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# Bureau of Land Management

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Subject: 1980 NEPA (Emery North Tract)

Remarks: not titled "EA", but that's what it is, (in effect)

Final

UINTA SW UTAH COAL SITE SPECIFIC ANALYSIS

EMERY NORTH TRACT

January 18, 1980

Covers Kingston tract

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# I. INTRODUCTION

## A. Purpose and Need

Under the new coal leasing program, the Department of the Interior has combined all major Federal coal management responsibilities into one unified program in order to:

1. Give the nation a greater assurance of being able to meet its national energy objectives;

2. Provide a means to promote a more desirable pattern of coal development with ample environmental protection;

3. Assure that State governments and local communities participate in decisions about where and when Federal coal production will take place; and

4. Increase competition in the western coal industry.

The Secretary of the Interior's new coal program decision of June 1 and 2, 1979 has resulted in the setting of regional coal production goals and leasing targets for 1981. The tentative leasing target for the Uinta Southwest Utah Coal Region is 520 million tons of reserve base coal. In order to meet this goal, a proposal to lease individual coal tracts or combinations of coal tracts will be analyzed in a site specific analysis and Regional Coal EIS. This site specific analysis assesses the impacts of leasing 43.0 million tons of reserve base coal reserves from the Emery North Tract.

## B. Authorizing Actions

Leasing and development will be under the authority of the following laws: The Mineral Leasing Act of February 25, 1920, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; the Surface Mining Control and Reclamation Act (SMCRA) of 1977; the Multiple Minerals Development Act of August 13, 1954; the Department of Energy Organization Act of August 4, 1977; the National Environmental Policy Act (NEPA) of 1969; the Federal Coal Leasing Amendments Act of 1976, as amended; the Act of October 30, 1978 that further amended the Mineral Leasing Act of 1920, and regulations: Title 43 CFR Parts 3400, 3500, and 2800 and Title 30 Parts 211, and 700.

The Federal agency responsibilites for the leasing and management of Federal coal are listed on pages 1-18 through 1-36 in the Final Environmental Statement on the Federal Coal Management Program (April 1979).

The State and county responsibilities are listed on pages I-9, III-8 and III-12 of Part 1 of the Final Environmental Statement on the Development of Coal Resources in Central Utah (1979).

# II. PROPOSED ACTION AND ALTERNATIVES

## A. Proposed Action

The total acreage within the proposed logical mining unit is 2,201 acres in which the coal is owned by the Federal Government. Ownership of the surface and other minerals are 1,520.75 acres of Federal and 680.25 acres of

private land. The proposed action would be to lease 2,201 acres containing Federal coal resources About 90 percent of the tract is believed to be underlain by minable coal, and it is also believed that surface mining would be the most efficient method for use over 40 percent of the tract. The tract is a logical mining unit as defined by Coal Lease Regulations 43 CFR 3400.5 (cc), either if mined independently or if mined in conjunction with adjacent coal land now under Federal and State lease.

1. Description of Tract

The Emery North Tract lies in Emery County, Utah, approximately 3 miles east of the town of Emery, 60 miles south of Price, Utah, and about 55 miles east of Salina, Utah. The legal description and ownership are shown in table 1.1. The general location is shown in maps 1.1 and 1.2.

TABLE 1.1

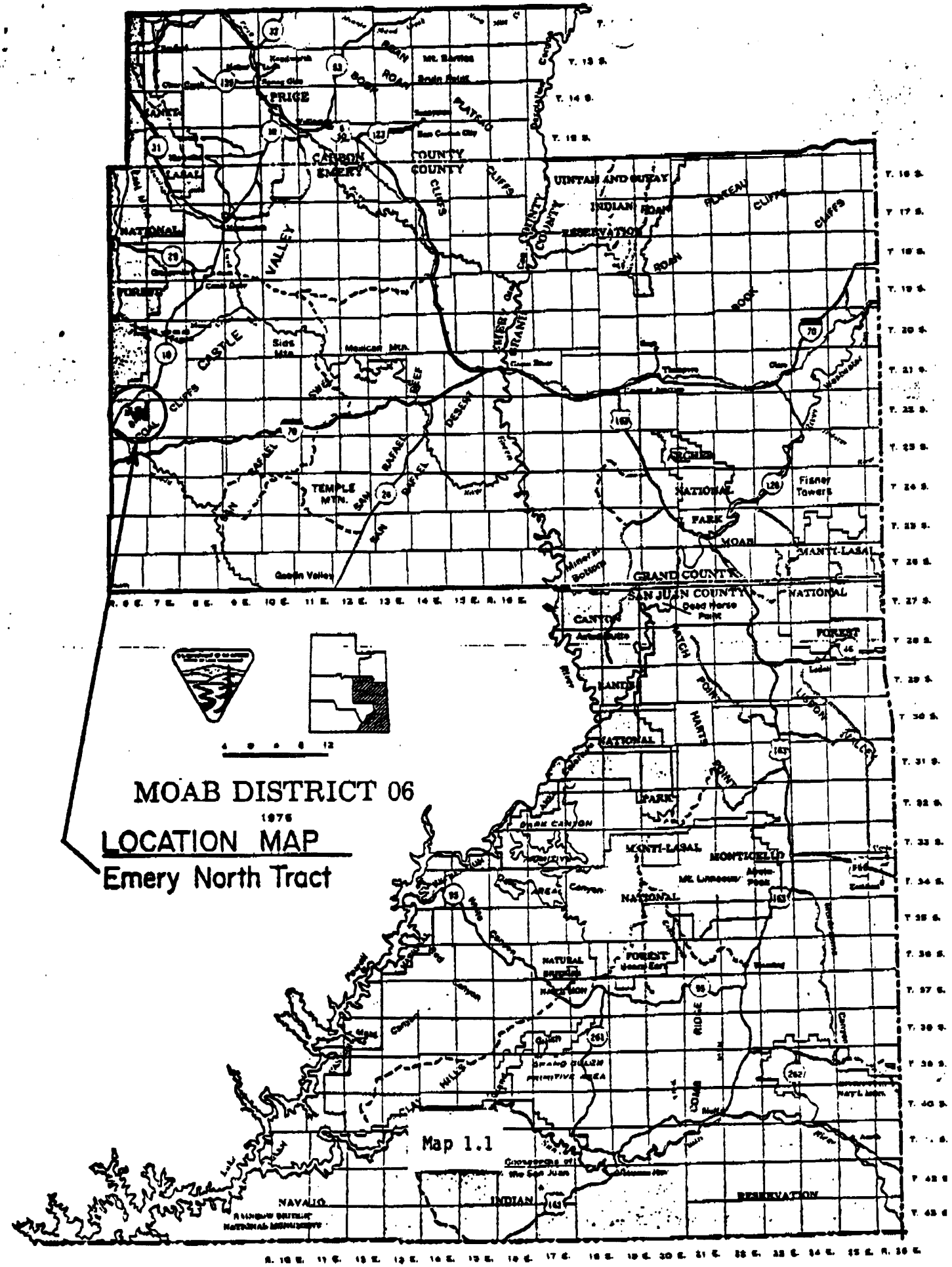
TRACT LOCATION AND OWNERSHIP

| | Surface Ownership (Acres) | | | Coal Ownership (Acres) | | | |
|---|---|---|---|---|---|---|---|
| Location | Federal | State | Private | Federal | State | Private | Legal Description |
| T22S - R6E SLB&M | | | | | | | |
| Section 1 | 240.75 | | 80.25 | 321.00 | | | Lot 1, 2, S 1/2 NE 1/4, SE 1/4 |
| Section 10 | | | 40.00 | 40.00 | | | SE 1/4 SE 1/4 |
| Section 11 | 160.00 | | 120.00 | 280.00 | | | NE 1/4, E 1/2, SE 1/4, SW 1/4 NW 1/4 |
| Section 12 | 440.00 | | 40.00 | 480.00 | | | NE 1/4, S 1/2 |
| Section 13 | 560.00 | | 80.00 | 640.00 | | | ALL |
| Section 14 | 80.00 | | 120.00 | 200.00 | | | S 1/2 SE 1/4, SW 1/4 NW 1/4, NW 1/4 SW 1/4, SE 1/4 SW 1/4 |
| Section 15 | 40.00 | | | 40.00 | | | NE 1/4 NE 1/4 |
| Section 22 | | | 160.00 | 160.00 | | | SW 1/4 NW 1/4 N 1/2 SW 1/4 SE 1/4 SW 1/4 |
| Section 23 | | | 40.00 | 40.00 | | | NE 1/4 NW 1/4 |
| TOTAL | 1,520.75 | | 680.25 | 2,201.00 | | | |

Mineral Ownership

Minerals underlying the land having Federal surface ownership are entirely Federally owned. Minerals, aside from coal, underlying the land having private surface ownership are entirely privately owned.

The tract lies within the Emery Known Recoverable Coal Resource Area (KRCRA). Total reserve base coal of the tract is approximately 43,000,000 tons, of which 24,380,000 tons are

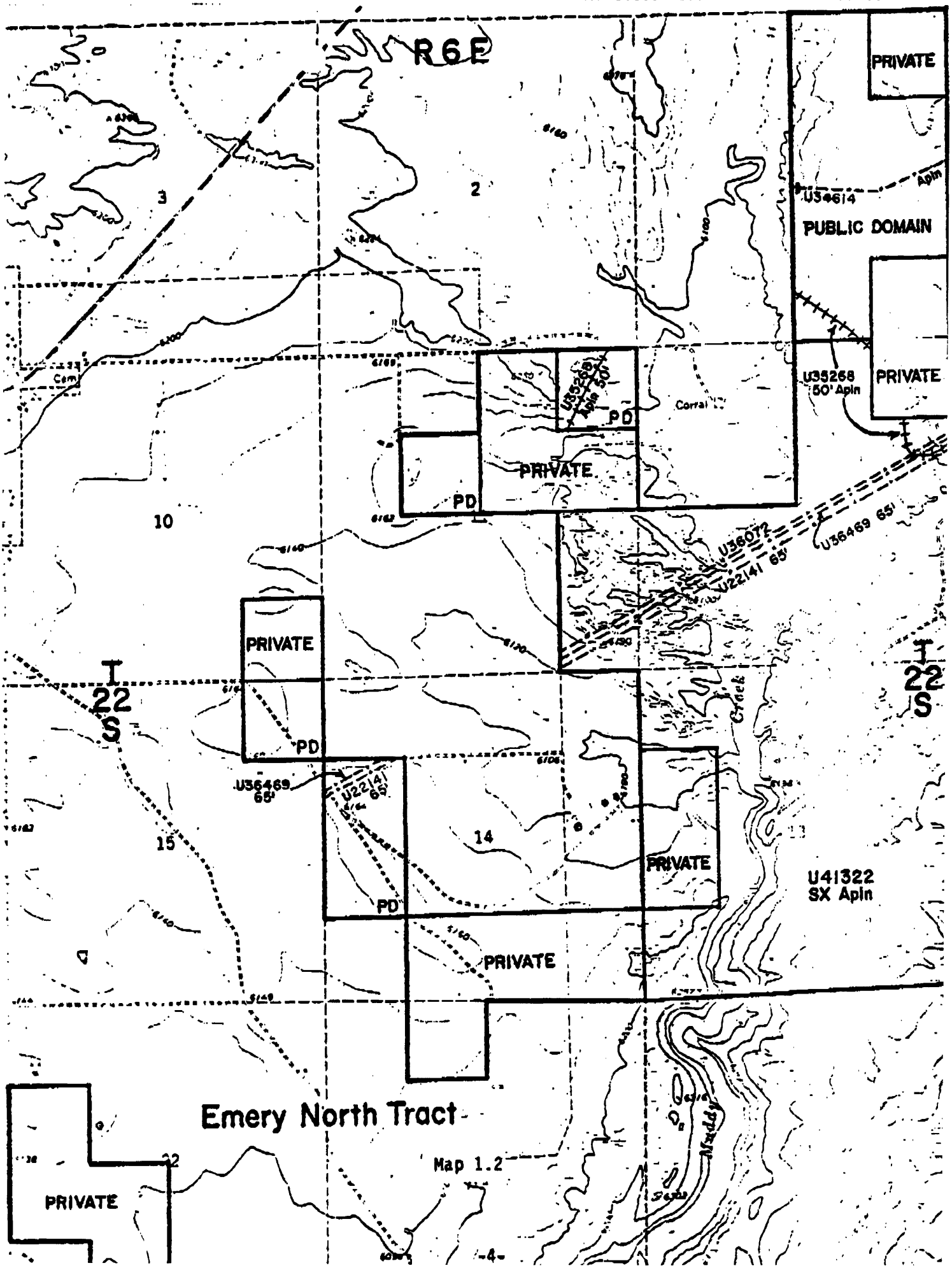



# MOAB DISTRICT 06

1976

## LOCATION MAP

## Emery North Tract


R6E
PRIVATE
U34614
Apln
PUBLIC DOMAIN
U35268
50' Apln
PRIVATE
U35268
50' Apln
PD
Corral
PRIVATE
PD
U36072
U22141 65'
U36469 65'
10
PRIVATE
T
22
S
PD
U36469
65'
U22141
65'
15
14
PRIVATE
PD
PRIVATE
U41322
SX Apln
Creek
Emery North Tract
Map 1.2
PRIVATE
22
-4-

recoverable. Of the total recoverable tonnage, 13,569,000 tons are recoverable by surface methods at an 85 percent recovery rate, and 10,820,000 tons are recoverable by underground methods at a 50 percent recovery rate.

