0008

UtahAmerican Energy, Inc.

February 19, 2004

Pam Grubaugh-Littig
Permit Supervisor
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Incoming
C/007/013

Re: 04-004 Copy of the Kaiser Steel Corporation South Lease Coal Property PAP.

Dear Ms. Grubaugh-Littig,

Enclosed you will find (1) copy of the Kaiser Steel South Lease Coal Property Application. A copy was requested by DOGM to be used as a reference only.

This copy of the Kaiser Application is to be used as a reference by DOGM and is not to be amended to the Lila Canyon Extension Application. All applicable referenced portions of the Kaiser Application have been included in the Lila Canyon Extension Application.

Because the Kaiser Steel information is being submitted for reference only, C1 and C2 forms are not included.

Should you have any questions please call.

Sincerely,

R. Jay Marshall

R. Jay Marshall
Project Engineer

ile in:
- ☐ Confidential
- ☐ Shelf
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Refer to Record No 0008 Date 02192004
In C0070013, 2004, Incoming
For additional information

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APPLICATION FOR AN UNDERGROUND COAL MINE PERMIT

KAISER STEEL CORPORATION
SOUTH LEASE COAL PROPERTY
EMERY COUNTY, UTAH

VOLUME 2 OF 7

CHAPTER

III OPERATION AND RECLAMATION PLAN (PART 1 OF 2)

APPLICATION FOR
AN UNDERGROUND COAL MINE PERMIT
FOR
SOUTH LEASE COAL PROPERTY
EMERY COUNTY, UTAH

Submitted to

State of Utah Natural Resources & Energy
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 44114

by

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Sunnyside, Utah 84539

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3.1 Scope

This chapter covers requirements for the reclamation and operation plan under UMC 784.

Continuous miners will be developing entries, longwall gates and extracting coal by the room and pillar mining method during the initial 5-year permit term. Longwall panels will be added after this initial permit term. A detailed operations plan complete with plates showing techniques, procedures and mining sequence is presented in this chapter.

Construction, use, duration of use, descriptions and reclamation of the proposed facilities are discussed in detail in this chapter. These facilities were planned so as to minimize any impact to the environment.

Reclamation plans including schedules, costs and methods are presented in this chapter.

In this chapter, years of mining and the construction schedule of facilities are given as A+1, A+2, etc. Point A is designated as the point of approval of the initial 5-year permit. The years of development work and mining are numbered consecutively from this point in time.

3.2 Surface Buildings and Construction Plans

The Sunnyside seam will be accessed from the Little Park Wash area and the base of the Book Cliffs. Surface facilities will be located in both of these areas (Plates III-1 and III-IV).

The waterline, water tanks, permanent unit train loadout and 36-inch overland conveyor will be constructed after the initial permit term. These proposed facilities are also located on Plates III-1 and III-10 to show the probable future expansion of this mine. A preparation plant is not a consideration at this time, however, market conditions may alter this decision.

The proposed surface facilities are discussed in the following sections according to the State of Utah Application Guidelines.

3.2.1 Site Selection and Preparation

Safety, the environment and early coal seam development were major considerations for the site selection of the proposed facilities.

The site on the top of the Book Cliffs provides early access to the coal seam for both development and examination of mining conditions. The site at the base of the Book Cliffs was selected because of its central location for the first 30 years of mining, its easy access and proximity to surface transportation and power. In addition, this location minimizes disturbance to the environment because it requires less excavation for the railroad loop, access road and portals than the other sites examined.

Site preparation for the two locations will consist of topsoil removal, stockpiling and construction of sedimentation structures. It will also include the establishment of the proposed access road to the base of the Book

3.2 Cont.

Cliffs, as well as the preparation for the temporary offices and bathhouses and other facilities at both the base and top of the Book Cliffs.

3.2.2 Portals

The Sunnyside seam will be accessed from two areas, the Little Park Wash area at the top of the Book Cliffs, and almost directly below at the base of the cliffs. Access from the Little Park Wash area is necessary to assess mining conditions. The two slopes at the base of the cliffs will provide permanent access to the Sunnyside seam. The locations of these slopes are shown on Plates III-1 and III-10.

Two 12 percent slopes, a man slope and a coal slope, will be driven from the base of the Book Cliffs. Both slopes will be driven simultaneously. The excavation cycle will consist of alternating drilling, blasting and mucking. The simultaneous excavation of two slopes simplifies ventilation designs, making compliance with federal and state regulations easier.

The portal structures for these 12 percent slopes will be concrete collars set into the hillside. These two slopes will each be approximately 4,900 feet long. They will be slightly arched with additional roof support in the Mancos Shale. Based on geologic data, approximately 3,000 feet of excavation will be in the Mancos Shale. In rock other than the Mancos Shale, these slopes will be rectangular in section.

The man slope will be used for tracks, roadways and waterlines. The coal slope will be used for conveyors, power and waterlines. These slopes are shown in detail on Plates III-11 and III-12.

3.2 Cont.

An initial access downslope of approximately 23 percent gradient will be driven from the surface near the Little Park Wash to the Sunnyside seam. Construction will begin and be completed during year A+1.

The portal will have a concrete collar and the inside dimensions will be approximately 8 feet x 20 feet, with a slope length of approximately 600 feet. The slope will be divided by a wall into two compartments; one 12 feet wide for materials, and the other 7½ feet wide for belts. The return airway for the intital drive will be on the belt side of the slope. The location of the portal and slope is shown in plan view on Plates III-1 and III-10 and in detail on Plate III-7.

3.2.3 Surface Buildings and Structures

The proposed surface buildings and structures are listed in Table III-1 and identified on Plates III-1 and III-10.

