)

ANNUAL SEDIMENT YIELD AT ALL ALTERNATIVE LEVELS OF NEW FEDERAL COAL DEVELOPMENT
YAMPA RIVER SUBBASIN

Type of Disturbance	Area Disturbed (acres)			Premining Sediment Yield (tons)			Sediment Yield as a Result of Disturbance (tons)			Net Increase (+) or Decrease (-) in Sdmt Yield (tons)		
	1987	1990	1995	1987	1990	1995	1987	1990	1995	1987	1990	1995
High Development												
Onsite (mining and facilities)	1,300	2,146	4,126	1,481	2,107	3,662	2	3	5	-1,479	-2,104	-3,657
Offsite (facilities, roads, powerlines, etc.)	2,583	2,583	2,583	1,627	1,627	1,627	3,255	2,440	1,627	+1,628	+813	0
Housing Infrastructure	301	456	456	191	287	287	379	384	193	+188	+97	-94
Total	4,184	5,185	7,165	3,299	4,021	5,576	3,636	2,827	1,825	+337	-1,194	-3,751
Maximum Development												
Onsite (mining and facilities)	2,400	3,550	6,290	2,027	2,788	4,680	5	7	12	-2,022	-2,781	-4,668
Offsite (facilities, roads, powerlines, etc.)	3,018	3,018	3,018	1,901	1,901	1,901	3,803	2,851	1,901	+1,902	+950	0
Housing Infrastructure	345	624	624	218	392	392	435	568	285	+217	+176	-107
Total	5,763	7,192	9,932	4,146	5,081	6,973	4,243	3,426	2,198	+97	-1,655	-4,775

TABLE F-6

FACTORS AFFECTING SEDIMENT YIELD IN THE PACIFIC NORTHWEST

Sediment Yield Levels	A SURFACE GEOLOGY (10)	B SOILS (10)	C CLIMATE (10)	D RUNOFF (10)	E TOPOGRAPHY (10)	F GROUND COVER (10)	G LAND USE (10)	H WELAND PROXIMITY (5)	I CHANNEL EROSION & SEDIMENT TRANSPORT (25)
High	a. Marine shales and related mudstones and siltstones.	a. Fine textures; easily dispersed; saline-sulfidic; high shrink-swell characteristics. b. Single grain silts and fine sands.	a. Storms of several days' duration with short periods of intense rainfall. b. Frequent intense convective storms c. Freeze-thaw occurrences	a. High peak flows per unit area b. Large volume of flow per unit area	a. Steep upland slopes (in excess of 30%) High relief; little or no floodplain development	Ground cover does not exceed 20% a. Vegetation sparse; little or no litter b. No rock in surface soil	a. More than 50% cultivated b. Almost all of area intensively grazed c. All of area recently burned	a. More than 50% of the area characterized by rill and gully or landslide erosion	a. Erosion banks continuously or at frequent intervals with large depths and long flow duration b. Active headcuts and degradation in tributary channels
aa									
Moderate	a. Rocks of medium hardness b. Non-erately weathered c. Moderately fractured	a. Medium textured soil b. Occasional rock fragments c. Caliche layers	a. Storms of moderate duration and intensity b. Infrequent convective storms	a. Moderate peak flows b. Moderate volume of flow per unit area	a. Moderate upland slopes (less than 30%) b. Moderate fan or floodplain development	Cover not exceeding 40% a. Noticeable litter b. If trees present understorey not well developed	a. Less than 25% cultivated b. 50% or less recently logged c. Less than 50% intensively grazed d. Ordinary road and other construction	a. About 25% of the area characterized by rill and gully or landslide erosion b. Wind erosion with deposition in stream channels	a. Moderate flow depths, medium flow duration with occasionally eroding banks or bed
aa									
Low	a. Massive, hard formations	a. High percentage of rock fragments b. Aggregated clays c. High in organic matter	a. Humid climate with rainfall of low intensity b. Precipitation in form of snow c. Arid climate, low intensity storms d. Arid climate; rare convective storms	a. Low peak flows per unit area b. Low volume of runoff per unit area c. Bare runoff events	a. Gentle upland slopes (less than 30%) b. Extensive alluvial plains	a. Area completely protected by vegetation, rock fragments, litter Little opportunity for rainfall to reach erodible material	a. No cultivation b. No recent logging c. Low intensity grazing	a. No apparent signs of erosion	a. Wide shallow channels with flat gradients, short flow duration b. Channels in massive rock, large boulders or well vegetated c. Artificially controlled channels

* THE NUMBERS IN SPECIFIC BOXES INDICATE VALUES TO BE ASSIGNED APPROPRIATE CHARACTERISTICS. THE SMALL LETTERS a, b, c, REFER TO INDEPENDENT CHARACTERISTICS TO WHICH FULL VALUE MAY BE ASSIGNED.