The coal is classified as high volatile B bituminous coal. Coal analyses are not available in enough detail to reliably show coal quality by individual beds, but those analyses available are considered indicative of the average quality of the coal that would be produced. Coal samples available were taken by Consolidation Coal Company from a drill hole in the southeast corner of Section 2. Surface mining methods would be used for the first 20 years of production, and underground methods for the final 20 years of the mine's projected life. The estimated stripping ratio is 12.2:1. The coal data from the Consolidation Coal Company samples is shown in table 2.1 in the minerals section.

2. Projected Scope of Development

If the tract is leased, the coal would probably be recovered with both surface and underground mining methods. Minable thicknesses of the upper, or "I-J" seam underlie 1,286 acres of the tract, with 890 acres having less than 200 feet overburden, being considered strippable. The strippable area comprises the coal-bearing portions of Sections 12, 13 and 14 included in the tract. Remaining "I-J" coal in Sections 1, 11, 12, 13, 14 and 23 and in the outer parcels in Sections 10, 14, 15, 22 and 23 would probably be mined by underground methods. Minable thicknesses of the "C-D" bed underlie 1,943 acres of the tract. Of this coal land, 377 acres are considered strippable. Strippable coal occurs in Sections 12 and 13 around the outcrop in Muddy Creek Wash.

The remaining 1,566 acres of "C-D" bed coal land is considered to be more economically mined by underground methods. Since the interburden interval between the "C" and "I" beds varies from 135 to 173 feet, and the maximum stripping height for a single bed is considered to be 100 feet, it might be feasible to strip mine the "C" bed throughout much of the area in which the I bed was surface mined. Dragline stripping is efficient with one seam, but where both beds are mined it would probably be necessary to use shovels and trucks for uncovering the upper seam, or else use a second dragline to double handle waste from upper seam stripping. Surface mining of the shallow coal in the S 1/2 SE 1/4 of Section 14 would be inefficient unless done in conjunction with mining of adjoining private coal land. The various outlying parcels could also be mined best in conjunction with adjacent private land.

The tract could be mined both as an independent operation or in conjunction with adjoining land. It appears that much of the strippable coal for this locality is on the tract, but that the pit could be profitably continued into private coal land in Sections 14 and 23.

The production schedule envisions surface mining of 678,000 tons per year during an initial 20 years of operation. Following this, as strippable coal is depleted, a shift would be made to underground production and 541,000 tons per year would be mined during the following 20 years. About 15 additional drill holes will be needed to provide information for detailed mine planning. Of these, only seven would have to be reclaimed, since the others are on land where strip mining is probable.

Surface mine production at the proposed rate of 678,000 tons per year could probably begin within 2 years of the start of construction, at which time the initial cut should have been made and the dragline put in operation. During the 20 years of planned surface mine operation, it is projected that 835 acres of upper bed coal and 377 acres of lower bed coal would be mined. Some of the strippable lower bed coal underlies upper bed coal. The total surface disturbed is estimated at 1,000 acres, or 50 acres per year. Backfilling by dragline can be safely done within about 500 feet of men and equipment working in the lower coal bed. This is equivalent to about 2 years of mining activity, so that after the mining cycle was established, reclamation can be brought up to about 2 years behind production. An estimated 40 of the 50 acres disturbed yearly by mining could be contoured for reclamation within the following years. An additional 50 acres of the mine area would be reclaimed during the early years of underground mining when fewer access roads are needed. The remaining roads and cuts must be left open to provide road access until surface mining is complete. The projected averages utilized for mining development and facilities are shown in table 1.2.

Reclamation of much of the surface mined area could proceed during mining as backfilling is completed. Areas can be contoured, topsoil spread and vegetation reseeded. However, restoration of a considerable portion of the area, perhaps one-fifth, will have to await completion of surface mining and one-seventh completion of underground mining. Surface mining, using a dragline, would require access roads on both ends of the pit and a wide buffer zone between reclamation work and active mine work. With the end of surface mining, part of the roads could be reclaimed and mined land reclamation brought up to a few hundred feet of the final surface cut where portals and other facilities for underground mining would be located. Final reclamation of the roads and final backfilling of the pit would have to await completion of underground mining.

A surface plant containing offices, maintenance shops, warehouse, change house and coal storage and truck loading facilities would be constructed on 20 acres in the N 1/2 SE 1/4 NW 1/4 of Section 11. Access and highway haulage requires 2 miles of surface road connecting with Highway 10 at Emery. Two miles of mine haulage road for off-highway vehicles would extend to the edges of the surface mine in the southwest corner of Section 13 and the south portion of Section 12. Haulage roads would be constructed down to the coal seams in the pit floor as the initial cuts are excavated.

Underground mining would be initiated from the pit floors when the maximum stripping depth was reached in each seam. The exposed coal seams in the pits would allow low cost access on fresh coal by as many entries as desired.

Underground mining would result in very little new surface disturbance. The same facilities would be used that would be constructed for surface mining. Most of the new facilities, such as portals, would be located on land in the surface mine where reclamation was already required. However, shafts for additional ventilation would be needed. All mining in the outlying parcels would be by underground methods. They should be mined in conjunction with adjoining coal lands. Separate mining would probably be impractical without right-of-way agreements with owners of adjoining land. Otherwise, new surface and underground access would be needed for each parcel.

Temporary employees needed during the construction period would be about 15 for 1 year. About 65 to 75 permanent employees would be needed during the surface mining period, and 120 to 155 employees will be needed for underground mining. An estimated 65 transporation employees would be needed to truck coal to Mohrland or Salina during the surface mining period, and 52 would be needed during the underground production period.

3. Relation of Tract to Planning and Unsuitability Criteria

The lands within the Emery North Tract have been found suitable for coal leasing subject to certain restrictions required by the application of unsuitability criteria numbers 7 (Historic Lands and Sites), 9 (Federally Listed Endangered Species), 14 (Migratory Birds) and criteria 16 (Flood Plains). The Muddy Creek flood plain and Rochester-Muddy petroglyph site are considered unsuitable for leasing. The exceptions to unsuitability criteria numbers 9 and 14 apply, which require that BLM consult with the U. S. Fish & Wildlife to obtain a final determination as to the suitability of this tract for coal leasing. The only additional land use controls that apply to this tract are the Emery County zoning regulations which have categorized these lands as open to mining and grazing (M&G-1).

4. Relation of Tract to Development Near the Tract

Consolidated Coal Company is now operating their Emery (Browning) underground mine 2 miles southwest of the tract. They own fee land west and north of the tract. They are likely lease sale bidders, and they could mine the tract efficiently in conjunction with their present coal land holdings. The outlying parcels included in the tract could only be efficiently mined in conjunction with the surrounding Consolidated holdings.

The Hollberg Preference Right Application, now controlled by Atlantic Richfield Company, borders the tract on the northeast. The portion of this tract in Section 1 could be mined efficiently in conjunction with the Hollberg property using underground methods.

5. Legal and Regulatory Requirements as Part of the Proposed Plan

If leased, the successful lessee will have to comply with all Federal, State and local regulations, laws and policies as they affect the leasing and development of coal. Some of the primary laws governing the leasing and development of Federal coal are: Mineral Leasing Act of 1920 as amended, Federal Coal Leasing Amendments Act 1976, and the Surface Mining Control Land Reclamation Act of 1977. In addition to these laws governing coal development, there are several laws providing the basis for resource management and protection on the Public Lands and National Forests. These are the Federal Land Policy Management Act of 1976 (90 Stat. 2743; 43 U.S.C. 1701-1771), Organic Act of June 5, 1897 (30 Sta. 34, as amended; 16 U.S.C. 473-482, 551) and Multiple Use-Sustained Yield Act of June 12, 1960 (74 Stat. 215; U.S.C. 528-531).

These laws are implemented by the Bureau of Land Management (BLM), Forest Service (FS), the Geological Survey (GS), And the Office of Surface Management (OSM), under the following regulations:

Title 43 CFR Part 3400 provides procedures to ensure that adequate measures are taken during exploration or surface mining of the Federal coal (among other minerals) to avoid, minimize, or correct damages to the environment and to avoid, minimize, or correct hazards to public health and safety.

TABLE 1.2

PROJECTED DEVELOPMENT DATA OF THE EMERY NORTH TRACT

| | 1987 | | 1990 | | 1995 | | End of Surface Mine (2008) | | Start of Underground Mine (2009) | End of Underground Mine (2028) | | Final Reclamation (2034) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Per Year | Cum. | Per Year | Cum. | Per Year | Cum. | Per Year | Cum. | Per Year | Cum. | Per Year | Cum. |
| Mining Operations (Total acres) | | 73 | | 173 | | 432 | | 1073 | | 1073 | | 1078 |
| Mining (acres) | | 0 | 50 | 100 | 50 | 350 | 50 | 1000 | | 1000 | | 1000 |
| Haul roads, overburden disposal, and topsoil storage | | 50 | | 50 | | 50 | | 50 | | 50 | | 50 |
| Exploration Drilling | | 3 | | 3 | | 3 | | 3 | | 3 | | 3 |
| Facilities onsite and Coal Storage (acres) | | 20 | | 20 | | 20 | | 20 | | 20 | vent shafts | 25 |
| Facilities offsite (acres) | | | | | | | | | | | | |
| Access road | | 24 | | 24 | | 24 | | 24 | | 24 | | 24 |
| Power line | | 4 | | 4 | | 4 | | 4 | | 4 | | 4 |
| Telephone | | 3 | | 3 | | 3 | | 3 | | 3 | | 3 |
| Housing and infrastructure (acres) | | | | | | | | | | | | |
| Construction | | 9 | | 84 | | 84 | | 84 | | 118 | | 118 |
| Mining | 100 acres per 1,000 population -- life of project | | | | | | | | | | | |
| Water use (acre/feet per yr.) | 89 | 89 | 133 | 488 | 151 | 1243 | 61 | 3462 | 156 | 3618 | 156 | 6582 |
| Mining | 35 | 35 | 35 | 140 | 35 | 315 | 35 | 770 | 30 | 800 | 30 | 1370 |
| Domestic | 54 | 54 | 98 | 348 | 116 | 928 | 126 | 2692 | 126 | 2818 | 126 | 5212 |
| Reclamation scheduled (total acres) | | | | 3 | | 40 | | 203 | 40 | 723 | 40 | 793 |
| | | | | | | | | | (Including 30 acre waste dump) | | | |
| | | | | | | | | | | | | 893 |
| | | | | | | | | | | | | 1085 |

Title 43 CFR Part 3400 provides procedures for leasing and subsequent management of Federal coal (among other minerals) deposits.

Title 43 CFR Part 2800 establishes procedures for issuing rights-of-way to private individuals and (or) companies on public lands.

Title 30 CFR Part 211 governs operations for exploration, testing, development, and recovery of Federal coal under leases, licenses, and permits pursuant to 43 CFR Part 3400. The purposes of the current regulations in Part 211 are to promote orderly and efficient operations and production practices without waste or avoidable loss of coal or other mineral bearing formation; to encourage maximum and use of coal resrouces.

Title 30 CFR Part 700 requires coal mining operations as a minimum, to restore the lands affected to a condition capable of supporting the use of which there is reasonable likelihood. Mining and reclamation plans would not be approved unless the applicant has demonstrated that reclamation to the proposed post mining land use can be accomplished under the mining and reclamation plan.

For a more complete and detailed listing of laws affecting coal leasing and development, see the Final Environmental Statement on the Federal Coal Management Program (p. 1-15 through 1-23).

6. Site Specific Assumptions

a. Mine life is defined as exploration through end of production.

b. The construction phase would take 1 to 2 years to complete.

c. Preliminary reclamation on an area is considered completed when disturbed lands have been backfilled, graded, contoured and seeded (approximately 2 years).

d. Complete reclamation of an area would occur on the following schedule:

1. An estimated 2 years for filling, shaping, contouring, seedbed preparation and seeding.

2. Approximately 5 years would be required for establishment of vegetation cover of the seeded species which would support small animals and birds.

3. Establishment of shrub cover would require 15 to 20 years.

e. Short term is defined as mine life plus 5 years. Long term is defined as that time beyond the short term in which impacts would continue to occur.

f. Approximately 100 acres would be used for housing and infrastructure per 1,000 population.

g. Access roads, powerlines and telephone lines were not included in final reclaimed acres because of the possibility of their continued use.

h. Rights-of-way width requirements:

Access road - 100 feet
Powerline - 30 feet
Telephone cable - 12 feet

i. Post mining land use would consist of restoring or enhancing the existing level of livestock grazing and wildlife habitat. The current levels of outdoor recreation activities such as hunting, sightseeing and ORV use, would be included as objectives in a post mining land use plan.

B. Alternative(s)

1. No Action

Assessment of taking no action is required by CEQ regulations contained in the Federal Register notice of November 29, 1979. Under the "No Action Alternative", the tract would not be leased. Coal development would not take place and ancillary facilities would not be constructed. Approximately 13,569,000 tons of coal recoverable with stripping methods and 10,820,000 tons recoverable with underground methods would not be utilized. Use of the surface and of resources, other than coal, would continue in the present manner.