A temporary office and bathhouse trailer with showers and lockers will be located at the base of the Book Cliffs for approximately 3½ years until the permanent office and bathhouse can be completed. The permanent office and bathhouse will be approximately 200 feet x 90 feet. Inside this facility will be an hourly women's change area, an hourly men's change area, a foremen's change area for men, a foremen's change area for women, storage areas, maintenance rooms, engineering rooms, a room for heating and air conditioning equipment, individual office areas for mine superintendents, foremen and clerks, a drafting area and training area.

TABLE III-1
Construction Schedule - Surface Structure and Facilities

Structure/Facility	Beginning Of Construction	Completion Of Construction	Approximate Duration Of Use (Years)
FACILITIES ON TOP OF BOOK CLIFFS			
Temporary Office/Changehouse	A+1	A+1	3
Parking Lot	A+1	A+1	3
Retention Ditches and Berms	A+1	A+2	LOM*
Existing Access Road	-	-	LOM
23% Downslope	A+1	A+1	LOM
Manshaft Raise	A+2	A+3	LOM
Coal Raise	A+2	A+3	LOM
Temporary Coal Stockpile	A+1	A+3	4
Exhaust Ventilation Raise	A+1	A+2	LOM
Intake Ventilation Raise	A+2	A+2	LOM
Fans	A+1	A+2	LOM
FACILITIES AT THE BASE OF BOOK CLIFFS			
Minimum Access Road	A+1	A+1	2
Access Road	A+2	A+4	LOM
Temporary Office/Changehouse	A+1	A+2	2 1/2
Sedimentation Control Structures	A+1	A+7	LOM
12% Slopes	A+1	A+4	LOM
12% Slope Conveyor to R.O.M. Stockpile	A+3	A+4	LOM
Rotary Breaker Station	A+2	A+3	LOM
R.O.M. Stockpile	A+2	-	LOM
Refuse Pile	A+1	A+7+	LOM
Temporary Truck Loadout	A+2	A+2	2 1/2 - 8
Rail Siding	A+3	A+3	LOM
1st Phase Train Loadout	A+3	A+3	0 - 5
Powerline and Substation	A+3	A+3	LOM
Supply Yard	A+4	A+4	LOM
Mine Office/Bathhouse	A+3	A+4	LOM
Mine Warehouse	A+4	A+4	LOM
Permanent Unit Train Loadout	A+6	A+6	LOM

* LOM - Life of Mine

TABLE III-1 (Cont.)
Construction Schedule - Surface Structure and Facilities (Cont.)

Structure/Facility	Beginning Of Construction	Completion Of Construction	Approximate Duration Of Use (Years)
FACILITIES AT THE BASE OF BOOK CLIFFS			
Overland Conveyor	A+6	A+6	LOM
Sampling Building	A+6	A+6	LOM
Waterline	A+7	A+7	LOM
Process Water Tank	A+1	A+1	LOM
Potable Water Tank	A+1	A+1	LOM

* LOM - Life of Mine

3.2 Cont.

The mine warehouse will have approximately 10,000 square feet. It will have a small shop area for maintenance, a welding bay for underground equipment and shelf space. It will be located at the end of the access road, near the mine office.

The proposed locations of the detonator and powder magazines for the base and the top of the Cliffs are based on safety and access considerations in accordance with the American Table of Distances. The magazines will be prefabricated and approximately 30 square feet in size.

The proposed supply yard location is based on easy access to the portal and the topographic constraints of the facilities area. Mine track will run from the man slope to the supply yard across fill provided by the 12 percent slope excavations.

Cross sections of these proposed facilities sites show the elevation of the pads, cuts and fills needed for construction (Plate III-17). The locations of the cuts and fills are shown in plan view on Plate III-10.

Located at the top of the Book Cliffs will be a temporary office and bathhouse trailer. It will be a small facility and used by less than 20 people.

For environmental considerations, these facilities on top of the Book Cliffs are planned such that very little excavation will be involved. The pads for these facilities will be formed by dozing the minimum area.

The facilities related to coal handling, processing and storage, power, water and sewage systems, sedimentation control, transportation and coal removal are discussed in the following sections according to the State of

3.2 Cont.

Utah, Division of Oil, Gas and Mining (DOGM) Guidelines.

3.2.4 Coal Handling, Processing and Storage

The Sunnyside seam will be initially accessed by a downslope driven from the Little Park Wash Area at the top of the Book Cliffs. Coal production will begin during the last quarter of year A+1, after the completion of the downslope, and production will continue into the middle of year A+2.

The coal will be conveyed through the initial access slope to the surface by a 36-inch belt. The coal will be temporarily stockpiled on top of the Book Cliffs until completion of the coal raise in the first quarter of A+3. This nominal 40,000-ton temporary stockpile is shown in detail on Plate III-9 and in plan view on Plate III-10.

Coal production will be suspended for 13 months until the intake shaft, coal raise and manshaft are completed.

When production recommences in the third quarter of year A+3 the stockpiled coal from the Little Park Wash area, as well as the coal being mined, will be sent down the coal raise and through the 12 percent coal slope by a conveyor belt to an open 40,000-ton stockpile. Plate III-13 provides the profile and typical section of this conveyor. The coal will then be reclaimed from the stockpile and conveyed to the rotary breaker (Plate III-14). Refuse will be hauled by truck to a refuse site directly west of the office area. Cross sections of the proposed refuse pile are shown on Plate III-18. During the initial permit term, the coal will be conveyed from the rotary breaker to a temporary truck loadout which will consist of multiple 150-ton

3.2 Cont.

bins side by side with a gathering conveyor (Plate III-14). The coal will then be contract-hauled from the bins to a train loadout already existing outside the proposed permit area.

A permanent unit train loadout (Plates III-1 and III-10) will be completed after the ititial permit term and then the coal will be conveyed from the rotary breaker by a covered 36-inch overland conveyor to the 40,000-ton open stockpile with a reclaim tunnel. A sampling building will be located on the overland conveyor.