** IF EXPERIENCE SO INDICATES, INTERPOLATION BETWEEN THE 3 SEDIMENT YIELD LEVELS MAY BE MADE.

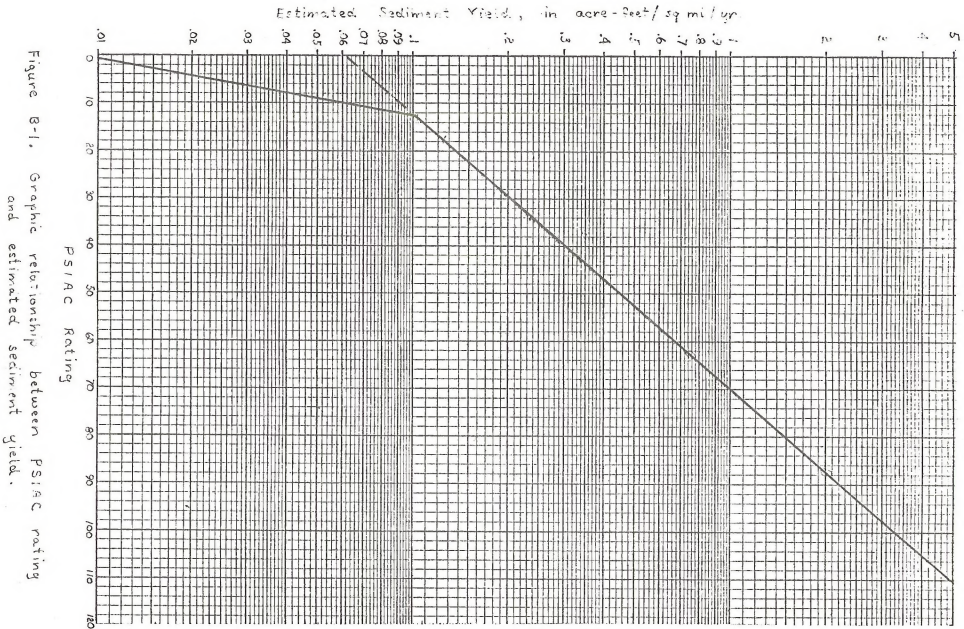


Figure B-1. Graphical relationship between PS/AC rating and estimated sediment yield.

APPENDIX C

Cultural Resources

METHODOLOGY

PRELIMINARY CUMULATIVE

Where Wyoming SSA data showed more acres surveyed than acres in tract (Medicine Bow and Rosebud), Rawlins District maps of areas surveyed were used to revise figures to get a better estimate. These revised figures were used throughout the analysis. Colorado data was revised to include maps of area surveyed for Lay and Pinnacle. "Judgemental reconnaissance" (undefined) was included in acres inventoried. From there, acres of inventory divided by number of sites equals acres per site; total acres of tract from SSA's divided by acres of inventory equals percent inventory. Acres to be inventoried divided by acres per site equals estimate of sites to be found. Sites found plus estimated sites to be found equals estimate of total sites on tract. Twenty percent eligibility figure is a first approximation from Interagency Archaeological Services and National Register sources (1976-77).

DETAILED CUMULATIVE

Wyoming county and state data was developed solely on Metcalf's (1977) work. Area II data was used for Sweetwater County; Area IV data for Carbon County. Area III (SW and CR) was calculated as a cross check. The worst bias of this is that Area IV does contain three of the present tracts and Area III contains the other two tracts. This leaves Area II as the only independent check. Of less significance, but commensurate difficulty, is the fact that the Area III discussions lump China Butte and Red Rim. Colorado county and state data was based on 24 reports which met the following criteria:

1. At least one cultural resource site was found, and
2. At least 100 acres or 5 linear miles of contiguous 100% survey was done, or
3. The survey was done for a coal lease.

Table C-1 gives abbreviated title, author and results of the analysis. The sum of the acres divided by the sum of the sites for all counties was used for the Colorado ratio. The regional ratio is the sum of the acreage data for the five counties divided by the sum of the sites.

All this mathematical manipulation was done to give some rational basis to an estimate of how many cultural resource sites will be found on the delineated tracts. The figures are not expected to be accurate for the following reasons:

1. Human behavior is patterned rather than random. Ratios derived imply that human activity will be evenly distributed throughout the tracts this will not be found true.
2. Percentage of survey varies from 0 to 90; this skews the data.
3. The definition of "site" varies considerably from author to author. No attempt was made to reconcile this flaw. Any site so named by an author was included in the analysis.
4. Since site is not defined, one author's site may be another's isolated find or isolated artifact. Some authors do not report isolated materials. To even the data base, all isolated material was discarded from analysis.

The result of the analysis was that there was no clear-cut difference for cultural resources between the alternatives proposed because each alternative added tracts to the previous alternative(s) changing the magnitude rather than the quality of the action. Simply, the greater the number of acres the greater the number of cultural resources encountered. The greater the number of cultural resources, the greater the chance that more of the cultural resources will be significant. While intuitively obvious, such statements do not provide clear-cut answers for decision making officials. Lacking a tested predictive model of site location and significance, such clear-cut answers must await complete inventory of the proposed action.

INTERPRETATION OF ANALYSIS

This section is offered as a spring board for discussion. The data is too widely separated to expect that valid conclusions can be drawn, and it is acknowledged that this section deserves the title "armchair archaeology."

GR/HF

The Green River/Hams Fork Region (11 counties) lies in two physiographic provinces, the Wyoming Basin and the Colorado Plateau, straddling the continental divide. It includes extremely varied terrain, soils and vegetation. All the ecological factors are present to imply a wealth and variety of cultural resources, and this seems to be the case.

The existing data, though sparse, indicates that the region was never a prehistoric home or heartland, but that it was utilized throughout prehistory by varied people at the same time. If this is true, then the area has

potential to contribute significant archaeological data to broad anthropological questions about cultures in contact with other cultures. There is also a broad potential for data on prehistoric trade networks and movement or migration corridors. The present state of the data base makes these questions a long term project with the contribution not realized for 50 to 100 years.

In the shorter term, the region has potential to address questions of Fremont extent and certainly variation. Two major Archaic traditions, the Great Basin and the Plains, interweave within this region. Sites belonging to one or the other, or both, may have been inventoried but not systematically investigated. Most inventory records or site forms do not assign cultural affiliation ostensibly because of the paucity of surface diagnostics. This lack is attributed to prior surface collection. The more realistic cause is that the diagnostic typologies have not been developed.

Smithsonian site numbers are sequential by county, so the highest number gives a rough estimate of how many sites have been identified within a county; using this estimate, at least 1,104 sites have been identified in the Wyoming counties. As of October 1, 1979, the BLM inventory of the Colorado counties contained 1,863 sites. Assuming that some not-sites and some duplicate numbers hve been counted, at least 2,500 sites have been identified. Of these, surely less than half have even a time affiliation noted. It is doubtful that more than 250 (10 percent) of these give any specific data on "culture" affiliation.