2. Mining the Total Tract With Underground Mining Methods

Using underground mining methods only, 17.2 million tons of coal would be recovered as opposed to 24.4 million tons using the combined surface and underground methods. Approximately 7.2 million tons of coal would not be recovered. There would less than 100 acres disturbed on the 2,201-acre tract if it is totally mined with underground methods. This compares to approximately 1000 acres of surface disturbance that would occur as a result of the proposed action. However, it may not be geologically, technically, or economically feasible to underground mine the total tract due to the relatively shallow depth of the coal on over 50 percent of the tract. Also, the adjacent private land ownership pattern would inhibit the underground mining of the tract by controlling access, transportation, and mine facility locations.

C. Further Environmental Assessment Points

The successful lessee must submit a plan for mining and reclamation (M&R) to the Secretary of the Interior, Office of Surface Mining (OSM) for the review and approval within 3 years after leasing. Once a mining plan has been submitted, OSM, BLM and GS would review the developments proposed in the mining plan. If necessary, OSM would then prepare a site specific environmental assessment prior to the approval of the mine plan. Additional environmental assessments for rights-of-way or special land use permits associated with ancillary facilities may be required of the surface managing aagency before the development of Federal coal on this tract.

## III. EXISTING ENVIRONMENT

### A. Affected Environment

#### 1. Climate

The tract lies just to the east of the Wasatch Plateau, which rises to an elevation of over 11,000 feet. The climate is semiarid (steppe), characterized by low relative humidity, abundant sunshine, low precipitation, warm summers and cold winters.

Data recorded from 1941 to 1970 at Emery about 3 miles west of the tract at 6,210 feet show an annual average precipitation of 7.64 inches. Winter preciptiation is light because the Wasatch Plateau depletes the moisture source. The principal precipitation season is summer when moist tropical air masses occasionally move into the region, resulting in thunderstorm activity. November is the driest month, averaging only 0.41 inches of precipitation. August is the wettest month, with an average of 1.17 inches.

January is the coldest month, with a mean daily maximum of 37.4 degrees F and a mean daily minimun of 11.3 degrees F. July is the warmest month with a mean daily maximum of 840 degrees F and a mean daily minimum of 52.3 degrees F. The average frost-free period is 132 days.

#### 2. Air Quality

Air quality in the vicinity of the tract is expected to be good, although no measurements have been made. There are no large population centers or industrial sources nearby. The largest industrial sources in the region are the Huntington and Hunter (Emery) coal-fired electric powerplants located about 32 miles and 21 miles northeast of the tract.

The closest air quality monitoring site is located near the Emery powerplant in Castle Dale, 24 miles northeast of the tract where the State of Utah is monitoring sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), nitrogen oxides ($NO_x$) and total suspended particulates (TSP). As shown in table 2.1, $SO_2$ and $NO_2$ concentrations were well below the National Ambient Air Quality Standards (NAAQS). Concentrations approaching the NAAQS for TSP were recorded at Castle Dale, but it is expected that a major portion of the TSP concentration was associated with suspended soil particles.

The other pollutants for which NAAQS have been promulgated are carbon monoxide (CO), ozone and lead (Pb). No CO or Pb data re available for the region, but levels are expected to be low.

Visibility - The BLM has been monitoring visibility by the photographic method at the south end of Cedar Mountain 37 miles northeast of the tract. The average visibility recorded from November 1976 to March 1979 was 85 miles (NOAA draft report). The tract and surrounding areas are designated Class II under Prevention of Significant Deterioration of Air Quality (PSD). The closest Class I area is Capitol Reef National Park, about 25 miles south of the tract.

TABLE 2.1

COMPARISON OF MEASURED POLLUTANT CONCENTRATIONS

| Pollutant | Location | | | | NAAQS |
|---|---|---|---|---|---|
| | Castle Dale | | Salt Wash | | |
| | Concentration ($ug/m^3$) | Percent of NAAQS | Concentration ($ug/m^3$) | Percent of NAAQS | |
| Annual average | 43 a) | 70 | | 60 | |
| Maximum 24-hour average | 12 a) | 80 | | 156 | |
| $SO_2$ | | | | | |
| Annual average | 0-13 b) | 0-16 | | 80 | |
| Maximun 24-hour avg. | 52 b) | 15 | | 365 | |
| Maximum 3-hour avg. | 208 b) | 16 | | 1300 | |
| $NO_2$ | | | | | |
| Annual average | 0-10 b) | 0-10 | | 100 | |
| Ozone maximum 1-hour average | | | 134 | 55 | 240 |

a) October 1978 to September 1979 b) July 1978 to June 1979

Trends in the Affected Environment

No climatic changes are anticipated. Energy related growth is expected to cause deterioration of air quality from its present high quality. Construction of coal-fired powerplants (1,000 MW) near Wellington and Green River, a coal gasification plant near Emery, and a nuclear generating facility near Green River are being considered. Whether these facilities will be constructed is unknown at this time. Increased coal production from existing leases is expected. Increased pollution levels in towns and cities is anticipated due to emissions associated with increased human activity. Some increase in haziness and decrease in visibility is expected from increased industrial activity and associated population growth.

### 3. Topography, Geology and Paleontology

The tract is located on a cuesta at an elevation of 6,400 to 6,850 feet. Drainage systems have cut canyons with a relief of 600 to 800 feet. Further to the west is the Wasatch Plateau, while to the east is the San Rafael Swell. The tract is situated on the western flank of the San Rafael Swell, a breached doubly plunging anticline.

The Ferron Sandstone Member of the Mancos Shale is the main coal-bearing formation in the area and dips 2 to 4 degrees to the west. The Ferron Sandstone contains 13 different coal seams, of which only the "D" and "J" seams are considered to be of minable thickness on this tract. No faults of any consequence are located on the tract.

The Ferron Sandstone contains fish, reptiles, clam, snail, oyster, ammonoid, echinoderm, and foram fossils, as well as plant remains associated with the coal (Robison, 1977). The scientific value of any undiscovered fossils is unknown; however, no exceptional sites have been located.

#### Trends in the Affected Environment

There are no existing or anticipated actions which would change the topography, geology, or paleontology of the resources on the tract.

### 4. Minerals

The coal is considered to be high volatile B bituminous in rank. Coal data are summarized in table 2.2.

TABLE 2.2
COAL DATA SUMMARY

| QUALITY | | |
|---|---|---|
| Btu per pound | 10,056 | (as received) |
| Ash (percent) | 22.01 | " |
| Moisture (percent) | 6.89 | " |
| Sulfur (percent) | 0.96 | " |
| Volatiles (percent) | 33.99 | " |
| Fixed Carbon (percent) | 37.11 | " |

| Quantity | "I-J" Bed | "C-D" Bed |
|---|---|---|
| Thickness of Seam (avg. feet) | 7.2 | 7.5 |
| Total Reserves Base (tons) | 16,760,000 | 26,240,000 |
| Recoverable Reserves (tons) | | |
| Surface @ 85 percent recovery | 9,230,000 | 4,326,000 |
| Underground @ 40 percent rec. | 2,360,000 | 8,460,000 |
| Minable Area (acres) | 1,290 | 1,935 |
| Depth of Seam (feet) | 0-400 + | 0-500 + |

The only other minerals of possible interest would be uranium and petroleum. Most of the tract is covered by oil and gas leases; however, no oil or gas wells have been drilled on the tract (Hansen and Scoville, 1955; Heylman, Cohenoun and Kayser, 1965). Uranium deposits have been found in the Morrison Formation which occurs stratigraphically over 1,000 feet below the Ferron Sandstone, but deposits have been found in the vicinity of the tract.

Trends in the Affected Environment

Underground coal mining is now occurring at the Old Browning Mine in Section 33. Other coal reserves are being evaluated and proposed for leasing in the area. Some of these include the Emery North, Emery South and Holberg PRLA Tracts. It appears the area will experience additional coal development in the future.

5. Soils

Soil information for the Emery North Tract is published in the Soil Survey Carbon-Emery Area, Utah, USDA, SCS, December, 1970. Table 2.3 illustrates the soil associations found on this tract, the dominant soil series of the associations, erosion, and reconstruction potential. The information provided is general and not meant to replace onsite investigations or more intensive soil surveys on impacted areas.

The two soil associations most affected by the strip mining activities are the Chipeta-Persayo-Badland Association and the Rock Land Shaly Colluvial land, Castle Valley-Kenelworth Association. There are no alluvial valley floors located on the tract, but there would be an estimated 110 acres of agricultural land taken out of production if surface-owner consent is given for development.

The Chipeta-Persayo-Badland Association is gently sloping and gently rolling to steep, well drained, moderately fine textured and medium textured soils that are shallow over gypsum bearing shale. The Rock land-Shaly Colluvial land-Castle Valley-Kenelworth Association is made up of benches and hills, dissected in places by deep ravines. This association is located along and surrounding the Muddy Creek. Rock land and shaly colluvial make up about 60 percent of this association. Rock land mainly consists of very steep to perpendicular sandstone and shale outcrops. Where there is soil material, the surface is more than half covered by coarse fragments. The shaly colluvial land contains fewer rock outcrops than rock land. The outcrops present are mainly shale. The Castle Valley soil is very shallow and stony and the Kenelworth soils are deep, stony and moderately coarse textured.

Because of climatic and soil conditions, 10 to 30 percent of annual revegetation attempts are expected to be successful based on the Interim Guide for Rating Soils According to Their Soil Suitability for Rangeland Seeding, Hagihara and others, 1972. The primary constraints are: the aridity of the area, lack of volume of soil resources, stoniness and high pH. Revegetation studies have been conducted in this tract on simulated reclaimed soils. The primary consideration for revegetation appears to be drought. The results of these revegetation trials using different soil treatments, species and management is published in the EMRIA Report No. 16, Reclaimability Analysis of the Emery Coal Field, Emery County, Utah, Bureau of Land Management.

TABLE 2.3

SOILS OF EMERY NORTH TRACT

| Mapping Unit | Dominant Soils Series of Unit and Textural Family | DEPTH Shallow 0 - 20 inches | DEPTH Moderately Deep 20 - 40 inches | DEPTH Deep 40 + inches | SOIL EROSION POTENTIAL Water K factor | SOIL EROSION POTENTIAL Wind Erodibility Group | Percent Slope | Acres Mapped | Percent Composition of Tract | Soil Reconstruction Potential | Soil Hazard Conditions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Saltair-Libbings Assoc. | Saltair (65%) | | | X | .47 high | 4L | Nearly level to gently sloping | | | Poor | Excess lime saline clayey erodes easily |
| | Libbings (20%) | | X | | .43 | | | | | Poor | |
| Sampete-Minchey Assoc. | Sampete (57%) | | | X | .10-.28 low-mod. | 8 | gently sloping | | | Fair | Lime |
| | Minchey (23%) | | | X | .32-.37 moderate | 4L | | | | Fair | Lime, stones |
| Chipeta-Persayo-Badland Assoc. | Chipeta (50%) | X | | | .43 high | 4L | gently sloping, gently rolling to steep | | | Poor | Saline, erodes easily |
| | Persayo | X | | | .49 high | 4L | | | | Fair | Excess lime, erodes easily, clayey, saline slopes |
| | Badland (13%) | | NO DATA | | | | | | | | |
| Rock land-shaley colluvial land-Castle Valley-Kenelworth | Rock land (60%) | | NO DATA | | | | gently sloping to very steep | | | | |
| | Shaly coll. land | | NO DATA | | | | | | | | |
| | Castle Valley (40%) | X | | | .37 moderate | 8 | | | | Poor | Excess lime, erodes easily, stones |
| | Kenelworth | | X | | .17 low | 8 | | | | Fair-Poor | Excess lime, stones |

The soil reconstruction potential for revegetation is based on several factors of soil characteristics (National Soils Handbook, Part II, 403.6). Based on the limited soil resources present in the area affected by the stripping, the reconstruction potential is rated poor to fair. Most soils are shallow, have a lime excess, high erodibility, and stony. Some soils also have a severe salinity problem.

Analysis of the total volume of available topsoil (EMRIA Report No. 16, 1979) indicates a lack of the recommended minimum topsoil for restoration due to the thinness of topsoil cover over some of the strippable areas. Secondly, greenhouse and geochemical tests indicate that the ground overburden is the poorest growth medium. In addition to being nutrient deficient, this overburden contains toxic levels of at least boron. Because of this problem, using overburden for topsoil must be very selective.

Erosion potential for the stripped area is high. Although Castle Valley is rated as having a moderate water erodibility factor (K value), when this is compared to the allowable soil loss (T value), the erodibility is quite significant. Wind erodibility factors can range from moderately high to low.

Trends in the Affected Environment

Estimates of sediment yields using the Universal Soil Loss Equation could range from 0.21 tons per acre per year to 2.24 tons per acre per year. Using an estimated cropping factor and comparing this to disturbed soil estimates, erosion rates could increase as much as 6 to 10 times for disturbed areas.

6. Water

Surface Water: Regionally, the Emery North Coal Tract is located in the southern end of Castle Valley within the Muddy Creek Watershed of the Dirty Devil River Basin.

Muddy Creek is a perennial stream that passes through the west side ofthe tract into the middle of Sections 12 and 13. Runoff from the tract is into Muddy Creek. The majority of the channels on the tract are ephemeral, going into a few intermittent tributaries of the Muddy. The lowland Muddy Creek channel grade is only 30 feet per mile. Surface runoff from the tract represents approximately one percent of Muddy Creek average annual runoff. This translates to 0.48 area inches or 88 acre-feet. Table 28 of EMRIA Report No. 16 shows mean monthly and annual water budgets for the Emery subarea.