3.2.5 Power System, Transmission Lines, Substations and Mine Feeders

Power for this operation will be supplied by the Utah Power and Light Company through an existing 46 KV high voltage powerline from Horse Canyon to the main substation (Plates III-1 and III-10). From the substation, power will be transmitted at 12.4 KV to the mine workings and surface facilities.

The 12.4 KV power cable terminates in the mine at a switchhouse where the power is distributed throughout the mine. Plate III-15 shows a typical power diagram.

Raptor protection will be provided. Utah Power and Light Company provided the typical structure drawings shown on Plate III-16. These structures incorporate raptor protection features.

3.2.6 Water Supply System

Throughout the initial permit term, water will be trucked to

3.2 Cont.

the mine. After the initial permit term a water pipeline may be used. Its proposed location is shown on Plate III-1. This water will be obtained from the Price River.

Process and potable water will be stored in separate tanks. Additional water tanks will be added as needed. The water will be used for culinary purposes, showers, fire control and mining uses.

Water produced by the mine workings will be used for dust control and other mining related activities. This should decrease the amount of water needed to be trucked to the mine site.

A water supply diagram is shown on Figure III-1.

3.2.7 Sewage System

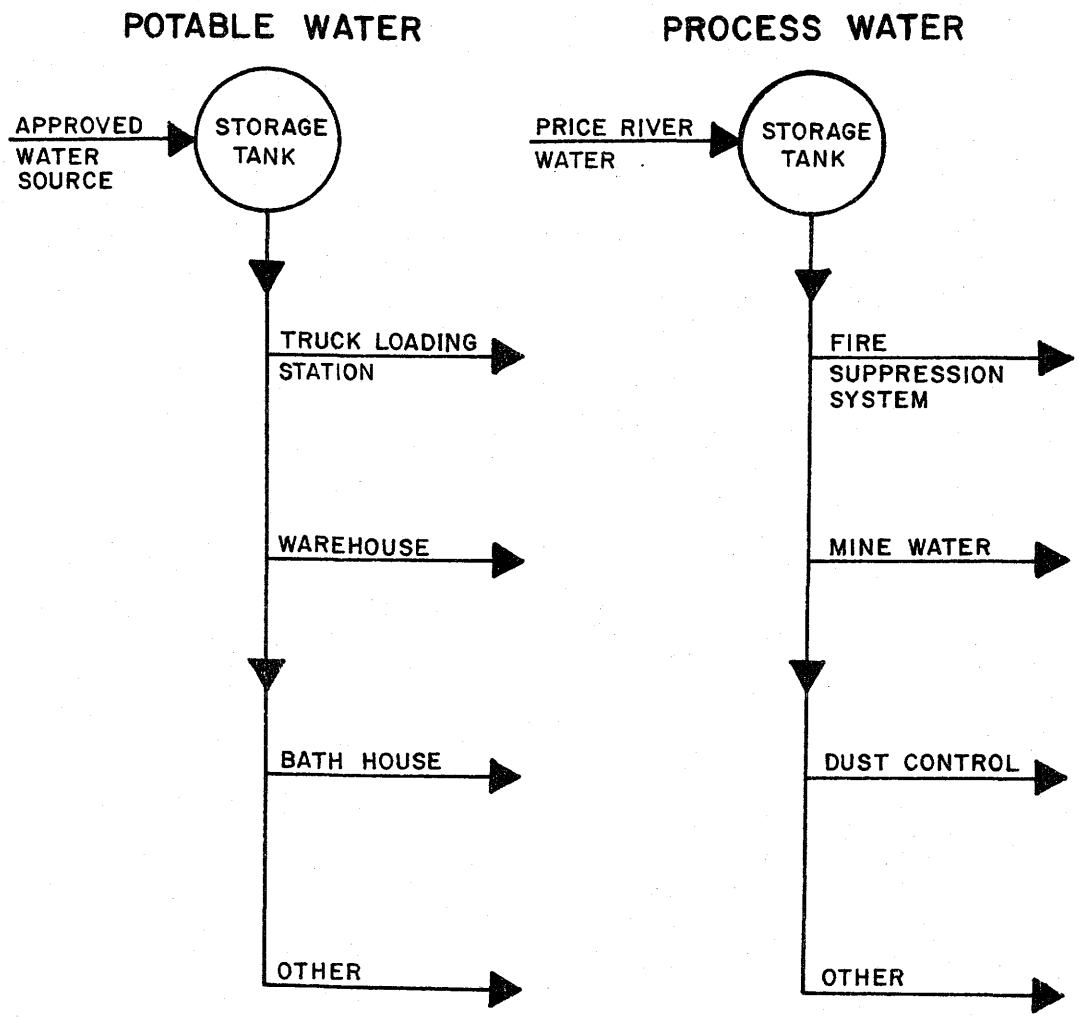
The sewage treatment facility will be an aerobic digester. Its proposed location is shown on Plate III-10 with typical manufacturer's schematic given in Figure III-2. Actual design specifications and drawings will be submitted to the State Board of Health for approval.

3.2.8 Water Diversion Structures

Water diversion structures are shown on Plates III-5 and III-10. They are discussed in detail in Chapter VII.

3.2.9 Sedimentation Control Structures

The locations of the sedimentation control structures are shown on Plates III-5 and III-10. The designs and a detailed discussion are provided in Chapter VII.