Such an inventory is a set of locations with perhaps some estimates of extent of site surface but it is not a scientific data base much less a management tool.

Radiocarbon dating each site is a contribution of seriation and sequence data, but it is a tedious and expensive way to develop a framework to interpret the past. It is also not anthropological in result, in the same way that seriation of potsherds in the southwest failed to say anything about how people lived.

THE FIVE-COUNTY REGION

The five counties contain all but three of the archaeological sites considered in the total region so the data is not much more limited though the area (acreage) is significantly reduced.

This region is physiographically more homogenous, focusing on the broad sagebrush steppe lands of the indistinct continental divide. The Yampa, Green and the North Platte rivers are the major drainages. Topographic relief is present but scattered. Forest environments are scattered and nowhere extensive; woodlands are limited to the southerly portion but are significant in Rio Blanco county. Sagebrush and mountain shrub are the major vegetative communities. Sand dune situations, whether active or stabilized, seem to have a greater density of sites than any other specific soil type. On present evidence buffalo were a more prevalent resource in Wyoming than in Colorado. Deer were a major resource from the Colorado data though some antelope were utilized. Present data indicates both variety of site types and of resource

base in Colorado, whereas Wyoming indicates a nearly exclusive reliance on hunting.

The majority of the sites are either lithic scatters or campsites. Rock shelters and rock art are limited in distribution to areas of sandstone outcrop, but within this environmental constraint are a regularly occurring type of site. Kill sites are more frequent in Wyoming. Sites with standing structures (rock walls or granaries) seem limited to Rio Blanco and Moffat counties. Quarry sites are again limited by where suitable stone outcrops but occur with great regularity in those situations. Tipi rings and wickiups are not rare but do not seem frequent. Burials and mammoths are rare; only one of each has been identified in the regional literature. In terms of time, the available data indicates that the most populous time was the late Archaic (6 of 16 sites) Fremont occupation at 6 of the 16 sites is not likely to represent a true regional picture because the data is confined to Rio Blanco and Moffat counties. Four of the sites date to the pre-Fremont Archaic. Only two sites date to the Plano period and only one site dates to the Llano period.

There is no data for a 2,500 year period spanning the end of the Paleo Indian through the beginning of the Archaic. This embarrassing blank in the record is likely to be a function of too little and too shallow excavation. If the USGS arroyo dates collected for alluviation studies are used, they indicate that this blank is a matter of four to eight meters of overburden on the sites of concern. There is another implication in this data: the stable surface which is now buried got buried with material from surfaces coeval or older than the site itself. If this is the case, then much of the coeval or earlier

evidence must have washed out with that alluviation. Undisturbed earlier evidence will, therefore, be an even more rare occurrence than has been posited. Early data will be both rare and deeply buried. It's discovery is presently fortuitous rather than systematic. Systematic surface survey is of no help unless deep cuts of the surface are present as in arroyos. It is not technologically feasible to use remote sensing at these depths.

There is another shorter gap in the chronological data, occurring between 2,500 and 3,500 years ago. Again, this appearance of hiatus may be misleading: there are five dates in excess of 2,000 BP and less than 2,500 BP but only two sites are involved. The four dates from Bull Draw shelter are from contexts between 1.4 and 2.1 m below datum; the latter is close to the general bottom of the excavation but the excavation did not reach the maximum depth of the deposit. The Cherokee Trail #1 date is from a single hearth in an extensive campsite. The hearth was uncovered during well pad construction and not through implementation of a research design. There is no evidence that this was the older limit of the site's age.

The next oldest date is from a definite hearth in an arroyo face 2.8 and 2.4 meters directly below the present surface of 5RB312. The Bull Draw data is from a depth where test excavation becomes impractical and extensive excavation is required. Though again, data is scant it seems likely that this data gap will be filled when extensive excavations can be funded so that the two to three meter deposits can be reached. The Cherokee Trail #1 type of situation cannot be depended upon to provide the necessary information.

ON TRACT

The 16 tracts are discrete logical mining units, but some are contiguous geographically, some are close together and a few are scattered.

In Wyoming China Butte and Red Rim form a long narrow swath. Medicine Bow, Seminoe II, and Rosebud are closely grouped. In Colorado, Danforth Hills #1, #2 and #3 are contiguous. Hayden Gulch and Williams Fork Mountains are contiguous with each other. Iles Mountain, Bell Rock and Empire tracts are grouped. Grassy Creek and Pinnacle are scattered. Lay tract is isolated from any other tract.

All the Wyoming tracts are on the east edge of the great divide country. Medicine Bow, Rosebud, and Seminoe II are east of the Continental Divide and are in the North Platte drainage. China Butte straddles, and Red Rim is west of the Continental Divide. The Colorado tracts are all west of the Continental Divide and generally on the south side of the Yampa River drainage. Lay Tract is on the north side of the Yampa drainage and on the southern edge of the Great Divide country. In all environmental strata, except location, Lay Tract fits best with the Wyoming tracts. All five Wyoming tracts and Lay are in the sage brush community. The other Colorado tracts are primarily in the mountain shrub community but with some sagebrush areas. No forest or woodland areas are on the tracts.

Site data for analysis is extremely limited for all tracts. The only dated site is the Union Pacific Mammoth. Type of site is not necessarily given in the descriptive material. Of the 96 identified sites, only 42 could be

tentatively typologised. The five identified Colorado historic sites are remains of four homesteads and one trash dump. The six Colorado prehistoric sites are considered lithic scatters because no hearths were found with the lithic debris.

No historic sites were identified in the Wyoming data. Seven of the sites had no evidence of hearths and were classified as lithic scatters. Two sites are single component tipi rings. In contrast to Colorado, 27 sites contained at least one hearth and were classified as campsites on that basis.

Two of these campsites are associated with a second type of site and may be multi-component. One has a petroglyph panel; the other has both midden developemnt and stone circles.