The Muddy Creek floodplain covers a broad area in Section 12 but goes into a more restricted channel in Section 13 as it passes through the tract. GS conducted a flood frequency analysis for Muddy Creek for the 100 and 500-year peak flows. The 100-year peak flow is 4,590 CFS which is 1.2 feet above the medium flow. The 500-year peak flow is 6,390 CFS which is 15.1 feet above the medium flow. This flood hazard should be considered in all actions involving the flood channel.

Water Quality: Surface water quality is of lower quality than the underlying aquifers. The high total dissolved solid values put the surface water into a classification ranging from slightly saline to moderately saline water. More specific water quality sampling information is contained in the Appendix.

Water Quality: The quality of the groundwater varies from locality to locality. Water in the Ferron Sandstone below the "I-J" coal is apparently better quality than water in the underlying and overlying shales and water in streams. Around the town of Emery, water from the Ferron Sandstone is used for municipal and culinary uses. The quality of water from wells closer to the tract site ranges from slightly saline to very saline. While the groundwater may be suitable for some mining operations, it would have to receive treatment to make it useable for human consumption. Due to their salinities, some of these waters are now usable only for stock watering.

Seasonal Water use is provided by Muddy Creek for livestock and wildlife. Muddy Creek is also diverted by Station 9-3305 and is channeled to Emery for irrigation purposes. Croplands surrounding Emery are supported by this diversion. There are a few surface ponds on the tract.

Surface water use of the tract area is typical of small farming communities. The quantity of water applied annually to croplands averages 3.6 acre-feet per acre, according to reports of the Utah Division of Water Resources (1975, 1976). Coal-fired electric powerplants to the north, in operation or under construction, will use about 62,000 acre-feet per year, not all of which is consumed.

Groundwater - The general conditions of occurrence of groundwater for the tract is show in figure 83, page 193 of EMRIA Report No. 16. Groundwater is found in the Ferron Sandstone Member of the Mancos Shale. These are Cretaceous sedimentary rocks. The Ferron Sandstone Member is a municipal aquifer. It is of major significance to Emery because it provides potable water. Another aquifer-type found in the area is a shallow or perched aquifer formed by the Quaternary alluvium river terrace deposits and deeply weathered sandstone, then up the Blue Gate Shale and sillstone units of the Mancos Shale. The shallow or perched aquifer is around the tract.

Groundwater recharge area is along the east side of the Wasatch Plateau (see figure 80 of EMRIA Report No. 16). The groundwater movement is from the mountains and foothills to the east and southeast and discharges into the Muddy. Recharge to these aquifers is sustained by snowmelt and rainfall. Another source of recharge is from local irrigation practices.

Groundwater is a major contributor to streamflow and it provides the continuity of base flow in the perennial stream as well as the seeps, wet pasturelands and springs between the town of Emery and the tract.

A general groundwater availability map (figure 83 on page 193 of EMRIA Report No. 16) showing potential well yields was made by GSC. The map shows the Ferron Sandstone Member potential well yields of 5 to 50 gallons per minute (gpm), with the shales not being significant as a source of water. However, wells which intersect major fractures, particularly near the Joe's Valley Paradise fault zone, may yield as much as a few hundred gpm. The Emery municipal well and the Kemmerer Coal Company well, which are both artisian, are two good examples. On September 10, 1975, the GS Water Resources Division measured a flow fo 375 gpm from the Emery municipal well without pumping, and on May 3, 1973, Layne Western Company measured a flow of 343 gpm while pumping from the Kemmerer Coal Company well.

Groundwater is used by the city of Emery and local individuals for potable water supplies. It is also used for irrigation, stock and wildlife purposes. Water from both wells and springs are utilized.

Trends in the Affected Environment

Surface water and groundwater within the tract site would remain unaffected if mining did not take place. The water conditions would probably remain static, varying only with the climatic conditions.

7. Vegetation

Throughout the Central Utah Region, precipitation is the principal factor controlling the distribution of major vegetation types. Although portions of the Emery North Tract lie at more than 6,000 feet in elevation, they lie in the rain shadow of the Fish Lake Mountains and receive only 7 to 8 inches of annual precipitation. The severity of the arid climate is accentuated by the seasonal rainfall distribution which peaks in July to August when air temperatures and evapotranspiration potential are at a maximum. Another result of the arid conditions is high soil salinity which is produced by the upward migration of groundwater towards the land surface where it evaporates, leaving salts in the upper soil horizons. Part of the area consists of steep talus slopes with unweathered rock debris around the perimeter of the benches. Soils derived from such materials are juvenile and consist of very coarse, thin veneers where present, with little or no organic component. Thus, naturally occurring environmental conditions are very harsh. At the same time, it is these conditions which create the habitats to which the natural vegetation has become adapted. Potential for reclamation is contained in the Emery EMRIA Report No. 16.

There are four major vegetation community types on the Emery North Tract: salt desert shrub, pinyon-juniper woodland, saline or alkaline moist area (greasewood) community and agricultural lands (table 2.4).

The salt desert shrub community is the most extensive, making up 59 percent (1,200 acres) of the tract. This community is the most prevalent type on the lower portion of the tract, and is common throughout the intermountain region. It is usually considered to be an edaphic climax on Saline Valley Soils (Holgrem, et al., 1973), but may also persist where salt concentration is relatively low. It is composed of low, widely spaced shrubs and perennial bunch grasses. Total vegetal coverage is 8 to 20 percent. The composition of this type is variable, perhaps due to spatial variations in soil salinity; however, its appearance is quite uniform. Shadscale (Atriplex confertifolia) and galleta grass (Hilaria jamesii) have the highest coverage values in this community. Other species present are included in Appendix I.

The greasewood riparian community makes up 17 percent (340 acres) of the tract. Almost pure stands are found on the margins of Muddy Creek. It is found on heavy clay-rich, highly saline soils and is the principal phreatophyte of the Shadscale zone (Holmgren et al., 1973).

Pinyon-juniper woodland is the next largest community, making up 16 percent (320 acres) of the tract. Associated species are included in Appendix I.

The remainder of the tract, 8 percent (180 acres), is made up of agricultural lands. Most of these lands are planted to alfalfa, which is supported by irrigation.

TABLE 2.4

GROUND COVER AND PRODUCTIVITY FOR EMERY NORTH TRACT

| Community | Acreage | Percent | Average Ground Cover | Vegetative Productivity (lbs./acre)[a] |
|---|---|---|---|---|
| Salt Desert Shrub | 1,200 | 59 | 60 percent veg. & litter<br>40 percent bare ground | 525 |
| Greasewood | 340 | 17 | 70 percent veg. & litter<br>30 percent bare ground | 695 |
| Pinyon-juniper | 320 | 16 | 70 percent veg. & litter<br>30 percent bare ground | 1,000 |
| Agricultural | 180 | 8 | | |
| TOTAL | 2,040 | 100% | | |

a Estimated Yield

Source: EMRIA Report No. 16, 1979

Threatened and Endangered Species

An inventory of public lands near Emery, Utah, underlain by potentially strippable coal reserves, was conducted during portions of May, June and September, 1979. The subjects of the survey were candidate threatened and endangered plant species as proposed in the 1975 and 1976 Federal Register publications, which were generated as a result of the Federal Endangered Species Act of 1973 (Public Law 93-205). Also included in the search were rare, unusual, or unique species which have been suggested fo inclusion in future lists.

The survey of the approximately 20,000 acre KRCRA was conducted on a systematic section by section basis. The following potential or candidate threatened or endangered species were found to be present:

| Scientific Name | Recommended Status |
|---|---|
| Astragalus consobrinus | Threatened |
| Castilleja scabrida | Delist |
| Cryptantha jonesiana | Threatened |
| Cryptantha mensana | Sensitive |
| Hymenoxys depressa | Threatened |
| Parthenium ligulatum | Delist |
| Townsendia aprica | Endangered |
| Sclerocactus wrightiae | Endangered |

The occurrence of these species by township, range, and section for the Emery North Tract are shown in table 2.5.

TABLE 2.5
LOCATION OF THREATENED AND ENDANGERED SPECIES

| Township and Range | Section | Cryptantha jonesiana | Hymenoxys depressa | Lomatium junceum | Sclerocactus wrightiae |
|---|---|---|---|---|---|
| T22S, R6E | 5 | | | X | |
| | 7 | X | | | X |
| | 11[a] | | | | X |
| | 12[a] | | | | |
| | 14[a] | | | | X |
| | 18 | | | | X |
| | 19 | | | | |
| | 23[a] | | | | X |
| | 35 | | | | |

[a] Sections with tract

Trends in the Affected Environment

The expansion of the pinyon-juniper woodland into other communities has been noted on the Emery North Tract and may possibly be attributed to heavy grazing. Research throughout the intermountain region has shown the expansion of woodland into heavily grazed sagebrush or shadscale communities (Arnold et al., 1964; Cottam and Stewart, 1940; Pickford, 1932).

In addition to outright conversion of shrubland, other areas show evidence of alteration in floristic compostion and forage value, and possibly gross productivity, which may be due to grazing. Unpalatable shrubs, forbs and grasses have become established where the competition introduced from desirable browse plants have been reduced. Halogeton glomeratus, which was introduced from Central Asia, is common in the lower Shadscale zone and contains oxalic acid which may be toxic to cattle in large amounts. A prickly pear cactus (Opuntia polycantha) has become frequent in the upper Shadscale zone. The production value of the present vegetation is probably lower because of the past grazing history.

8. Wildlife

The proposed lease tract is located within low quality habitat for mule deer. A small number of deer can be found on or near the tract. These deer are permanent residents and occupy the area yearlong.

Deer density numbers have been estimated to be less than one deer per section (.72 deer/section) by Utah Division of Wildlife Resources (UDWR, Dalton, 1979). When compared to deer density numbers for the surrounding Manti and Bookcliffs deer herds, this number is extremely low. An average density figure for the Bookcliffs deer herd is 10.6 deer per section, while an average density figure for the Manti deer herd is 19.4 deer per section (UDWR, Dalton, 1979).

Muddy Creek is a perennial stream that flows through the proposed lease tract. UDWR has classified Muddy Creek as a nongame fish, Class 5 stream. It is of limited value as a fisheries. Fish species present are speckled dace, flannel mouth sucker, green sucker (blue head sucker) and roundtailed chub. The riparian zone along the Muddy Creek is important habitat for ducks, songbirds, deer, small mammals and raptors.

The endangered bald eagle is a winter resident of the region between mid-November and late March each year. Golden eagles may be found in the area year-round. To date, no concentrations of bald or golden eagles are known on the proposed lease tract. A bald eagle concentration area (roost site) has been identified near the junction of U-10 and I-70. Up to five bald eagles have been observed in one specific cottonwood tree (UDWR).

Peregrine and prairie falcons may occasionally be seen on or near the proposed lease tract. Both of these falcons are yearlong residents, and sighting of both species are fairly common in the Carbon-Emery County Areas. There are no known peregrine falcon, prairie falcon, or golden eagle aeries (nests) occurring on or near the proposed tract. Other birds of high Federal interest under that could occur on the tract include the golden eagle, prairie falcon, Ferruginous hawk, burrowing owl, Cooper's hawk, Western bluebird, and Scott's oriole. The use of this tract by any of these species would be considered as incidental. Therfore, the tract does not meet the criteria for classification as high priority habitat (USF&WS, 1979).

There are no known prairie dog colonies on the tract. Therefore, the possible occurrence of the black-footed ferret, which is on the threatened species list, or the burrowing owl, which is a species of high Federal interest is very remote. There are no other threatened, endangered or species of high Federal interest known to inhabit or migrate through the proposed lease tract (UDWR, Dalton and USF&WS, Johnson).

Other wildlife species found on or near the proposed lease area include cottontail rabbit, jack rabbit, bobcat, fox, coyote, small mammals such as and ground squirrel, woodrats, kangaroo rat, and several species of ducks and songbirds (perching birds). The American rough-legged hawk, which is not listed under Criteria No. 14, is present in the region and could occur on the tract. It could be affected by off site activities.

There are no wild horses and burros found on or near the tract.

Trends in Affected Environment

Trends in wildlife populations and habitat quantity and quality are summarized in table 2.6.

TABLE 2.6
WILDLIFE TRENDS

| Species | Population Trend | Habitat Trend Quantity | Quality |
|---|---|---|---|
| Mule deer | stable | decreasing | fair |
| Moose | cyclic | stable | good |
| Coyote | cyclic | stable | good |
| Fox | stable | stable | good |
| Rabbits | cyclic | stable | good |
| Raptors | increasing | stable | good |
| Ducks | stable | stable | fair |

Source: (UDWR, 1979)

9. Cultural Resources

The best represented prehistoric culture in the area is the Fremont culture (A.D. 650 to 1300). However, remains of the Paleo-Indian (big game hunters, ca. 12,000 B.C. to ca. 5,000 B.C.), Desert Archaic (hunters/gatherers, ca. 6,000 B.C. to Ca. A.D. 650), and Ute-Southern Paiute (hunters/gatherers ca. A.D. 1100 to the historic period) phases are also known from the region and may exist in the area. One 40-acre National Register site (42Em 392, Rochester-Muddy petroglyphs) has been identified on the tract. Thirty-six other cultural sites have been identified within the tract boundaries, some of which are considered potentially eligible for the National Register, especially petroglyphs, rock shelters and some prehistoric lithic manufacturies.