KAISER STEEL CORPORATION

SOUTH LEASE COAL PROPERTY

EMERY COUNTY, UTAH

WATER SUPPLY SCHEMATIC

SCALE: NONE

DATE: 3/17/82

FIGURE III-1

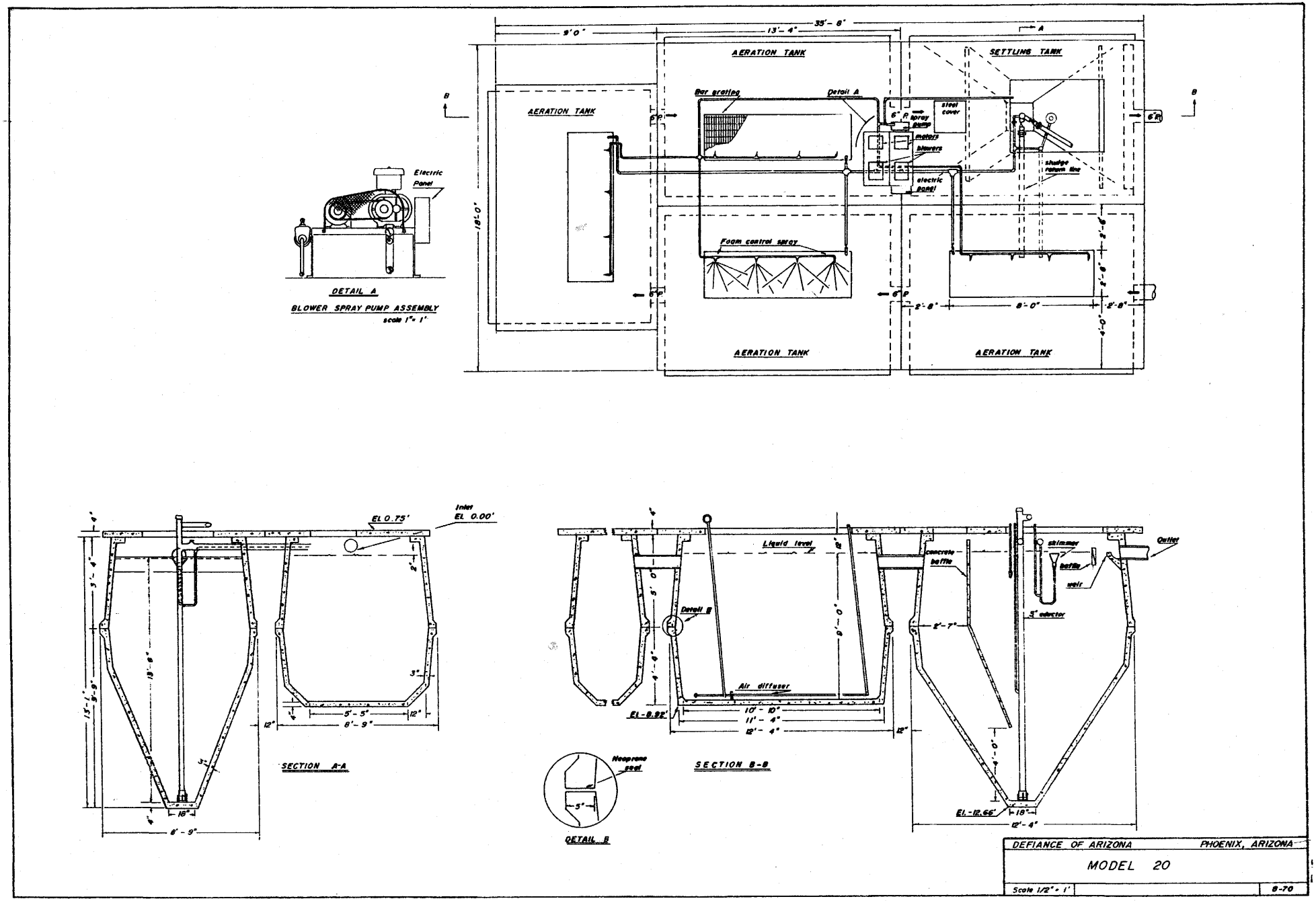


Figure III-2 South Lease Coal Property Typical Sewage Treatment Facilities - Aerobic Digestor

3.2 Cont.

3.2.10 Transportation, Roads, Parking Areas and Railroad Spurs

The location of these facilities are shown on Plates III-1 and III-10.

The existing BLM road from Horse Canyon is shown on Plates III-6 and VII-2. It will be used for hauling machinery and material to the top of the Book Cliffs primarily during the first two years. Later on, it will be used occasionally to service the fans and other facilities. This road will be extended to the coal raise. The section of the road from the manshaft to the coal raise will only be used for a few months from the end of year A+2 to the beginning of A+3 while the coal raise is being bored.

Helicopter service will provide the main access for men to these facilities during the initial phase of mining. The helicopter will also transport equipment and materials to the top of the cliffs from November through March when this area is considered deer wintering grounds and the BLM road may be closed.

A minimum access road to the base of the Book Cliffs will be used to transport material to the site initially. It will be on the same alignment as the permanent access/haulage road (Plates III-1).

Environmental concern was a major consideration in the selection of the location of the access/haulage road to the base of the Book Cliffs. Less excavation work was required for this site than the other sites considered, thus minimizing surface disturbance.

3.2 Cont.

The permanent road will be constructed during years A+2 and A+3. The surface will be gravel until year A+4 when it will be paved.

The profile and cross sections of this haulage/access road are shown on Plates III-1 and III-21 through III-33.

The parking lot at the base of the cliffs will be approximately 67,500 square feet and surfaced with blacktop. It will be sloped at two percent to the south so it can drain properly. The runoff will be collected in a retention ditch for sedimentation control purposes.

The parking facility on top of the cliffs will be less than 10,000 square feet (Plate III-10). No surfacing is proposed for this parking lot since it is temporary.

The railroad spur will be approximately 4.3 miles long. Construction will be compatible with Denver and Rio Grande Western standards. Earthwork will be done during year A+3 and the railroad spur will be completed after the initial permit term. It is shown in profile and with cross sections on Plates III-21 through III-33. The proposed U.S. Highway 50 & 6 grade separation associated with the railroad spur is shown in plan and section on Plate III-20.