This data indicates that the prehistoric occupation of the tracts was sporadic at best and that the remains are those associated with repeated short-term use. Time of use is indeterminate except for the hint that tipi rings tend to be a late type of site.

The presence of the Union Pacific Mammoth confounds this interpretation. This unique datum opens the possibility of long occupation of at least the China Butte and adjacent Red Rim tracts. Moreover, where one mammoth was found others tend to occur and a good kill site remained a good kill site.

TABLE C-1
 COLORADO BASELINE ANALYSIS

Survey	Class III ac.	Number of sites	ac:site	NR Possibility
<u>Moffat County</u>				
Savery Pothook-LOPA	7,100	88	81	35 + Dist. of 7
EMARS for MF-LOPA 1/	8,162	30	272	
Phone Co-Pio	21	2	10	8?
WR Grace RR-Lischka	2,028	69	29	
Utah Int.-LOPA	1,000	1	1,000	1
Gasline MF Co. LOPA	37	2	19	
Sugar Loaf-LOPA	1,700	2	850	1
Flowline MF Co-LOPA	5	1	5	
Sherridan Coal Mine LOPA	40	0	--	48 (24%)
Panhandle Products G & K	90	5	18	
	<u>20,183</u>	<u>200</u>	<u>101</u>	
<u>Routt County</u>				
EMARS for RT-LOPA	6,622	25		4
Coal Development Energy-LOPA	292	2		1
4 Coal Leases, Routt Co-LOPA	430	1		5 (18%)
	<u>7,344</u>	<u>28</u>	<u>262</u>	
<u>Rio Blanco County</u>				
Superior OS-LOPA	3,437	20	171	8
C-a -LOPA	38,400	94	408	1
S. Doug-LOPA	104	4	26	
In situ OS-LOPA	10,246	99	103	[134]
Canyon Pintado-LOPA 1/	14,755	218	68	
Rangely Exp-LOPA	963	4	241	1
Taiga/Coseka-G&K	366	20	18	3
Sagebrush Hills II-G&K	73	2	37	4
N. Doug pipeline-G&K	152	0	--	
Full Section Survey-Lischka	2,112	12	176	150 (31%)
N. Coal-Pioneer	3,480	7	497	
	<u>74,088</u>	<u>480</u>	<u>154</u>	
<u>Jackson County</u>				
Sigma Mine-PTo	240	4	60	10 5 %
Coal Lease Areas-Lischka 1/25,	104	161	156	
Seis lines-LOPA	60	6	10	10 5 %
One Section JA Co-LOPA	640	10	64	
	<u>16,680</u>	<u>189</u>	<u>141</u>	
<u>Grand County</u>				
Middle Park Class II 1/	2,500	41	61	--
Gore Pass-Windy Gap-Lischka	980	17	57	
	<u>3,480</u>	<u>58</u>	<u>60</u>	

1/ Used for narrow base estimate also.

APPENDIX D

ECONOMICS

Appendix D - Economics

Additional data that were incorporated into tables 4-31, Per Capita Projections of Operating Revenues and Bonding Capacities, and 4-33, Cumulative Capital Requirements Under All Alternatives, are given in tables D-1 through D-4. Computations of the actual figures in tables 4-31 and 4-33 are not shown because of their length (every jurisdiction for every alternative for every year). Details of these computations are available in Craig District Office files.

As is explained in Section 4, projections of operating revenues and bonding capacities were made on a per capita basis, an inferior method which was necessitated by the unavailability of certain essential data that prevented a more detailed analysis. Budget data on which these projections were based is presented in table D-1. To these projections have been added estimates of the additional property tax revenues and bonding capacities that would result from expected major private investments (which are called baseline projects) and from the new Federal leasing. Table D-2 shows the contribution that would result from the baseline projects. Table D-3 shows the derivation of investment estimates for the mines that would be developed under new Federal leasing. Table D-4 then shows the estimated contribution of those mines to local property tax revenues and bonding capacities, based on their investment and on their coal production.

Estimation of capital expenditure requirements for communities and school districts necessitated development of a set of standards for physical requirements for community facilities and a set of cost estimates of those

facilities. Both sets are given in table D-5. Physical requirements were based on the population projections in table 4-28.

TABLE D-1

REVENUES OF COUNTIES, COMMUNITIES, AND SCHOOL DISTRICTS: 1978

	Counties					
	Moffat	Rio Blanco	Routt			
Assessed valuation	\$ 107,378,980	\$ 205,514,480	\$ 112,504,010			
Property taxes	1,487,198	1,135,081	1,639,211			
Sales taxes	450,874	0	0			
Payment in lieu of taxes	161,985	152,910	213,698			
Federal mineral revenue	200,000	200,000	200,000			
Other intergovt. revenue 1/	1,305,095	556,234	926,816			
Other revenue 2/	1,667,080	2,129,200	1,332,126			
Total	3,567,924	4,173,425	4,311,851			
	Communities					
	Craig	Hayden	Meeker	Oak Creek	Stmbt Spgs	Yampa
Assessed valuation	\$ 20,057,500	\$ 3,170,190	\$ 4,850,450	\$ 930,920	\$ 31,498,460	\$ 776,300
Property taxes	208,160	50,283	38,360	22,342	301,440	16,760
Sales taxes	832,771	66,031	83,169	11,600	920,000	0
Water and sewer fees 3/	853,873	110,470	220,984	74,405	374,712	32,000
Intergovt. revenue 1/	156,520	31,910	55,917	22,614	145,280	6,848
Other revenue 2/	697,510	86,915	268,498	138,601	600,412	3,892 4/
Total	2,748,834	345,609	666,928	269,562	2,341,844	59,500 4/
	School Districts					
	Moffat County Sch. Dist.#1	Rio Blanco County Sch. Dist.#1	Routt County Sch. Dist.#1	Routt County Sch. Dist.#2	Routt County Sch. Dist.#3	
Assessed valuation	\$ 107,378,980	\$ 23,291,360	\$ 53,101,300	\$ 48,178,030	\$ 20,232,600	
Property taxes	2,927,907	922,793	1,414,272	2,287,310	1,050,649	
State equalization	619,456	300,950	99,680	602,023	187,652	
Other revenue 2/	1,186,608	584,737	294,193	531,558	275,273	
Total	4,733,971	1,808,480	1,808,145	3,420,891	1,513,574	

NOTES AND SOURCES TO TABLE D-1

Notes:

Budget data were not obtained for Wyoming counties, communities, and school districts. Total revenue figures are available in Centaur Associates, "Description of the Existing Socioeconomic Environment in Southcentral Wyoming" (full reference in Bibliography).