The region was settled by Anglo-Europeans in the late 1870s and a few historic signatures and remains of early mining efforts exist on the tract and to the east and south. None are considered potentially eligible for the National Register.

Based on earlier industrial-related cultural inspections and a recent sample, it is estimated that between 40 and 150 cultural sites may exist on the tract. Because of the incompleted nature of the archaeological survey which identified these sites, this number should only be regarded as an estimate of potential sites in the proposed area.

Trends in the Affected Environment

Because of increased population, access and availability of four-wheel drive recreational vehicles, cultural sites have suffered increasing vandalism in recent years. On the other hand, industrial actions have had to mitigate cultural damage which may have resulted in loss of resources in the past.

## 10. Visual Resources

Visual Resource Management Class II, III and IV exists within the proposed tract. The tract area is predominately a buff and tan outcrop which contains the Muddy Creek and its containing cliffs of 200 to 400 feet. Primary vegetation is pinyon-juniper on the mesa top and singleleaf ash and perennial grasses below the cliff in the talus areas. The Class II designation basically comes from the fact that the tract is visible from I-70. This highway receives 1,690 vehicles per day, or approximately 616,580 per year. Class III is the northeast portion of the tract and Class IV is the western half of the tract. Class II designation is the most restrictive class in visual resource management, second only to Class I areas which are designated National Parks, Primitive Areas, and Wilderness Areas.

### Trends in the Affected Environment

A review of the visual resource management classification for the tract area will be undertaken in 1983 as a planning update for the San Rafael Grazing Statement. It is not expected to change the existing classification. Subsequent planning revisions occur, roughly, on a 4-year cycle. It is unforeseen what management decisions may be which would change the existing management classes.

## 11. Recreation

Recreation access from the north and south into the tract area is through public lands. Dispersed recreation activities occur within the tract on a seasonal basis with the majority of use occurring in the spring. Approximately 400 visitor days are expected to occur per year. Activities represented are artifact collecting, rockhounding, ORV use, picnicking, hunting small game, and some scenic sightseeing. There are no public or private recreation developments on or adjacent (within 5 miles) to the proposed mine area.

The Rochester-Muddy Creek Petroglyph Panel, a National Register Site of 40 acres, is found in the center of Section 13. This panel has received national exposure through its National Register and local publicity and publication in the National Geographic Magazine (January 1980). This panel has increasing popularity for scenic sightseers, cultural resource professionals, and photographers.

The Emery North Tract lies in the Wilderness Inventory Unit UT-060-012. This unit was part of an accelerated wilderness review through the intensive phase as part of the Intermountain Power Project Environmental Impact Statement. However, the Sierra Club has filed an appeal to the IBLA on the IPP accelerated wilderness determination to drop this area from further consideration. Until this process is completed, the tract lands are to be managed as potential wilderness under the Bureau's Interim Management Guidelines.

### Trends in the Affected Environment

Dispersed recreation will continue throughout the county. It will not be expected that anything but a minor increase would occur over a 30-year period in the delineated tract. Urban recreation demands are anticipated to increase steadily as a result of continued energy development in the area.

## 12. Land Uses

The major land uses on the Emery North Tract are livestock grazing, rights-of-way, oil and gas leases, with minor uses for firewood and fence posts. The tract contains portions of two allotments; the Bunderson and Lone Tree Allotment (table 2.7). There are 100 allotments in the San Rafael Resource Area, for a total of 80,418 AUMs. The Bunderson (27 AUMs) and Lone Tree (2,750 AUMs) Allotments combined have 2,777 AUMs. The 61 AUMs contained in the tract would be less than one percent of the two allotments.

TABLE 2.7
GRAZING ALLOTMENTS IN THE EMERY NORTH TRACT

| Allotment Name | Total AUMs | AUMs in Tract | Number of Users |
|---|---|---|---|
| Bunderson | 27 | 27 | 1 |
| Lone Tree | 2,750 | 34 | 10 |
| TOTAL | | 61 | 11 |

Four utility easements for powerlines and an application for a railroad right-of-way exist on the tract (table 2.8). A large block of land in the tract has a State exchange application pending (table 2.10).

TABLE 2.8

RIGHTS-OF-WAY ON EMERY NORTH TRACT

| Existing R/W | Number | Location | Length of R/W on Tract |
|---|---|---|---|
| UP&L 345 KV Power line | U-22141 | T.22S-R6E | |
| | | Sec. 14 | .24 miles |
| | | Sec. 11 | .27 miles |
| | | Sec. 12 | 1.08 miles |
| UP&L 345 KV Power line | U-36469 | Sec. 14 | .2 miles |
| | | Sec. 11 | .27 miles |
| | | Sec. 12 | 1.1 mile |
| UP&L 138 KV Power line | U-36072 | Sec. 11 | .27 miles |
| | | Sec. 12 | 1.08 miles |
| Emery Town TV FM Power line | U-34614 | Sec. 1 | .49 miles |
| Communication Site | U-34614 | Sec. 1 | 1.78 acres |
| R/W Application | | | |
| Castle Valley RR (D&RGW) | U-35268 | T.22S-R6E | |
| | | Sec. 11 | .27 miles |
| | | Sec. 1 | .25 miles |
| | | Sec. 12 | .3 miles |

TABLE 2.10
STATE EXCHANGE APPLICATION

| | State Exchange Appl. | Acres |
|---|---|---|
| T.22S., R6E., SLB&M | | |
| Section 11, E 1/2 SE 1/4 | U-41322 | 80 |
| Section 12, S 1/2, S 1/2 NE 1/4, NW 1/4 NE 1/4 | U-41322 | 440 |
| Section 13, E 1/2, E 1/2 W 1/2, NW 1/4 NW 1/4, SW 1/4 | U-41322 | 560 |
| | Total | 1080 |

There are three oil and gas leases on the tract (table 2.9).

TABLE 2.9

OIL AND GAS LEASES ON EMERY NORTH TRACT

| | Lease # | Acres |
|---|---|---|
| T.22-R6E SLB&M | | |
| Section 1, Lot 2, N 1/2 SE 1/4, S 1/2 NE 1/4, SW 1/4 SE 1/4 | U-33931<br>U-42438 | 240.75 |
| Section 11, SE 1/4 NW 1/4. NE 1/4 NE 1/4, E 1/2 SE 1/4 | U-33933 | 80.00 |
| Section 12, S 1/2 S 1/2 NW 1/4, NW 1/4 NE 1/4 | U-33933 | 440.00 |
| Section 13, E 1/2, E 1/2 W 1/2, NW 1/4 NW 1/4, SW 1/4 SW 1/4 | U-33933 | 560.00 |
| Section 14, SW 1/4 NW 1/4, NW 1/4 SW 1/4 | U-33933 | 80.00 |
| Section 15, NE 1/4 NE 1/4 | U-33933 | 40.00 |
| | TOTAL | 1440.75 |

Local residents use the pinyon-juniper woodlands as a source of fuel wood and fence posts.

Consolidated Coal Company is now operating their Emery (Browning) underground mine 2 miles southwest of tract. They own fee land west and north of the tract. The Hollberg Preference Right Application, now controlled by Atlantic Richfield Company, borders the tract on the northeast.

Trends in the Affected Environment

By 1985 livestock grazing on the tract will be under more intensive management in an effort to try to maintain and/or restore vegetation productivity to these lands. It is possible that, in the near future, 1,080 acres of the tract would be transferred to the State under a State exchange application.

Oil and gas exploration would continue in this area, which could increase the surface disturbance.

With the increased use of firewood as a home heating fuel, the demand for firewood from the tract will increase.

13. Transportation and Noise

About 1.9 miles of local secondary road gives access to Utah Highway 10 (U-10) at Emery, which in turn gives access to loadouts at Mohrland (50 miles) and Salina (50 miles). The local road presently carries very little traffic. On U-10 southward from Castle Dale and on Interstate Route 70 (I-70) from Fremont Junction into Salina, present traffic is well within the capabilities of the roads to carry it. North of Castle Dale on U-10, the two-lane road is presently overloaded into Price and has been recommended by the Transportation Planning Division, Utah Department of Transportation, for upgrading to four lanes. Present traffic congestion in downtown Salina would be relieved by a proposed extension of I-70 to a junction with U.S. 89 southwest of Salina.

Trends in the Affected Environment

Traffic on U-10 has been increasing very rapidly during the 1970's due to the completion of I-70 into Salina at its south end and due to energy related developments along its length. Traffic counts made in 1978 in most places exceed projected traffic for 1990 based on 1975 data. South of Castle Dale, traffic volumes have remained low (700-2,600 vehicles per day (vpd) in 1978) despite a large percentage increase. North of Castle Dale, however, 1978 average annual daily traffic (AADT) ranged from 2,800 to 7,450 vpd, from south to north, with a maximum of 9,500 vpd at the junction with U.S. 6 in Price, reflecting traffic increases of 18 to 22 percent per year since 1970. Although traffic projections reflecting base data developed for the present study are not now available, the consensus amoung UDOT staff members is that traffic volumes are not likely to continue to grow for long at recent rates.

14. Social Economics

The primary areas that would be impacted by the proposed action (PA) include the areas of Ferron-Clawson (Emery County), Emery-Moore (Emery County) and Price-Helper-Wellington (Emery County). These three areas would receive 92 percent of the total population impacts. The remaining impacts (8 percent) would occur in other communities in Carbon, Emery, Sevier, and Sanpete Counties.

Ferron-Clawson - From 1970 to 1978 the population of the area increased from 812 people to 1,480 (82 percent), an average annual growth rate of 10.3 percent.

Emery-Moore - From 1970 to 1978 the population of this area increased from 265 to 397 (50 percent), an average annual growth rate of 6.2 percent.

Price-Helper-Wellington - From 1970 to 1978 the population of this area increased from 12,934 people to 18,400 (42 percent), an average annual growth rate of 5.3 percent.

From a county perspective the majority of the impacts would occur in Emery County (81 percent). Approximately 11 percent of the population impacts would occur in Carbon County. The remaining increases would occur in Sanpete and Sevier Counties.

Growth and decline in Carbon County and to a lesser extent in Emery County has historically been linked with the coal industry. When the coal industry expanded so did the surrounding communities. The history of the Utah coal industry has been one of rapid expansion and decline. The most recent decline (1950 through 1970) was caused by the poor market conditions for coal. Today the industry is in the midst of rapid expansion. This has resulted from the increased utilization of coal for electricity generation as well as the national trend towards coal utilization (Robison, 1977).

Of the 275 people employed in the Ferron-Clawson area, 94 (34 percent) are employed in the agriculture sector. Trade and government are the second and third largest employers in the area, employing 76 (28 percent), and 47 (17 percent) people, respectively.

In the Emery-Moore area mining, agriculture, and trade are the largest employers. Total employment in the area is 246. Of this, mining provides 100 jobs (40 percent), agriculture provides 94 jobs (38 percent), and trade provides 14 jobs (5 percent).

Employment in the Price-Helper-Wellington area is mostly in the trade, government, and services sector. Of the 6,258 jobs in the area, trade provides 1,538 (25 percent) jobs, government provides 1,205 (19 percent) jobs, and services provides 925 (15 percent) jobs.

## Trends in the Affected Environment

As the coal industry declined from 1950 to 1970, the population of Carbon and Emery Counties declined. For the foreseeable future the coal industry in Utah is expected to expand and prosper. Whether this expansion will again be followed by decline depends largely on the future energy technology and the extent to which it might replace coal. Population trends are shown in table 2.11.

TABLE 2.11

POPULATION BY COUNTY

| | | | | | Percent Change | | |
|---|---|---|---|---|---|---|---|
| County | 1950 | 1960 | 1970 | 1978 | 1950-60 | 1960-70 | 1970-78 |
| Carbon | 24,901 | 21,135 | 15,261 | 20,200 | -15.1 | -27.8 | +32 |
| Emery | 6,304 | 5,546 | 5,101 | 9,200 | -12.0 | - 8.0 | +80 |

Source: (U.S. Bureau of Census, 1970)

The population of the areas to be affected have shown similar trends, although the Salina-Redmond-Aurora area was not significantly affected by coal mining before 1970.

Ferron-Clawson - The population is projected to be 2,179 in 1987, 2,251 in 1990, 2,319 in 1995, and 2,257 in 2000. This is a 52.8 percent increase, an average annual growth rate of 2.4 percent.

Emery-Moore - The population is projected to be 491 in 1987, 525 in 1990, 554 in 1995, and 540 in 2000. This is a 36 percent increase, an average annual growth rate of 1.6 percent.

Price-Helper-Wellington - The population is projected to be 23,355 in 1987, 24,529 in 1990, 25,993 in 1995, and 26,453 in 2000. This is a 44 percent increase, an average annual growth rate of 2 percent.

## IV. ENVIRONMENTAL CONSEQUENCES

### A. Proposed Action

#### 1. Impacts

##### a. Air Quality

Particulates are the only pollutants which might significantly degrade air quality as a result of the proposed action. Increased emission of other pollutants, such as nitrogen oxides, sulfur oxides, carbon monoxide and photochemical oxidants would occur from vehicular traffic and sources associated with population growth, but the impact from the proposed action alone is expected to be small.