The mine supply track at the base of the Book Cliffs will run from the man slope to the supply yard as shown on Plate III-2. A gage of 42 inches and a 60-pound track are planned.

Transportation of coal was previously addressed in Section 3.2.4, Coal Handling, Processing and Storage.

3.2 Cont.

3.2.11 Total Area for Surface Disturbance During Permit

Total surface areas to be disturbed during the permit period are estimated to be a maximum of 385 acres or about 10 percent of the permit area. These areas are shown on Plates VIII-2 and VIII-3.

3.2.12 Additional Areas for Surface Disturbance for the Life of Mine

Future areas planned for surface disturbance will consist primarily of new portals to access the coal north of the Central Graben fault, ventilation shafts and roads leading to these sites. The locations of these sites have not yet been determined. The amount of acreage involved should be small. Two additional ventilation shafts will be required after the initial permit term to enable the complete mining of coal in the first block. It is anticipated that construction will begin on these shafts in year A+6 and be completed during year A+7.

3.2.13 Detailed Construction Schedule

The construction schedule discussed throughout Section 3.2 is detailed on Table III-1.

3.3 Operation Plan

The Sunnyside seam will be accessed initially by a downslope located on top of the Book Cliffs. At the same time, work will begin on the two 12 percent upslopes located at the base of the Cliffs. The 12 percent upslopes will provide permanent access into the Sunnyside seam. It is projected that full production will be reached in year A+8.

Details of the proposed operation plans for the South Lease Coal Property are presented in the following sections according to the DOGM guidelines.

3.3.1 Mining Plans

Mining will begin in Section 2, T17S, R14E, in the Sunnyside seam. Development of the Sunnyside seam will be in a downdip direction toward the east between the Williams Draw and the South Boundary faults.

Production during the first year is estimated at 9,200 raw tons. Coal will be mined intermittently during the first two years while the slope bottom is being developed and the initial shafts are being raise bored. The production will increase to 2.1 million raw tons per year in year A+8.

Mine production will begin with the slope bottom development, utilizing one continuous mining unit, during the last half of year A+1 through the first half of A+2. Mining will then be suspended for 13 months and will recommence in the third quarter of year A+3. Continuous mining units will be added quarterly until six units are producing coal. Continuous mining units working two shifts per day, five days per week, will account for the entire production. Longwall production will commence in year A+6, after the initial permit term.

3.3 Cont.

3.3.1.1 Orientation and Multiple Seam Considerations

The Sunnyside seam is the only mineable seam present in this area.

Longwall panels are sited approximately parallel lengthwise to the strike with a slight updip orientation to provide drainage for the development faces. This practice will be applied to the continuous miner panels wherever possible.

3.3.1.2 Portal, Shafts and Slopes

The locations of the proposed portals, shafts, and slopes are shown on Plate III-2. The man and coal slopes, the initial access slopes and the portals were previously discussed in Section 3.2.2. Profiles and sections of the coal slope, man slope and initial access slope from the Little Park Wash area are shown on Plates III-12, III-11 and III-7 respectively.

To allow for early development, the initial access to the Sunnyside seam will be the downslope from the Little Park Wash area located on top of the Book Cliffs (Plate III-7.) During year A+1, this slope and the exhaust ventilation raise will be completed. It will be 12 feet in diameter and approximately 200 feet in length. The mine fan for the exhaust raise will be installed at that time and slope bottom development will continue. At the same time, work will begin on the 12 percent man and coal upslopes at the base of the Book Cliffs.

3.3 Cont.

The man and coal upslopes will both be approximately 4,900 feet in length. Approximately 3,100 feet of excavation along the man slope will be required to reach the manshaft. The coal raise will be intersected by the coal slope after approximately 3,500 feet of excavation.

Slope bottom development will continue approximately through the end of the first half of year A+2. The slope bottom is shown on Plate III-8. Coal production will then stop for an estimated 13 months.

The intake ventilation raise will be 12 feet in diameter and approximately 200 feet in length. The manshaft will be 12 feet in diameter and approximately 550 feet in length. Plate III-10 shows their locations in plan view. Their positions relative to the 12 percent man slope and Sunnyside seam are shown on Plate III-11.

The coal raise, feeders, hoist house and shaft guides will be completed during year A+3. The coal raise will be 12 feet in diameter and approximately 300 feet in length. Its location is shown in plan view on Plate III-10. Its position relative to the coal slope and Sunnyside seam is shown on Plate III-12.

The slope conveyor and mine track will be installed during the first half of year A+3. Production will begin again in the third quarter of year A+3.

The man and coal upslopes are scheduled for completion in year A+4. The remaining track will be installed in the man slope. As mine development continues, continuous mining units will be added and production will increase.

3.3 Cont.

During years A+6 and A+7, it is anticipated that the underground shop, warehouse and two ventilation shafts 20 feet in diameter and approximately 430 feet in length will be installed.

3.3.1.3 Mining Methods, Room and Pillars

Continuous miners will account for all the production during the first five years. Mining will consist of driving mains, developing room and pillar panels and gate entries for future longwall mining. Retreat mining method will be used for the room and pillar panels unless under Little Park Wash.

The mine will be laid out to accommodate six continuous miners and three longwall sections. The longwalls will use the retreat mining methods to remove coal from panels with faces 500 feet in length.

Typical longwall panels, mains, entries and room and pillar panels are shown on Plate III-19.

3.3.1.4 Projected Mine Development, Mains, Submains and Panels

The projected mine development and mining sequence are shown on Plate III-4. The orientation of the underground mine layout to the surface facilities is shown on Plates III-1 and III-10.