Bonding capacities are determined by limits prescribed by state law, and are based on either assessed valuation or market valuation. Legal bonding limits under state laws are:

Colorado:

Counties: 1.5% of assessed valuation
 Communities: 3% of market valuation
 School Districts: 20% of assessed valuation

Wyoming:

Counties: 2% of assessed valuation
 Communities: 4% of assessed valuation, plus an additional 4% for sewer bonds (8% assumed for this study)
 School Districts: 10% of assessed valuation

Assessed valuations of Wyoming jurisdictions in 1978 were (Wyoming Taxpayers Association, 1978: full reference in Bibliography):

Carbon County	\$ 230,860,257	Encamp./Rvrsd.	\$ 658,094
Baggs	285,044	Medicine Bow	672,578
Dixon	69,082	Rawlins	15,644,221
Elk Mountain	229,603	Rock River	608,778
Elmo/Hanna	1,815,879	Saratoga	2,744,896
		Wamsutter	317,515
Carbon County School Districts	\$ 230,860,257		

Market valuation in Colorado communities was estimated by dividing assessed valuation by the average assessment rate, which is 22% in Meeker and Steamboat Springs and 30% in the other communities.

The communities of Creston Junction and Walcott Junction are unincorporated and have no tax base.

Footnotes

- 1/ Excludes nonrecurring items, such as special project grants
- 2/ Excludes carryover balances
- 3/ Tap and service fees
- 4/ Estimated

Sources: local jurisdictions

TABLE D - 2

ADDITIONS TO PROPERTY TAXES AND BONDING CAPACITY FROM BASELINE PROJECTS
(thousand dollars)

	Moffat County	Rio Blanco County	Routt County	Moffat Co. School District	Routt Co. School District
1985 Investment	167,700	1,800,000	81,000	167,700	81,000
Assessment rate	.30	.30	.30	.30	.30
Assessed valuation	50,310	540,000	24,300	50,310	24,300
Mill levy	13.85	5.70	15.90	27.21	37.27 ^{1/}
Property taxes	697	3,078	386	1,369	906
Bonding limit	.015	.015	.015	.20	.20
Bonding capacity	755	8,100	364	10,062	4,860
1990 Cumulative investment	169,900	2,250,000	129,700	169,900	129,700
Assessment rate	.30	.30	.30	.30	.30
Assessed valuation	50,970	675,000	38,910	50,970	38,910
Mill levy	13.85	5.70	15.90	27.21	37.27
Property taxes	706	3,848	619	1,387	1,450
Bonding limit	.015	.015	.015	.20	.20
Bonding capacity	765	10,125	584	10,194	7,782

Notes: Baseline projects are major private investments that are expected to occur regardless of new Federal leasing. Investment data was not available on baseline projects in Wyoming.

^{1/} Average mill levy weighted by assessed valuations

Sources: NWSR, table 4-28
Data from county assessors

TABLE D-3
STARTUP INVESTMENT ASSOCIATED WITH DELINEATED COAL TRACTS
(thousand dollars)

	China Butte	Danforth Hills #2	Danforth Hills #3	Empire	Hayden Gulch	Iles Mountain	Lay	Red Rim	Rosebud	Williams Fork Mountains
Type of Mine	Surface	Surface	Surface	Underground	Surface	Surface	Surface	Surface	Surface	Surface
Coal Production (tons)	4,000,000	4,298,500	3,555,600	500,000	2,756,000	1,908,000	2,716,230	1,700,000	1,000,000	1,315,500
Mine Startup Investment \$	50,000	53,731	44,445	17,500	34,450	23,850	33,953	21,250	12,500	16,444
Access Road: Miles	27							4		
Investment	4,050							600		
Power Line: Miles	10							4.5	1.2	
Investment	200							90	24	
Railroad: Miles	17	30	40		10		25	5		
Investment	17,000	30,000	40,000		10,000		25,000	5,000		
Total Investment	71,250	83,731	84,445	17,500	44,450	23,850	58,953	26,940	12,524	16,444

Notes: The initial capital investment cost is estimated to be \$10 to \$15 per ton of annual production for a surface mine and \$30 to \$40 per ton of annual production for an underground mine (U. S. Geological Survey. Tract Delineation Reports for the Site-Specific Analyses). For the purposes of this study, an average of the ranges was used, i.e.: \$12.50 per ton for surface mines and \$35 per ton for underground mines.

Access road and power line investments were estimated only for Wyoming mines. Mileages exclude the first three miles from the mine site. Access road: \$150,000 per mile; Power line (34 Kv): \$20,000 per mile.

Railroad: \$1,000,000 per mile.

Sources: USGS and BLM estimates.