Particulate emissions from various mining activities were estimated using available emission factors (Pedco, 1978). It is estimated that approximately 750 tons per year of particulates would be emitted (480 tons from unpaved haul and access roads and 270 tons from mining activities) during strip mining. Approximately 405 tons of particulates per year would be emitted while undergrond mining occurs (385 tons from the unpaved haul and access road and 20 tons from transfer and storage sources). Fifty percent control of dust was assumed from watering of unpaved haul roads within the tract (which would be the minimum amount of control required under OSM regulations). Sources which would emit greater than 250 tons per year of any pollutant are presently subject to PSD permit review by EPA. Emissions from strip mining operations consist mainly of coal and soil particles.

No modeling was performed to estimate increases in pollutant concentrations. Because of the large size of the particulates that would be emitted from the mine and unpaved roads, most would settle out and be deposited on the ground within 1 mile or less downwind. Based on other studies, it is expected that annual average TSP increased concentrations would be below the 19 micrograms per cubic meter ($ug/m^3$) Class II increment. However, maximum 24-hour average concentrations could approach or exceed the Class II increment of 37 $ug/m^3$ in the immediate vicinity of the tract and any unpaved roads.

Some visibility reduction and atmospheric discoloration wouldoccur in the immediate vicinity of the mine and associated haul and access roads as a result of particulate emissions.

The nearest Class I area is Capitol Reef National park about 20 miles south of the tract. Considering the distance from the tract to Capitol Reef and the rapid fallout of particulates with distance from the mine and unpaved roads, impacts to air quality and air quality related values (including visibility) would be expected to be extremely small at Capitol Reef.

The coal from this tract has the lowest Btu content, highest ash and highest sulfur content of all the tracts studied. If burned in powerplants, this would lead to higher levels of TSP and $SO_2$ emissions to achieve a given emission rate, increased emission controls and, subsequently, increased costs of pollution control equipment would be needed.

b. Topography, Geology and Paleontology

The mining operation will change natural contour of the tractat the rate of 50 acres per year. By 1990, 100 acres will be disturbed, 350 acres by 1995 and 1,000 acres by the end of the operation. Drainage patterns would probably be changed to a minor extent. An additional 78 acres would be disturbed by mining related activities. Reclamation will begin 5 years after mining commences and will be done at the rate of 40 acres per year. The recontoured land would not be steep enough to cause landslides; however, until revegetation takes place, a potential for erosion which could result in rills and gullies.

Subsidence up to 90 percent of the thickness of the coal mined could occur on most of the 1,560 acres of the tract, and is affected by several variables including (1) mining methods, (2) overburden thickness, (3) extraction amount and rate, and (4) geometry of mine workings. Tension cracks occur above barrier pillars a few months after mining, while compression bulges are formed on the surface approximately 1.5 to 2 years after mining. Also, additional tension cracks may occur as the surface subsides several years after mining completion (U.S. Department of the Interior, 1979). However, Consolidation Coal Company's Emery Mine has experienced few problems with subsidence using the room and pillar method in the same coal field (BLM, 1979).

An unknown number of invertebrate, vertebrate, and plant fossils could be destroyed as the result of mining activities. However, discovery and preservation of fossils exposed by mining which otherwise would remain undiscovered could occur. Due to the lack of data on location of paleontological sites and the scientific or educational value of fossils, the extent of the impact cannot be determined.

c. Minerals

At a 85 percent recovery rate, 15 percent (2,381,000 tons) of coal in the surface minable seams and 60 percent (16,230,000 tons) of coal in the underground minable seams at a 40 percent recovery rate would be lost as would any coal in seams which are not presently considered to be economically minable.

Petroleum and uranium exploration could conflict with coal miningas could any oil and gas production and uranium mining. Since potential for either commodity is moderate, any impacts should be relatively minor and would exist only for the duration of the operation for the area to be mined by surface mining methods.

d. Soils

By the end of mine life, an estimated 1,073 acres would be disturbed as a result of strip mining operations. This disturbance would involve the removal of large amounts of soil, stockpiling, and redistribution of the soil material. Loss of the natural soil integrity and the creation of new soil complexes would result. This action would alter the soil horizonation and structure, which would, in turn, affect the permeability, infiltration rates, chemistry, available water holding capacity, microclimates, soil microbiology and erosion potential. All of these factors would have a direct affect on loss of soil productivity and reconstruction potential. Observation of the detailed soil maps in the Carbon-Emery Report illustrates that a sizeable percentage of the 1,073 acres do not have identified soil resources on them, i.e., rock outcrop, rock land, badland, etc. The majority of soil resources that would be affected are very shallow (less than 20 inches) and unproductive. However, an estimated 110 acres of agricultural land would be taken out of production. Underground operations using vent shafts would add an additional 5 acres to the already disturbed 1,073 acres.

An estimated 50 acres of land would be disturbed each year when actual mining begins in 1989. Temporary loss of soil productivity would result. The cumulative acreage disturbed for the window years of 1990 and 1995 would be 173 and 432 acres, respectively. Reclamation of this land is scheduled to begin in 1990. An estimated 20 acres plus vent shafts would not be reclaimed until after the end of mine life. Starting in 1987, an additional 24 acres of land offsite would be disturbed because of access roads, and an additional 7 acres for powerlines and telephone lines. Secondary impacts of acreage lost to new housing and related development is expected to be 118 acres. Soil production would be lost where all permanent structures occur on areas that would not be reclaimed.

All soils affected by the strip mining activities have a poor to fair rating for soil reconstruction material. Materials rated as poor have indications that revegetation and stabilization would be very difficult and costly. The total volume of available topsoil on the tract appears to lack the minimum 30 inches recommended by the EMRIA report. Top dressing with better material would be necessary to establish and maintain vegtation. This would create an additional offsite surface disruption due to the increased number of borrow pits required to supply topsoil.

Estimated cost for the restoration of 18 inches of topsoil (EMRIA Study) would range from $3,500 per acre to $7,000 per acre. The fractional breakdown of these cost estimates are found in the EMRIA Report #16, page 240.

Onsite erosion rates from water could be expected to increase 6 to 10 times the present rate of 0.21 to 2.24 tons per acre per year if strip mining occurs. Quantification for soil loss by wind was not undertaken because of the unpredictability of wind occurrence and velocity. However, the sandy loam textures found dominately throughout the tract have a high susceptibility to wind erosion. This process would be accelerated until final seedbeding takes place. However, estimated losses for wind erosion can range from 65 to 117 tons per acre per year (I value soil erodibility index for wind).

Long-term storage of the topsoil may also lead to biological "death" of microorganisms necessary to soil nutrients. Increased infiltration of space and topsoil banks may lead to mass wasting of topsoil or space which may decrease air quality as well as increasing sediment loading of streams.

e. Water

The coal to be mined is within the Ferron Sandstone Member of the Mancos Shale. The Ferron Sandstone, a municipal aquifer that supplies potable water to the town of Emery and local individuals. would be disturbed by both strip and underground mining. The presence of mine and equipment on and in the aquifer would raise the pollution potential for the aquifer. The surface drainage would be disrupted by strip mining. Since the tract is on both sides of Muddy Creek, mining operations would impact it. Operations would require creek crossing, possible flow diversion, and mining below the creek bed which could cause seepage losses from the creek. These impacts would have sediment loading increases. Sediment yields might increase locally, but the amount of increase would depend on the time of construction, location, extent of areas disturbed, type of mitigation and weather conditions during mining.

The proposed coal tract is located in the groundwater discharge area along the Muddy. The proposed method of strip mining to a depth of 200 feet would put the mining operation below the streambed and into the zone of groundwater. It is likely that water problems would confront the mining operations. Flooding by released groundwater plus surface flooding should be under constant consideration because there are possibilities for these types of events. Mine drainage could be required and the mine water may be discharged to Muddy Creek, creating additional pollution. Substances which usually follow underground coal mining could create rock fractures through which shallow or perched aquifers might be drained. Should this occur, wildlife or livestock might have to find an alternative water source.

Obtaining the 73 to 123 acre-feet per year, (54 to 126 acre-feet for municipal use and 35-acre feet for mining) needed to implement the proposed action would cause a reduction in the water available to other users. The impacts of withdrawing 75 to 123-acre feet per year from Muddy Creek Drainage would have the impact of lessening the dilution effect of higher quality water upon the system (table 3.1). Thus, the water available for downstream uses will increase slightly in salinity.

f. Vegetation

The impact on vegetation from surface mining would be complete loss of existing plant communities on approximately 73 acres by 1987, 173 acres by 1990, 432 acres by 1995, and a maximum of 1,073 acres by the end of surface mining in 2008. Underground mining starting around 2009 would eliminate an additional 5 acres for ventilation shafts. The major vegetation loss would be in the Salt Desert Shrub type and would be approximately 460 acres. Three hundred twenty acres of the pinyon-juniper type, 310 acres of greasewood and 110 acres of agricultural land would be lost. Loss of vegetation would be in Sections 12, 13 and the S 1/2 of the SE 1/4 of Section 14.

TABLE 3.1

PROJECTED WATER DATA OF THE EMERY NORTH TRACT

| ITEM | 1987 Per Year | 1987 Cum. | 1990 Per Year | 1990 Cum. | 1995 Per Year | 1995 Cum. | End of Surface Mine 2008 Per Year | End of Surface Mine 2008 Cum. | Start of Underground Mine 2009 Per Year | Start of Underground Mine 2009 Cum. | End of Underground Mine 2029 Per Year | End of Underground Mine 2029 Cum. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mining Water Use ac/ft/yr | 35 | 35 | 35 | 140 | 35 | 315 | 35 | 770 | 30 | 800 | 30 | 1370 |
| Population Increase | 241 | | 438 | | 516 | | 561 | | Same as 2008 | | | |
| Required Increase in Culinary Water Supply | 54 | | 98 | | 116 | | 126 | | Same as 2008 | | | |
| Required Increase in Sewage | 16 | | 29 | | 35 | | 38 | | Same as 2008 | | | |
| Consumptive Use of Water by Increased Population | 73 | | 104 | | 116 | | 123 | | Same as 2008 | | | |
| (Initial Use and Mining Less Sewage Effluent) | | | | | | | | | | | | |

Offsite vegetation loss by 1987 from support facilities such as access roads, powerlines and telephone lines would be approximately 31 acres. No additional vegetation loss from offsite facilities would occur after 1987. The magnitude of the impacts from these offsite facilities depends on specific locations, which were not available. Given the extent and sensitivity of the present vegetation and the severity of the climate, it is probable that the post mining environment would not be suitable for plant growth without significant long-term support for transplanted and seeded shrubs and grasses.

Sclerocactus wrightiae, officially listed as endangered, has been found in Section 14, and other threatened and endangered plants may be in Sections 12 and 13. Surface mining of these sections could destroy this cactus and its habitat within the mining area.

g. Wildlife

The proposed action would have an influence on all of the 2,201 acres of onsite wildlife habitat during some period of the 40-year mine life.

The removal of coal through strip mining procedures and the development of both onsite and offsite facilities would physically destroy 1,109 acres of low quality wildlife habitat before the mining operation is completed. The loss of 2,201 acres (1,109 through strip mining and 1,092 for human influence and occupancy) of habitat would reduce the carrying capacity of the range by 2.2 deer.

Strip mining activities along Muddy Creek would destroy riparian habitat which is important for use by deer, small mammals, raptors, songbirds and ducks. All riparian habitat areas are important in a semi-desert area. Any disturbance of the stream channel would degrade water quality by increasing sediment loads. This could result in reduced nongame fish populations in Muddy Creek below the proposed tract. The increased sediment and salt load could also have a negative impact on the fish species in the Colorado River. The losses to fish and wildlife resulting from the destruction of the riparian zone and stream channel along Muddy Creek cannot be quantified.

The number of small and medium-sized wildlife species that would be lost or displaced cannot be quantified. Offsite losses to these species will result from increased truck and vehicle traffic. When considering the widespread occurrence of these species and the availability of suitability habitat, losses resulting both on the tract and offsite should not be significant.

There would be some offsite losses to deer and raptors resulting from coal being transported on I-70 to Salina, Utah. Most of these losses would occur during the five month winter period. It's been estimated that 2 deer per month, or 10 deer per year, would be killed by the increased truck traffic. Over the 40 year mine life, this would result in a direct loss of 400 deer. The increased truck traffic along U-10 and I-70 would result in an undetermined loss of raptors.

The impacts which could occur to birds of high Federal interest are not known. However, because the use of this tract by any of the species listed under Criteria 14 would be considered as incidental and because the tract does not meet the criteria for classification as high priority habitat, there should not be any impacts to these species (F&WS, 1979).

h. Cultural Resources

Of the 37 known (and up to 150 estimated) cultural sites, all but three appear to be located on potential impact areas of strip mining. Again, however, this is a mere approximation and the precise impact areas would need to be inventoried to identify all sites, known and unknown, which might be impacted by proposed developments. Construction of access roads, core drill sites, plant facilities, powerlines and stripping of coal could destroy or these sites resulting in irreparable loss of scientific and educational information which is of unknown recreational potential. Most or all sites may require some degree of salvage excavation or other data recovery resulting in a loss of context of the artifacts and any data currently unrecoverable with existing techniques.

i. Visual Resources

The proposed action, excluding the off site facility development, would conflict with the management guidelines for Class II and III. Severe disruption to the existing landform would occur on a short-term and long-term basis. The area which is Class II is visible from I-70. Approximately 50 acres per year would be affected each year by actual mining. See table 3.2 for a time point analysis of the visual impacts. The facilities offsite would not significantly affect the visual resources since these would be in keeping with the present development in the Emery area.

j. Recreation

Access to public lands and the National Register Site on the mesa top would be restricted by the proposed action. Displacement of recreation visitors would be of minimal impact. The surrounding country offers comparable values and experiences. Increased recreational demand as a result of the anticipated employment would not result in a significant change to the dispersed nature of recreation in Emery County. Demand for urban recreation facilities (city parks, swimming pool, tennis courts) is expected to increase slightly in the larger communities.

k. Land Uses

Mining of the Emery North Tract would eliminate livestock grazing on approximately 1,073 acres of public land. This would amount to a loss of approximately 34 AUMs by the year 2000 all from the Lone Tree Allotment. This would be a 1 percent loss of AUMs from the total of 2,750 AUMs in that allotment. The 31 AUMs lost to offsite facilities would have negligible impact on livestock use.