A projected life of mine plan divided into yearly increments for the first 10 years of mining is presented on Plate III-2. The projected mine plan is also shown on a topographic base, Plate III-3.

Mine production buildup begins with the slope bottom development during the last part of year A+1 and the first half of year A+2. Mine production will

3.3 Cont.

begin again 13 months later, after the shafts, raises and coal handling facilities are completed.

During the years A+3 and A+4, two three-entry mains will be developed, both downdip and along the strike.

During the years A+4 and A+5, one five-entry main will be developed along the strike and a seven-entry main will be developed downdip.

Full extraction retreat room and pillar mining will be employed to the south and east of the slope bottom. During the fourth and fifth years of mining, the continuous miner panels will be developed by driving butt entries toward the outcrop and then rooms along the strike will be mined. The coal must be removed from this area before longwall mining can begin.

Gate entries for longwall development will be initiated in year A+5. The bleeder entries will be developed the same year.

The actual mining of the longwall panels will not occur until year A+6, after the initial permit term.

3.3.1.5 Retreat Mining

The retreat mining method will be used by the continuous miners when mining the room and pillar panels unless under Little Park Wash.

Longwall retreat mining is planned during year A+6. This method is illustrated on Plate III-19.

3.3 Cont.

3.3.1.6 Roof Control, Ventilation, Water System, Dust Suppression, Dewatering and Electrical

The roof control plan has been submitted to and approved by MSHA.

Ventilation of the mine will be by an exhaust system. The ventilation plan has been submitted to and approved by MSHA.

It is estimated that 754,000 cfm will be required at full production which will be after the permit term in year A+8. This estimate is based on computer simulation of the mine ventilation. Intake air will be supplied by shafts from the surface.

A water supply system schematic is shown on Figure III-1. Potable water from an approved source will be hauled by truck and stored in a minesite storage tank located near the man and coal slope portals. Alternate sources for potable water are being considered. A treatment plant may be indicated. Process water will be hauled from the Price River by truck and stored in another minesite storage tank. This process water will provide for dust control, water to the mine and fire suppression. Mine water will be used with the process water.

Dust suppression will be accomplished by the use of sprays on all underground equipment as required. Sprays will also be used along sections of the conveyors and at transfer points.

After the initial permit term, when longwall panels are added, sprays will be used along the face.

3.3 Cont.

No major dewatering concerns are anticipated at this property. The workings are expected to produce some water with more water being produced as the depth of mining increases. Part of this water will be used for dust suppression. The remainder will be collected in sumps and pumped to the surface and treated when necessary.

The quantity and quality of the mine water, the monitoring program and the necessary water rights are discussed in Section 7.1.3.2.

Underground power systems will be installed and maintained according to the regulations of the 1969 Health and Safety Act.

A diagram showing power distribution is presented on Plate III-15.

3.3.2 Barrier Pillars

Barrier pillars are discussed in Sections 3.3.2.1 through 3.3.2.3.

3.3.2.1 Protection of Oil and Gas Wells

No oil and gas wells will be encountered in the proposed mining area during the permit term. During future mining should an oil or gas well be encountered, a barrier will be left. Other measures determined necessary by the state regulatory authority in consultation with the mining supervisor will also be taken.

3.3.2.2 Protection of Surface Structure Seams

No pillar extraction will occur under the Little Park Wash. This area is shown on Plate III-8. The first mining to be done under the wash will be on 80 x 60 foot centers.

3.3 Cont.

3.3.2.3 Property Boundaries

In accordance with 30 CFR 211, mining will not occur within 50 feet of any outside lease boundary during the permit term. After the permit term, it is proposed that mining in Section 26, T16S, R14E extend approximately 150 feet to the outside of the western lease boundary for a length of approximately 600 feet in order to conserve the coal resource.

3.3.2.4 Outcrop Protection

An unmined zone will be left to protect the outcrop except where the entries daylight (Plate III-2).

3.3.3 Conservation of Coal Resource

The coal resource will be conserved. Mining during the permit term will primarily be development in the slope bottom area, extension of mains and longwall entries. For this reason, recovery during this period is estimated at approximately 36 percent. Recovery over the life of the mine has been calculated to be approximately 69 percent.

3.3.3.1 Justification for Non-Recovery

In addition to the reasons listed under Section 3.3.2.2 for leaving coal unmined, barrier pillars will be left to protect haulage and ventilation entries. However, subject to mining conditions, an attempt may be made to pull the barriers and pillars along the mains before the mining block is abandoned.

3.3.3.2 Access to Future Reserves

Access to future reserves will not be a problem at the South Lease Coal Property. After the first block of coal is mined, the block

3.3 Cont.

directly north of that block will be mined in the same manner. It will be accessed by two underground slopes crossing the Williams Draw fault.

For access into the reserves north of the Central Graben fault, a slope daylighting near the base of the Book Cliffs is planned. The proposed location is shown on Plate III-3.

3.3.4 Equipment Selection

3.3.4.1 Surface Equipment

Production equipment on the surface is associated with conveyors, coal loadout and stockpile. The operation will also use various mobile equipment including:

Contract coal haulage trucks
Contract reclamation equipment (hydroseeder, hayblower, rock rake, seed drill, etc.)
Trucks (welding, powerlines, refuse haulage, water)
Flatbed trucks
Pickup trucks
Backhoe
Forklifts
Motorgrader
Ambulances
Front-end loaders
Dozers
Fans
Locomotive
Hoist
Contract scrapers

3.3.4.2 Underground Equipment

During the first five years of mining, the major underground equipment will include:

Continuous miners
Shuttle cars
Roof bolters (double boom)
Belt feeder breakers
Rock dusters
Scoop trams

3.3 Cont.

High pressure pumps
Rail haulage system
Power centers and electrical distribution systems
Dewatering pumps and waterlines
Air compressors and air lines
Mantrips
Personnel jeeps
Supply, material, equipment, rock dust and lube cars

After year A+5, three longwall mining systems will be added including shield supports, double drum ranging shears, stage loaders and face conveyors.