TABLE D - 4

ADDITIONS TO PROPERTY TAXES AND BONDING CAPACITY FROM MINES DEVELOPED UNDER NEW FEDERAL LEASING
PART A - COLORADO MINES

	Danforth Hills #2	Danforth Hills #3	Empire	Hayden Gulch	Iles Mtn.	Lay	Williams Fork Mtns.
Property taxes							
Coal price	\$ 16.00	\$ 16.00	\$ 15.50	\$ 15.00	\$ 16.00	\$ 15.00	\$ 15.00
Royalty rate	.09	.09	.06	.09	.09	.09	.09
Royalty	1.44	1.44	.93	1.35	1.44	1.35	1.35
Present value of royalty	10.084	10.084	6.513	9.454	10.084	9.454	9.454
Coal production (000 tons)	4,300	3,560	500	2,760	1,900	2,700	1,300
Leasehold valuation (000)	43,361	35,899	3,256	26,092	19,159	25,525	12,290
Capital investment (000)	83,731	84,445	17,500	44,450	23,850	58,953	16,444
Total valuation (000)	127,092	120,344	20,756	70,542	43,009	84,478	28,734
Assessed valuation (000)	38,128	36,103	6,227	21,163	12,903	25,343	8,620
Mill levy: schools	27.21	43.23	27.21 ^{1/}	26.44 ^{1/}	27.21	27.21	26.96 ^{1/}
other uses	14.39	18.102	14.75 ^{1/}	24.83 ^{1/}	14.29	14.29	19.63 ^{1/}
Property taxes:							
schools (000)	1,037	1,561	169	560	351	690	232
other uses (000)	549	653	92	525	184	362	169
Bonding capacity							
Assessed valuation (000)	38,128	36,103	6,227	21,163	12,903	25,343	8,620
Bonding capacity:							
school districts (000)	7,625	7,221	1,245	4,233	2,581	5,069	1,724
county (000)	572	542	93	317	194	380	142

^{1/} Mill levies for tracts which lie in two or more taxing districts were determined either by using the levy for the district in which the majority of the tract is located or by a weighted average based on acreages.

TABLE D - 4

ADDITIONS TO PROPERTY TAXES AND BONDING CAPACITY
FROM MINES DEVELOPED UNDER NEW FEDERAL LEASING
PART B - WYOMING MINES

	China Butte		Red Rim		Rosebud	
	1990	1995	1990	1995	1990	1995
Property taxes						
Coal production valuation						
Coal price	\$ 9,511	\$ 9,511	\$ 9,511	\$ 9,511	\$ 9,511	\$ 9,511
Coal production (000 tons)	4,000	4,000	1,700	1,700	1,000	1,000
Assessed valuation (000)	38,040	38,040	16,167	16,167	9,510	9,510
Capital investment						
Buildings						
Investment (000)	7,125	7,125	2,694	2,694	1,252	1,252
Valuation (000)	3,646	3,646	1,379	1,379	641	641
Equipment						
Investment (000)	64,125	64,125	24,246	24,246	11,272	11,272
Depreciation (000)	19,238	64,125	7,274	24,246	3,382	11,272
Valuation (000)	44,887	0	16,972	0	7,890	0
Total valuation (000)	48,533	3,646	18,351	1,379	8,531	641
Assessed valuation (000)	12,133	912	4,588	345	2,133	160
Total assessed valuation (000)	50,173	38,952	20,755	16,512	11,643	9,670
Mill levy: schools	62.70	62.70	62.70	62.70	59.56	59.56
other uses	3.56	3.56	3.56	3.56	7.88	7.88
Property taxes:						
schools (000)	3,146	2,442	1,301	1,035	693	576
other uses (000)	178	139	74	59	92	76
Bonding capacity						
Assessed valuation (000)	50,173	38,952	20,755	16,512	11,643	9,670
Bonding capacity:						
School Districts (000)	5,017	3,895	2,076	1,651	1,164	967
County (000)	1,004	779	415	330	233	193

TABLE D - 4

ADDITIONS TO PROPERTY TAXES AND BONDING CAPACITY FROM MINES DEVELOPED UNDER NEW FEDERAL LEASING
 PART C - SUMMARY BY JURISDICTION: ADDITIONS TO PROPERTY TAXES
 (thousand dollars)

	Carbon County 1990 1995		Moffat County	Rio Blanco County	Routt County	Carbon County School Dists. 1990 1995		Moffat County School Dist.	Routt County School Dist.
Alternative and Tract									
Low Alternative									
China Butte	178	139				3,146	2,442		
Danforth Hills #3				653					
Empire			92					169	
Red Rim	74	59				1,301	1,035		
Rosebud	92	76				693	576		
Total	344	274	92	653	0	5,140	4,053	169	0
Medium Alternative									
Previous alternative	344	274	92	653	0	5,140	4,053	169	0
Hayden Gulch					525				560
Total	344	274	92	653	525	5,140	4,053	169	560
Preferred Alternative									
Previous alternatives	344	274	92	653	525	5,140	4,053	169	560
Danforth Hills #2			549					1,037	
Lay			362					690	
Total	344	274	1,003	653	525	5,140	4,053	1,896	560
Maximum Alternative									
Previous alternatives	344	274	1,003	653	525	5,140	4,053	1,896	560
Iles Mountain			184					351	
Williams Fork Mtns.			113	1/	56 1/			155	77 1/
Total	344	274	1,300	653	581	5,140	4,053	2,402	637

1/ Williams Fork Mountains tract was split between Moffat County (67%) and Routt County (33%), based on acreages.

TABLE D - 4

ADDITIONS TO PROPERTY TAXES AND BONDING CAPACITY FROM MINES DEVELOPED UNDER NEW FEDERAL LEASING
 PART D - SUMMARY BY JURISDICTION: ADDITIONS TO BONDING CAPACITY
 (thousand dollars)

	Carbon County		Moffat County	Rio Blanco County	Routt County	Carbon County School Dists.		Moffat County School Dist.	Routt County School Dist.
	1990	1995				1990	1995		
Alternative and Tract									
Low Alternative									
China Butte	1,004	779				5,017	3,895		
Danforth Hills #3				542				1,245	
Empire			93						
Red Rim	415	330				2,076	1,651		
Rosebud	233	193				1,164	967		
Total	1,652	1,302	93	542	0	8,257	6,513	1,245	0
Medium Alternative									
Prev. alternative	1,652	1,302	93	542	0	8,257	6,513	1,245	0
Hayden Gulch					317				4,233
Total	1,652	1,302	93	542	317	8,257	6,513	1,245	4,233
Preferred Alternative									
Prev. alternatives	1,652	1,302	93	542	317	8,257	6,513	1,245	4,233
Danforth Hills #2			572					7,625	
Lay			380					5,069	
Total	1,652	1,302	1,045	542	317	8,257	6,513	13,939	4,233
Maximum Alternative									
Prev. alternatives	1,652	1,302	1,045	542	317	8,257	6,513	13,939	4,233
Iles Mountain			194					2,581	
Williams Fork Mtns.			86	1/	43 1/			1,155	1/
Total	1,652	1,302	1,325	542	360	8,257	6,513	17,675	4,802

1/ Williams Fork Mountains tract was split between Moffat County (67%) and Routt County (33%), based on acreages.