There may be conflicts between oil and gas and coal resources if exploration and development are not closely coordinated by GS and various lessees. It is anticipated that there would not be any impacts to the existing rights-of-way, since coal management regulations require the coal lessee to maintain the integrity of the existing rights-of-way, either by avoiding them or having them moved.

TABLE 3.2

Time Point Analysis for Visual Impacts

| | 1987 | 1990 | 1995 | End of Surface Mine Life 2008 | Start of Underground Mine 2028 | End of Underground Mine 2034 | Final Reclamation 2034 |
|---|---|---|---|---|---|---|---|
| **VRM** | | | | | | | |
| Mining Operations | Moderate | Severe | Severe | Severe | Severe | Severe | Moderate |
| Facilities On Site & Coal Storage | Minimal | Moderate | Moderate | Moderate | Moderate | Moderate | Minimal |
| Facilities Off Site[a] | Minimal | Minimal | Minimal | Minimal | Minimal | Minimal | Minimal |
| **RECREATION** | | | | | | | |
| Mining Operations | Minimal | Minimal | Minimal | Minimal | None | None | None |
| Facilities On Site & Coal Storage | Minimal | Moderate | Moderate | Moderate | Moderate | None | None |
| Facilities Off Site[a] | None | None | None | None | None | None | None |

[a] Access Road, Powerline, Telephone Line

l. Transportation and Noise

Before A.D. 2000, surface mining would be taking place on the property, which would add 83 truckloads of coal per day (166 vehicles per day) to the anticipated traffic base. Workers at the mine would add about 108 vpd in auto and light truck passages. About 22 vpd would result from servicing the needs of the mine which would total about 400 vpd on the access road.

At U-10, this anticipated traffic would divide, depending on its destinations. If the coal were to be trucked to points north, about 242 vpd would go northward, 54 vpd south and west. If the coal were to be trucked to Salina, 76 vpd would go north and about 220 vpd to the south and west.

Service truck traffic from Price and coal truck traffic, if it goes northward, would tend to make a bad traffic situation worse if U-10 is not made into a four-lane highway before the mine traffic began to use it. Coal truck traffic would be an irritant in the smaller towns, both from the standpoint of noise and from interference with other traffic and pedestrians. Hauling coal to Mohrland near the south end of the crowded length of road would cause annual average daily traffic (AADT) to exceed 6,000 vpd in the vicinity of Huntington, a figure UDOT considers to be a warning sign of traffic overloads based on 1978 AADT without projections to 1990.

If coal were to go westward along I-70 into Salina, additional traffic would add 10 percent to 1978 traffic along this road, which carries a comparatively light load for a four-lane interstate highway. Commuter traffic to and from the mine would presently use underutilized sections of U-10 with small impact. Through most of rural Utah, traffic accidents increase generally in proportion to traffic volume.

On the average, diesel trucks that would be hauling coal produce about 95 decibels, "A" scale (dBA) traveling at road speeds measured 50 feet away. A 40 percent increase in sound intensity from 95 dBA to about 98 dBA would result when two such trucks pass each other.

m. Social Economics

The total population increase resulting from the Proposed Action is projected to be 241 people in 1987, 438 in 1990, 516 in 1995, and 516 in 2000. Growth would mainly occur in the Ferron-Clawson (54 percent), the Emery-Moore (27 percent) areas of Emery County, and the Price-Helper-Wellington area (11 percent) of Carbon County.

The remaining growth would be spread among several other communities in Carbon, Emery, Sanpete, and Sevier Counties. Of these, no single community would receive a sufficient population increase to cause significant impacts.

Ferron-Clawson - The greatest growth of population (54 percent) would occur in this area. The population increase would be 130 people in 1987, 232 in 1990, 268 in 1995, and 284 in 2000. The baseline population projection for the same years in the area are 2,179, 2,251, 2,319, and 2,257 respectively. The projected growth represents a 6 percent increase over the baseline in 1987, 10 percent in 1990, 12 percent in 1995, and 13 percent in 2000, and when combined with the baseline, represents a 72 percent increase in year 2000 over the present (1978) level of 1,480. These population increases would increase the average annual growth rate from 2.4 percent to 3.3 percent.

Emery-Moore - Approximately 27 percent of the population growth associated with the PA would occur in this area. The population increase would be 67 people in 1987, 117 in 1990, 134 in 1995, and 141 in 2000. The baseline population projections for the same years are 491, 525, 554, and 540 respectively. The projected growth represents a 14 percent increase over the baseline in 1987, 22 percent in 1990, 24 percent in 1995, and 26 percent in 2000, and when combined with the baseline, represents a 71 percent increase in year 2000 over the present (1978) level of 393. These population increases would increase the average annual growth rate from 1.6 percent to 3.3 percent.

Price-Helper-Wellington - Approximately 11 percent of the population growth attributable to the PA would occur in this area. The population increase would be 24 people in 1987, 48 in 1990, 59 in 1995, and 71 in 2000. The baseline population projections for the same years are 23,355, 24,529, 25,993, and 26,453, respectively. The projected growth represents a .1 percent increase over the baseline in 1987, .1 percent in 1990, .2 percent in 1995, and .2 percent in 2000, and when combined with the baseline represents a 44 percent increase in year 2000 over the present (1978) level of 18,400. These population increases would increase the average annual growth rate from 1.9 percent to 2 percent.

2. Mitigating Measures

a. Air Quality

The Central Utah Coal ES (USGS, 1979) stated "...each mining plan and the Department's approval thereof shall use at a minimum, an appropriate combination of the following fugitive dust controls:"

- Pavement or equivalent stabilization of all haul roads used or in place for more than 1 year;
- Treatment with semipermanent dust suppressant of all haul roads used or in place for less than 1 year or for more than 2 months;
- Watering of all other roads in advance of and during use whenever sufficient unstabilized material is present to cause excessive fugitive dust;
- Reduction of fugitive dust at all coal dumps and truck to crusher locations through use of negative-pressure bag house or equivalent methods. Inclusion of conveyor and transfer point covering and spraying and the use of coal loadout silos.

In the above measures, the term haul road should be interpreted to include roads used for haulage of coal and major mine access roads. Bussing of employees to and from work would result in less impact to air quality and visibility than allowing workers to drive their own cars.

b. Topography, Geology and Paleontology

Disturbed area should be graded to the natural contour and revegetated as required by OSM regulations. BLM should be notified upon the discovery of a significant paleontological site and the site should be salvaged prior to any further mining activity.

c. Minerals

Any exploration conducted by a uranium or petroleum company would require coordination between the exploring company and the coal company.

d. Soils

The information and recommendations in the EMRIA Report should be utilized as a model for soil reclamation and revegetation. Some of the more critical reclamation measures that apply to this tract are:

- Initially, at least 6 inches of topsoil must be removed over the pit and stockpiled;
- Topsoil to qualify for stockpiling must have an exchangeable sodium ratio (SAR) less than 15 (clay ratio less than 40 percent) and be 6 inches or greater in depth;
- Stockpiled topsoil must be protected from wind and water erosion;
- Overburden must be tested a minimum of twice annually to determine the presence of adverse contaminants. All overburden materials deemed suitable should be mapped and graded according to their ability to support plant growth.
- The timing and treatment of stockpiled soil and surface treatment as recommended in the EMRIA Report (pages 242 to 248) should be utilized to insure minimum adverse impacts.

e. Water

It is essential that mining operations be kept out of the floodplain. Flood flows of around 4,590 CFS coming down the channel are definitely high hazards to human life and mining equipment. Besides, there are EO's (Floodplain Management and Wetland Management) requiring this area to be protected. Since some of the area of the strip mining will be below the depth of the streambed, any accidental blockage of the channel could divert the whole flood into the pit if precautions are not taken. Mitigation measures of a 300 foot buffer zone beyond the floodplain on both sides of Muddy Creek is advisable.

To keep sediment loads to a minimum, stream crossing should be localized to a few spots. Bridges should be constructed as a minimum high quality crossing. All equipment should be kept out of the Muddy Creek channel. Additional contouring of the stripped area's overburden and restructuring of surface drainage will also reduce sediment loading.

Since the operations will be conducted on a municipal aquifer, all sanitation facilities should be self contained and disposed of away from the aquifer by way of legal methods. Practices to prevent spillage of fuel oils and other contaminants in the area should be implemented.

f. Vegetation

It is recommended that mined and disturbed areas be seeded to as many native species as possible with the addition of introduced species that have proven successful locally to return the vegetation to the original level of productivity or better than that which was existing before mining. Refere to EMRIA Report No. 16, page 242-248 for a detailed description of reclamation maeasures. Reclamation of the mined area should support the existing levels of livestock grazing, wildlife habitat and vegetative covering. be seeded to as many native species as possible with the addition of introduced species that have proven successful locally. To return the vegetation to the original level of productivity or better than that which was existing before mining, refer to EMRIA Report No. 16, pages 242-248 for a detailed description of reclamation measures. Reclamation of the mined area should support the existing levels of livestock grazing, wildlife habitat, and vegetation cover.

Before any surface disturbance is initiated, an onsite survey to determine the exact location of the T/E species would be required.

Proposed leasing and disturbance of a known T/E species or its habitat would require formal consultation with the Fish and Wildlife Service and a decision from the Endangered Species Committee. Pending the results of consultation and a site specific survey, certain identified underground mining areas could possibly be leased with no surface occupancy.

g. Wildlife

The loss of habitat for deer and other small and medium-sized wildlife species on the tract could be mitigated by requiring the company to revegetate 1,078 acres of disturbed area. However, reclamation efforts will maintain the quality of wildlife habitat that existed before mining. A seed mix that would produce a species composition of one-third grass, one-third forb and one-third browse would be most desirable for wildlife. Reclamation efforts should start no later than 2 years following the disturbance of the surface area involved. Attempts at revegetation should be required until a successful vegetation composition has become established on the disturbed areas.

Prior to any surface disturbance there should be an on the ground investigation of the tract to ensure that important habitat for birds of high Federal interest (Criteria No. 14) will not be destroyed.

To minimize negative impacts to duck, songbird, deer and fisheries habitat, the stream channels and adjacent riparian vegetation along Muddy Creek should not be disturbed for a distance of 300 feet on each side of the stream.

h. Cultural Resources

Some potential impacts to cultural sites may be avoided by moving or adjusting the location of surface facilities. This would preserve the sites and data in place and is most preferable and economical. Where impacts are unavoidable (such as in strip mining), salvage of significant sites would be necessary. To determine the appropriate course of action, the lessee would be required to provide a qualified archaeologist approved by BLM's authorized officer. This archaeologist would intensively survey impact areas prior to any surface disturbance and propose needed mitigation. Based on the archaeologist's recommendations, BLM would develop a mitigation plan after consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation. The lessee would then be required to comply with that plan before construction could proceed.

It is recommended that the 40 acre area designated as a National Register of Historic Sites locale (42Em392 along Muddy Creek) be withheld from leasing. This coincides with the MFP recommendation that the National Register site is unsuitable for coal leasing under unsuitability criteria number 7.

i. Visual Resources

The proposed strip mining should leave the escarpment undisturbed, so that the coal cliff line of the Molen Reef on the east, southeast portion of the tract would be natural as viewed from the Rochester-Muddy National Register Site and I-70.

j. Recreation

No mitigating measures are needed as dispersed recreation will naturally adjust to adjacent areas and urban recreation demands will be met of other energy and support programs. As discussed in the preceeding VRM section, an additional 20 acres should be added to the existing National Register property to protect the scenic and scientific value of this unique rock art panel.

k. Land Uses

Unmined areas within the tract should be left available for livestock grazing, so far as safety to the animals is maintained. Early coordination between oil and gas and coal lessees and the GS, would be required to facilitate development of these resources.

1. Transportation and Noise

Watering or paving of the access road would be required to reduce dust and improve safety conditions.

All motorized equipment must be muffled to produce not more than 80 dBA at 35 mph under acceleration measured at a distance of 50 feet.