3.3.5 Mine Safety, Fire Protection and Security

3.3.5.1 Signs

All signs required by the rules and regulations of the BLM, DOGM, OSM and MSHA will be properly posted. Prior to posting these signs, detail designs will be submitted to the agencies for approval.

3.3.5.2 Fences and Gates

As determined by experience and in accordance with any applicable state or federal regulations, fences, gates, signs and lighting will be installed where needed for safety and security purposes. Although fencing is planned around the mine surface facilities for safety and security, as recommended by the USFWS (Clark, personal communication), the haul road and railroad tracks will not be fenced. Other fencing is discussed in Section 3.5.5.4.

3.3.5.3 Fire Protection

Fire protection for the South Lease Coal Property will follow

3.3 Cont.

accepted fire prevention standards established by the National Fire Protection Agency and the Factory Mutual Engineering Association. In addition, Kaiser Steel Corporation will comply with all applicable provisions of Title 30 CFR, Parts 75 and 77 as they pertain to fire protection under the 1977 Federal Mine Safety and Health Act.

3.3.5.4 Explosives

Storage, handling and use of explosives will comply with MSHA's requirements, 30 CFR 75 and 77. The locations of the powder and detonator magazines are shown on Plate III-10.

3.3.6 Operation Schedules

3.3.6.1 Annual Production per Year for Permit Term

The total potential raw tons of coal production per year during the initial permit period is:

Year	1	2	3	4	5
Tons	9,200	28,400	70,500	485,200	787,600

Total raw tons for the permit period is estimated to be 1.4 million.

3.3.6.2 Operating Schedule

During the permit term the normal operating schedule will be 5 days per week: 2 shifts per day for production and 1 shift per day for maintenance.

3.3.6.3 Operation Employment

Total employment at full production will be approximately 475 active employees: 91 salaried and 384 hourly. It is estimated that during the initial 5-year permit term employment will reach about 225 employees.

3.3 Cont.

3.3.7 Mine Permit Area

3.3.7.1 Projected Mining by Year

The projected mining sequence by year is shown on Plate III-4 for the permit area.

3.3.7.2 Acreage and Delineation of Mine Permit Area

The total area included in this initial 5-year permit period approximates 3,960 acres. The permit area is shown on Plate IV-1.

3.3.8 Mine Plan Area

The Mine Plan Area includes approximately 10,371 acres and is shown on Plate IV-2.

3.3.8.1 Projected Mining by Future Permit Term for the Planned Life of Mine

The size, sequence and timing of the area to be mined are shown on Plates III-3 and III-4. The time increments shown on Plate III-4 are within the parameters approved by Jackson Moffitt of the USGS.

This schedule is an estimate and is subject to change depending on geological conditions, coal market, coal quality, management decisions and other economic factors which affect yearly production.

3.4 Environmental Protection

3.4.1 Preservation of Land-Use

Current land uses are primarily grazing land, fish and wildlife habitat and recreation (Section 4.4.2). Outside of the surface disturbed areas which will be changed to an industrial/commercial use for the purposes of coal mining and processing, there is no intention to alter the existing land uses of the Mine Plan Area. Less than 10% of the permit area may potentially be affected during the term of this permit application.

Reclamation and revegetation planning is designed to return the disturbed areas to their pre-mine land uses. Land management for grazing, wildlife habitat and recreation will continue throughout the mining period by the State of Utah and the BLM, unless they make future land-use changes.

3.4.1.1 Projected Impacts of Mining on Current and Future Land-Use

Approximately less than 10% of the Mine Permit Area will be withdrawn from the current land uses of wildlife habitat, grazing land, and recreation. The number of AUMs the grazing allotments can support will be slightly reduced because of the reduction in land area available for forage production. Wildlife use on those areas adjacent to the surface area may be reduced by those species sensitive to human or industrial disturbances. The impact of mining on wildlife is thoroughly dicussed in Chapter X. Recreation outside of the surface disturbed areas should not be affected with the exception that improved roads created by KSC and oil companies doing exploration in the area improve public accessibility.

Future land uses should be largely unaffected by the mining operation. Grazing capacity will be restored through reclamation and revegetation procedures.

3.4 Cont.

In fact, revegetation will improve upon the current fair to poor range condition of many areas (Photographs III-1 and III-2).

Revegetation is designed to establish self-replicating plant communities. Wildlife species immediately invade these new environments. Within the limits of the natural environment, wildlife species present will change and evolve concomitant with the successional development of the plant communities.

3.4.1.2 Control Measures to Mitigate Impacts

Frequently the majority of effort for mitigation of mining effects is expended through means of final reclamation. However, because of the great longevity of this proposed mine, special effort will also be placed on reclamation adjacent to all construction sites, employee education, on-going monitoring and study. These measures are thoroughly discussed in Section 3.4 and in Chapters VII through X.