NOTES AND SOURCES TO TABLE D - 4

Six tracts (Bell Rock, Danforth Hills #1, Grassy Creek, and Pinnacle in Colorado; Medicine Bow and Seminoe II in Wyoming) are excluded from these estimates because it is assumed that they would become extensions of existing mines. As such, they would provide little or no increase in coal production, employment, or investment in equipment.

Part A

Mine property taxes in Colorado are based on both production and capital investment. Production is assessed by means of an estimated leasehold valuation, in which the present value of a 30-year royalty is applied to annual coal production. Prices, royalty rates, and discount rate (determined by the state each year) for 1979 are:

Price per ton

9,800 - 10,400 btu:	\$15.00
10,401 - 11,000 btu:	16.00
11,001 - 11,600 btu:	17.00

Royalty rate

Underground mine: 6 percent

Surface mine: 9 percent

Present value of royalty factor: present value of a \$1.00 uniform series for 30 years at 14% compound interest = 7.0027

Assessed valuation = total valuation x 30% assessment rate

Current mill levies for tract locations were used.

Legal bonding limits under state law:

School districts: 20% of assessed valuation

Counties: 1.5% of assessed valuation

Part B

Mine property taxes in Wyoming are also based on both production and capital investment. Assessed valuation of production is determined by applying state-determined prices to coal production. The average 1978 price for Carbon County was \$9.51 per ton. Capital investment in buildings (assumed to be about 10% of total capital investment) is assessed at 1967 values (1978-1967 deflation factor = 1.954). Capital investment in equipment (the remaining 90% of total capital investment) is assessed at its depreciated value.

Depreciation assumption: straight line depreciation over 5-year life, beginning mid-1989, with results as follows:

1990: 1.5 years = 30% depreciation

1995: 6.5 years = 100% depreciation

Assessed valuation = total capital valuation x 25% assessment rate. Current mill levies for tract locations were used.

Legal bonding limits under state law:

School districts: 10% of assessed valuation

Counties: 2% of assessed valuation

Sources: Data from county assessors
Tables 2-13 and D-3.

TABLE D - 5

COMMUNITY FACILITY STANDARDS AND UNIT COST ESTIMATED
(STANDARDS PER 1,000 POPULATION, EXCEPT WHERE INDICATED)

Physical Unit	Physical Unit	Physical Requirement		Cost per Unit (dollars)		
		By Source	Rounded Average	By Source	In 1978 Dollars	Rounded Average
Schools						
Classroom space	Sq. Ft./Student		115			53
BBC						
Elementary		75		40	48.48	
Jr. High		90		42	50.90	
High School		110		50	60.60	
MWR						
Elementary		90				
Secondary		150				
QDA						
Elementary		120				
Jr. High		135				
High School		150				
Other Capital Needs	Per Student					103
DRI				85	103.02	
Health Facilities						
Hospital bed			<u>1/</u>			75,000
BBC				55,000	66,660	
COG				48,152	70,687	
DRI				72,000	87,264	
MWR		<u>1/</u>				
Ambulance			.2			18,000
BBC		.2		15,000	18,180	
Law Enforcement						
Police officer			<u>2/</u>			
MWR		<u>2/</u>				
Police vehicle	Per Officer		.33			8,100
BBC				7,000	8,484	
CMC		.33				
COG				1,325	<u>3/</u>	
DRI				6,500	7,878	
Police Station Space	Sq. Ft.		340			73
BBC		400		60	72.72	
EPA		200				
MWR		370	<u>4/</u>			
QDA		382	<u>5/</u>			

TABLE D - 5, cont.

COMMUNITY FACILITY STANDARDS AND UNIT COST ESTIMATED
(STANDARDS PER 1,000 POPULATION, EXCEPT WHERE INDICATED)

	Physical Unit	Physical Requirement		Cost per Unit (dollars)		
		By Source	Rounded Average	By Source	In 1978 Dollars	Rounded Average
Fire protection						
Pumping capacity	gallons/min.		6/			7/
CRF				7/		
MNR		6/				
Fire station space	Sq. Ft.		8/			73
BBC		8/		60	72.72	
Water system						
Million gal/day			.2			6,400,000
COG				4,330,000	9/ 6,356,440	
WCCCES		.2				
Sewer system						
Million gal/day			.075			4,800,000
COG				3,270,000	10/ 4,800,360	
JWG		.075				
Landfill						
Acres			.21			3,700
DOH		.21				
DOH/WUR				3,700		3,700 11/
Recreation facilities (Recreation Section, table 4-22)						
Library space						
Sq. Ft.			600			53
BBC		550		45	54.54	
COG		700		35	51.38	
EPA		550				
Office space						
Sq. Ft.			220			75
BBC		250		50	60.60	
COG		204		53	77.80	
DRI		3,750	3/	70	84.84	
EPA		204				

1/ Formula for estimating hospital bed need:

$$\text{Current use rate} = \frac{\text{Patient days per year}}{\text{Current population}}$$

$$\text{Hospital bed need} = \frac{\text{Current use rate} \times \text{projected population}}{365 \times .80}$$

Current use rates:

Carbon County	.31	Moffat County	.61
Rio Blanco County	.51	Routt County	.42

Hospital bed need was projected on a county basis because a single hospital serves most impacted area counties. However, capital requirements were assigned to the community where the hospital is located because the community generally accounted for the majority of the hospital district tax base.