3. Residual Unavoidable Adverse Impacts

a. Air Quality

The mitigating measures listed for fugitive dust control would reduce particulate emissions by a substantial amount, although unquantifiable at this time. Emissions resulting from population growth would not be altered by the mitigating measures.

b. Topography, Geology and Paleontology

The topography and local drainage patterns will be changed as the result of the mining. The Ferron Sandstone would be completely disrupted by the mining. Mining the coal would destroy an undetermined amount of floral, vertebrate and invertebrate fossils.

c. Minerals

Coal in seams which cannot be economically mined and 18,611,000 tons of coal which are unrecoverable, would be lost. Exploration for uranium and petroleum on the tract would be difficult while mining is taking place on 375 acres being surface mined.

d. Soils

There would be a loss of the soils morphology on 1,930 acres, i.e., soil horizonation, structure, alteration of the permeability and infiltration rates, as well as the available water holding capacity, soil microbiology and microclimates. Soil development is a very slow process and with the semiarid climate, this process is significantly slower. Thus, the restoration or duplication of the original soil may take thousands of years or may be irretrievable. With reclamation and additional topsoil being brought in, the productivity may increase. All of these factors are directly related to reconstruction-revegetation potential. There would also be a loss of soil productivity on all sites with permanent structures.

e. Water

Mining would divert 73 to 123-acre feet of water per year for the life of the tract. Changes in water quality would be increased sediment loading which would vary with the mining operation and climatic conditions. Surface expression of water would be changed if subsidence occurred.

f. Vegetation

Possible loss of 1,073 acres of existing plant communities for a period of 5 to 50 years.

Possible loss of plants and habitat for one endangered plant, Sclerocactus wrightiae. The final decision would come from the Endangered Species Committee.

g. Wildlife

Twenty-five acres of access road, powerline and telephone line rights-of-way would not be revegetated, resulting in a permanent loss of wildlife habitat.

h. Cultural Resources

Some unknown or surficially undetectable (i.e. buried) cultural resources may be damaged by construction of various facilities. Context of artifacts and data currently unrecoverable using existing techniques would be lost also. Exposure of the Rochester-Muddy Petroglyphs as an isolated unmined area would increase visitation and possible vandalism or destruction by rock art collectors. However, this would be mitigated somewhat if the petroglyph area was only part of a larger unmined strip along Muddy Creek.

i. Visual Resources

Modification of the natural landform would occur with significant impacts on the Class III area. The resulting landform would be noticeable as an unnatural intrusion since rehabilitation to the original visual character is unlikely.

j. Recreation

Displacement of dispersed recreation use patterns would occur into adjacent areas.

k. Land Uses

Loss of 34 AUMs for livestock grazing at a rate of approximately 2.0 AUMs per year to end of mine life, and then 5 to 20 years longer for reclamation.

l. Transportation and Noise

Most of the impacts of increased traffic would occur on U-10 from Price southward, decreasing southward to the vicinity of Castle Dale.

## 4. Short-Term Use and Long-term Productivity

The topography of the tract will be altered at the rate of 50 acres per year due to the mining. In 1987, 73 acres would have been disturbed due to road construction and other activities. Mining would have disturbed 100 acres in 1990, 350 acres in 1995 and 1,000 acres by the end of the operation. Reclamation would be scheduled to be done at the rate of 40 acres per year, with 203 acres restored by 1995. The rest of the tract would be reclaimed with 5 years after cessation of mining. Any paleontological sites discovered and salvaged now would not be excavated in the future when recovery and analysis techniques and research orientation may be improved, but collection of fossils now could contribute to present knowledge.

The extraction of the coal would be an immediate commitment of the resource of which 24,389,000 tons of 43,000,000 tons of coal would be recoverable, while the remaining is not. Conflicts between exploration for petroleum and uranium, and coal mining could occur during the life of the operation.

Short-term soil and vegetative productivity would be lost on 1,073 acres from mine site development due to the proposed action. Revegetation of the disturbed areas would be required, and productivity would be regained over time following successful reclamation. Long-term productivity would also be lost on soils due to housing and related development and increased borrow activities. Habitat for Sclerocactus wrightiae could be lost.

After mining ceases on the tract and the land is reclaimed, water production should be about the same as it was before mining. If the increased population due to mining remained, then, of course, use would continue and the pollution potential for the Muddy Creek drainage would remain.

There would be a temporary reduction in deer, raptors and small and medium-sized wildlife species on and off the tract while the mine is in operation and until vegetation becomes reestablished after the mine life has expired. The loss of habitat (2,201 acres) would reduce the capability of the range to support 2.2 deer and 60 deer over the life of the mine. The long-term productivity for all wildlife species should be equal to present levels on the tract approximately 15 to 20 years after the life of the mine. After this period of time, a variety of grasses, forbs, trees and shrubs should have become reestablished. Habitats for most species of wildlife should be restored.

Cultural sites thought now unimportant may later be recognized as significant. Any prehistoric sites salvaged now could not be excavated later with better data recovery and analysis techniques and improved research orientations. However, materials collected and analyzed now would contribute to improved understanding of the area's cultural resources and thus contribute to future research.

Short term ue of the area for coal mining would not meet the existing visual resource management classes. Restoration of the area after mining would meet the Class II objectives, but would not meet the Class II and III visual resource management objectives on those existing classified areas. Dispersed recreation will gradually return after the area is reclaimed.

Over the short term, a loss of 34 AUMs per year would occur. Long term grazing capacity would be restored to existing levels or better.

5. Irreversible and/or Irretrievable Commitment of Resources

Termination of coal mining would lead to a termination of pollutant emissions. Thus, the air resource would not be irreversibly committed as a result of mining. Emissions from secondary growth and related activity such as traffic, urban fuel consumption, etc., induced by the proposed action would be more permanent and result in a long-term commitment of the air resource to some deterioration.

Some changes in topography and drainage would occur, but the changes are not expected to be extensive. An unknown number of plant, vertebrate and invertebrate fossils would be displaced, damaged or destroyed.

Leasing this tract would irretrievably commit 24,389,000 tons of coal to be mined, with the remaining 18,611,000 tons being lost.

Addressing the productivity standpoint, there would be no irreversible or irretrievable impacts on the soil resources providing successful reclamation.

Interruption of the Ferron Sandstone aquifer would be irreversible. Drainage patterns into Muddy Creek could be permanently altered.

Strip mining of T/E habitat would eliminate the particular T/E plants from the tract permanently.

The proposed development would result in a loss of habitat quality and productivity (carrying capacity capabilities) for deer and other wildlife species for the entire mine life plus 20 to 40 years. The loss of 60 deer during the mine life are irretrievable. All loss of deer and raptors resulting from truck and vehicle traffic during the mine life are irretrievable.

The number of small and medium-sized wildlife species that will be lost or displaced cannot be quantified.

Any cultural site information damaged or lost during salvage excavations due to current methodological inadequacies would be irreversibly and irretrievably destroyed. Rochester-Muddy Petroglyphs would suffer irreversible change in their surroundings, which would alter their quality and the quality of the viewing experience signficantly. This would be partially mitigated by leaving a strip unmined along the length of Muddy Creek; temporary impairment is certain.

Cumulative loss of 850 to 1,530 AUMs to the livestock operators over the life of the mine.

## 6. Net Energy Balance

The new CEQ regulations (November 1979) require that a net energy analysis be discussed indicating the energy requirements of an action compared to the anticipated energy yields. The accompanying Net Energy Summary Sheet (table 4.1) estimates the amount of energy in the coal produced, the energy expended in its production, and the energy left in the ground as not being economically recoverable.

The energy input shown, as needed for "Production and Transportation" includes all energy required to produce the coal and transport it to a rail shipping point. This comprises fuel used directly or as electricity for mine production, truck transportation of coal and transportation of personnel and supplies -- the energy used for manufacturing the mining and transportation equipment and for constructing facilities -- the energy used for manufacturing supplies -- the petroleum used in hydraulic fluids, lubricants, and explosives -- and hydrocarbon in feedstocks used in supply manufacture.

The energy input shown as required for "infrastructure" includes the energy consumed as electricity, natural gas, heating oil, and gasoline by mine employees and families, by the similar number of service employees who support, and by a proportionate number of commercial establishments.

Rail shipment of coal requires about 600 btu's per ton/mile in the form of direct energy. A similar amount is consumed indirectly and by associated infrastructure. About one-half percent of the energy in coal is required to transport it 100 miles by rail.

Energy consumption is considered as beginning for electricity with coal deliveries to the generating station -- for petroleum products with deliveries to area supplies -- and for natural gas with deliveries to consumers.

Net energy analyses made for tracts in the Hams Fork-Green River Region included full allowances for unrecovered resources in the deposits from which energy minerals would be supplied to the proposed sale tracts. These allowances were not included in this analysis. This item appears useful only in the tract being considered for lease sale. In any case, the item is meaningless without evidence as to the ultimate recovery of coal, oil, and gas both with and without the lease sale. Allowances for unrecovered coal in the mines (which are all underground), that would supply electricity to the tract would be equal to the coal burned. Allowances for unrecovered oil and natural gas is considered to be about 2.2 times that recovered (verbal communication from Albert G. Melcher, Project Manager, Energy Division, Colorado School of Mines Research Institute).

# TABLE 4.1

## NET ENERGY SUMMARY SHEET

**SITE:** Emery North

**BLM:** Utah

| | | Surface Mining Period | | Underground Mining Period | | Total Life-of-Mine |
|---|---|---|---|---|---|---|
| | | Annual | Total Period 20 Yr. | Annual | Total Period 20 Yr. | Total Mine Life 40 Yrs. |
| 1. | Energy Output Btu's | 13,640 | 272,800 | 10,880 | 217,600 | 490,000 |
| 2. | Energy Input Direct & Indirect Btu's | 840 | 16,800 | 509 | 10,180 | 26,980 |
| 3. | Unrecovered Resource Btu's | | 47,890 | | 326,220 | 374,110 |
| 2.1 | Production/Transp. | | | | | |
| | Petroleum | 285 | 5,700 | 104 | 2,080 | 7,780 |
| | Natural Gas | 58 | 1,160 | 43 | 860 | 2,020 |
| | Coal | 359 | 7,180 | 172 | 3,440 | 10,620 |
| | Hydro Power | --- | --- | --- | --- | --- |
| | Nuclear | --- | --- | --- | --- | --- |
| | Other | --- | --- | --- | --- | --- |
| | Total | 702 | 14,040 | 319 | 6,380 | 20,420 |
| | Ratio Output/Input | 19.4 | | 34.1 | | 27.3 |
| 2.2 | Infrastructure | | | | | |
| | Petroleum | 53 | 1,060 | 73 | 1,460 | 2,520 |
| | Natural Gas | 44 | 880 | 60 | 1,200 | 2,080 |
| | Coal | 41 | 820 | 57 | 1,140 | 1,960 |
| | Hydro Power | --- | --- | --- | --- | --- |
| | Nuclear | --- | --- | --- | --- | --- |
| | Other | --- | --- | --- | --- | --- |
| | Total | 138 | 2,760 | 190 | 3,800 | 6,560 |
| | Ratio Output/Input | 98.8 | | 57.3 | | 74.8 |
| 2.3 | Total 2.1 + 2.2 | | | | | |
| | Petroleum | 338 | 6,760 | 177 | 3,540 | 10,300 |
| | Natural Gas | 102 | 2,040 | 103 | 2,060 | 4,100 |
| | Coal | 400 | 8,000 | 229 | 4,580 | 12,580 |
| | Hydro Power | --- | --- | --- | --- | --- |
| | Nuclear | --- | --- | --- | --- | --- |
| | Other | --- | --- | --- | --- | --- |
| | Total | 840 | 16,800 | 509 | 10,180 | 26,980 |
| | Ratio Output/Input | 16.2 | | 21.4 | | 18.2 |

## V. CONSULTATION AND COORDINATION

Dykman, James, Utah State Historic Preservation Office (USHPO).

United States Fish and Wildlife Service (USF&WS) (Clark Johnson) was contacted for information pertaining to threatened and endangered species and migratory birds (Criteria No. 14).

Utah Department of Transportation, Transportation Planning Division.

Utah Division of Wildlife Resources (UDWR), (Larry Dalton), Southeastern Regional Office was contacted for input into the wildlife section of the environmental analysis.

Weed, Carol, Project Supervisor, 1981 Coal Leasing Cultural Inventory, New World Research, Pollack, Louisiana.

# APPENDIX I

## Salt Desert Shrub Community

| | |
|---|---|
| Atriplex confertifolia | Eriogonum corymbosum |
| Xanthocephalum sarothrae | Artemisia pygmaea |
| Ambrosia acanthicarpa | Cymopterus bulbosus |
| Artemisia bigelovii | Lepidium montanum |
| Eriogonum cernuum | Eriogonum hookeri |
| Astragalus asclepiadoides | Tetradymia spinosa |

Especially common on clay barrens are:

| | |
|---|---|
| Atriplex cuneata | Atriplex corrugata |
| Eriogonum inflatum | Eriogonum gordonii |
| Atriplex powellii | Camissonia scapoidea |
| Phacelia demissa | Cleomella palmerana |

## Pinyon-Juniper Woodland Community

| | |
|---|---|
| Juniperus osteosperma | Optunia polyacantha |
| Pinus edulus | Culanthus crassicaulis |
| Amelanchier utahensis | Yucca harrimaniae |
| Artemisia tridentata | Schoencrambe linifolia |

Species especially common on rim rock and cliff systems:

| | |
|---|---|
| Cercocarpus intricatus | Thelypodiopsis divaricaata |
| Cercocarpus montanus | Astragalus desperatus |
| Cowania mexicana | var. petrophilus |
| Ephedra viridis | Cryptantha spp. |

## Saline or Alkaline Moist Area Community

| | |
|---|---|
| Sarcobatus vermiculatus | Distichlis stricta |
| Juncus arcticus | Aster brachyactis |
| Salix exigua | Aster pauciflora |
| Scirpus maritimus | Chrysothamnus linifolius |
| Typha latifolia | Tamarix ramosissima |
| Suaeda spp. | Bassis hyssopifolia |
| Oxytenia acerosa | Polypogon monspeliense |

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