NOTES AND SOURCES TO TABLE D - 5, cont.

- 2/ Standard for police officers
 Community with less than 10,000 population: 2 officers per 1,000 people
 Community with 10,000 or more population: 1.7 officers per 1,000 people
- 3/ Item excluded from calculation of average
- 4/ 200 sq. ft. per officer x 2.7 officers per 1,000 people = 340 sq. ft.
 200 sq. ft. per officer x 1.7 officers per 1,000 people = 400 sq. ft.
 Average = 370 sq. ft.
- 5/ 1.8 officers per 1,000 people + .25 staff per officer = 1.8 x 1.25
 = 2.25 personnel per 1,000 people x 170 sq. ft. per person = 382 sq. ft.

6/ Required fire pumping capacity

Population	Gallons per minute
1,000	1,000
1,500	1,250
2,000	1,500
3,000	1,750
4,000	2,000
5,000	2,250
6,000	2,500
10,000	3,000
13,000	3,500
17,000	4,000
22,000	4,500
27,000	5,000

Requirements were calculated by interpolation between these figures.

- 7/ Average 1978 costs of pumper trucks
 500 gallons per minute \$64,000
 750 gallons per minute \$72,000
 1,000 gallons per minute \$80,000
 1,250 gallons per minute \$88,000
- 8/ Standard for fire station space
 Community with less than 15,000 population: 1,000 sq. ft. per 1,000 people
 Community with 15,000 or more population: 700 sq. ft. per 1,000 people
- 9/ 200 acre-feet per year x 325,851 gal. per acre-foot divided by 365 =
 179,000 gal. per day = .179 million gal. per day
 \$775,000 for 200 acre-feet per year divided by .179 = \$4,330,000 for 1 million gal. per day.
- 10/ \$550,000 per 1,000 population divided by .168 million gal. per day per 1,000 people (standard commonly used) = \$3,270,000 per million gal. per day.
- 11/ Derived from DOH and WUR data. Details available in Craig District Office files.

NOTES AND SOURCES TO TABLE D - 5

Because the sources that were examined varied widely in standards for community facility requirements, and because no single source was considered authoritative, the standards used for this study were developed as averages of the standards contained in the references. Where a standard in one source varied too greatly from the others it was excluded from the average. The sources, indicated by initials, are keyed to the references listed below. References are given in abbreviated form; full references are included in the bibliography.

Costs per unit were expressed in 1978 dollars, using the following price index to move costs from the estimated year of source data to 1978 (Fischer, Bureau of Labor Statistics, 1980):

Year	Index	1978/Earlier Year
1978	195.4	--
1977	181.5	1.077
1976	170.5	1.146
1975	161.2	1.212
1974	147.7	1.323
1973	133.1	1.468

Some community service requirements, such as number of police officers, are included in this table for use in the analysis of Social Implications of Impacts on Community Services in Section 4 (table 4-35). Unit costs were not estimated because they involve operating costs and not capital costs.

City streets were excluded from this analysis because most new streets are constructed as part of subdivision developments and are paid for by property owners. New connector streets, which are the community's responsibility, were estimated to be 10 percent of total new street costs and were ignored (Information from local community officials).

Sources (Year in parentheses is estimated year of source data):

- BBC (1975): Bickert, Browne, Coddington and Associates. Vol. II, Tables D-17 through D-21.
- CMC (1977): Centaur Management Consultants. Page 82.
- COG (1973): Colorado West Area Council of Governments
- CRF (1978): Robacker (Craig Rural Fire Department)
- DOH (1979): Stoddard (Colorado Department of Health)
- DRI (1975): Gilmore and others. Analysis of Financing Problems in Coal and Oil Shale Boom Towns. Pages F-13 and F-14.
- EPA (1977): Briscoe, Maphis, Murray, and Lamont (prepared for Environmental Protection Agency). Table 2-3.
- JWG (1979): Geise, J. William, Jr.
- MWR (1974): Chalmers, and Anderson (Mountain West Research, Inc.), Pages 109-127.
- QDA (1977): Quality Development Associates. Pages VIII-7 through VIII-21, XI-11 and XI-13.
- WCCES (1976): West Central Colorado Coal Environmental Statement. Page 314.
- WUR (1979): Deu Pree (Western United Realty)

APPENDIX E

Consultation With the Colorado State
Historic Preservation Officer



COLORADO
HISTORICAL
SOCIETY

The Colorado Heritage Center 1300 Broadway Denver, Colorado 80203

18 April 1980

Charles W. Luscher
Acting State Director
Bureau of Land Management
1600 Broadway
Denver, CO 80202

RE: Green River/Hams Fork Coal Lease Region

Dear Mr. Andrus:

Thank you for your correspondence dated March 14, 1980, concerning this proposed project.

It is our understanding that the proposed coal lease areas within the Green River/Hams Fork region have not been completely surveyed. As a result, the potential exists for as yet unidentified significant resources to be located in the impact areas of the proposed coal leases. Therefore, this office recommends that the delineated coal lease tracts be surveyed prior to awarding the leases.

Furthermore, we do not concur with your determination that the issuance of coal leases does not constitute an effect on cultural resources. While the issuance of coal leases in and of itself will not have a direct effect on cultural properties which may be eligible, it is the opinion of this office that such issuance does constitute an effect in that the ultimate result, coal mining operations, while later in time, are still reasonably foreseeable and certainly have the potential to adversely affect cultural resources.

Sincerely,

Arthur C. Townsend
State Historic Preservation Officer

ACT(KKP):ng
cc: Jane Kardokus, Colorado Attorney General's Office





LEADER'S CARD

573 1980 v.2

Hans Fork
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	OFFICE	DATE RETURNED

(Continued on reverse)