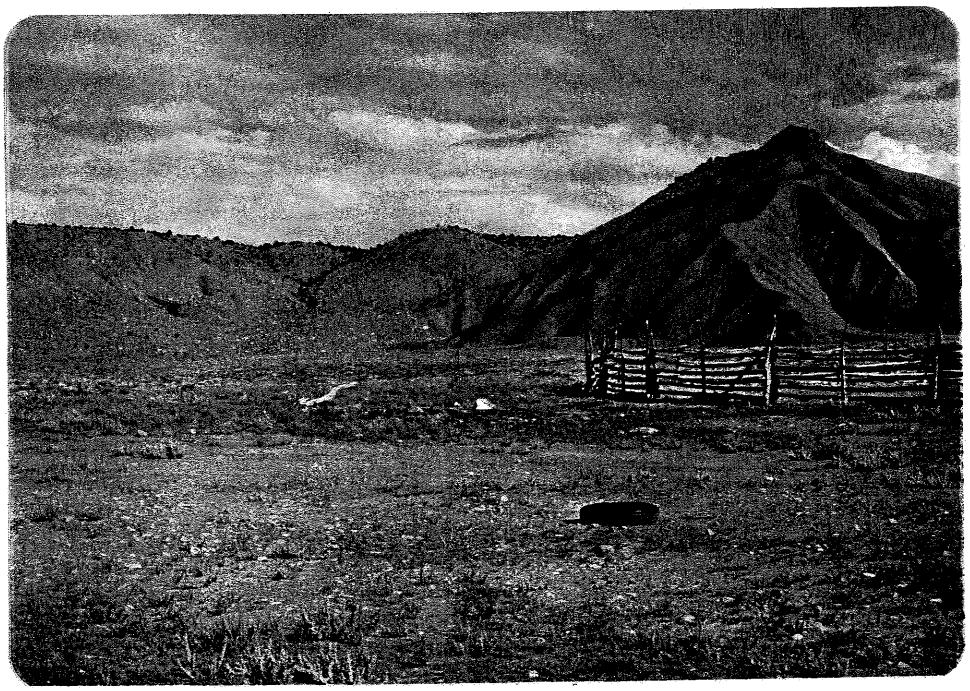
3.4.2 Protection of Human Values

3.4.2.1 Projected Images of Mining on Human Values - Historical and Cultural

A cultural resource inventory was conducted for Kaiser Steel Corporation on state and federal mine lease property in Emery County, Utah. One site (42Em1121) had been previously recorded within the permit boundaries prior to this investigation. A total of seventeen cultural resource sites were observed and recorded during the field portion of this project. Only one site (42Em1342) was recommended for nomination to the National Register of Historic Places. In addition, site 42Em1343 was test-excavated as per recommendations made to Kaiser Steel Corporation. Further archeological investigation on the remaining sites holds no realistic

3.4 Cont.

Photograph III-1. Heavily grazed Saltbush-Badland range is beginning to evidence pedestalling and shows sheet erosion.



Photograph III-2. Bare ground and invasion by unpalatable species indicates disturbance of vegetation near corrals created by livestock concentrations.

3.4 Cont.

promise of yielding sufficient additional information, beyond that recorded on the site form, to warrant the additional expense.

Projected impacts to these sites may include natural phenomena, vandalism, offroad vehicle use, subsidence and mine lease related construction or disturbance. For a complete site by site inventory of projected impacts to cultural resources see Section 5.4.3 of this application. See Chapter V of this application for a complete description of the entire cultural resource examination.

3.4.2.2 Control Measures to Mitigate Impacts

Protection or mitigation measures for this project ranged from a test-excavation (site 42Em1343) to total avoidance (site 42Em1342). The majority of cultural resource sites recorded should not be affected by mine related construction, however the sites which will sustain impact do not appear to hold sufficient additional information beyond that which was recorded on the site inventory form to warrant additional mitigation. See Section 5.7 for an evaluation of these cultural resources and Section 5.8 for recommendations and conclusions concerning these resources.

3.4.3 Protection of Hydrologic Balance

3.4.3.1 Projected Impacts of Mining on Hydrologic Balance

During the initial five-year permit term, mining is near the cliff face and subsurface groundwater is not expected to be significant. In future years, as mining extends further downdip and nears faults or fracture zones, groundwater in increasing quantities may be encountered. Longwall production will induce caving which may encounter water in overlying

3.4 Cont.

sandstone channels and localized fracture zones. This water is expected to be in-place and because of low recharge capability, change in the hydrologic balance can be expected to be local in area and of minimal quantity in terms of the regional hydrologic setting.

There are no perennial streams in or adjacent to the MPA. Flash flood waters flowing through disturbed areas may increase the sediment load, however because of the insignificant surface area disturbed, quality of surface runoff waters will not be greatly affected.

3.4.3.2 Control Measures to Mitigate Impacts

Gravity flow of the subsurface in-place water is downdip and outside the MPA. Excess mine water when encountered will be pumped to the surface and used for outside facilities or discharged according to appropriate regulatory authorization. In areas where abrupt flows are encountered, horizontal and vertical drill holes may be necessary to alleviate the static water level.

Retention ditches, berms, channels and culverts have been incorporated to control snowmelt runoff and precipitation, mainly flash flooding.

3.4.3.3 Monitoring Procedures to Measure Projected Impacts and Control

Groundwater Monitoring Plan - The monitoring of subsurface water will include the following:

(a) Measurement of the static water level in WMH-3_D on a quarterly basis (Plate VII-2).

3.4 Cont.

(b) Measure the water flow and test the water quality monthly during mining when sufficient water is encountered to merit such monitoring.

(c) Measure and record water data from future drill holes.

The above program should provide minimum data on a quarterly basis to compare with observations and sampling of springs, seeps, and water flows completed in the summer of 1981.

Surface Water Monitoring Plans - Collection of water samples from observed water occurrences commenced in the fall of 1980. Ongoing sampling and measurement of surface and alluvial water will consist of the following. See Plates VI-7 and VII-2.

(a) Measurement and sampling of water WMH-1_A and WMH-2_A.

(b) Observation of crest staff gages CSG-1, 2 and 3.

(c) Sampling and measurement of sites No. 14 and 16 (Plate VII-2).

Future water reports will be submitted on a quarterly basis.

3.4.4 Preservation of Soil Resources

The major soils of the permit area are Torriorthents, Torrifluvents or Calciorthids. The Calciorthids belong to the order Aridisol; the remaining soils are of the Entisol order. Entisols are soils of such minimal or recent development that only an ochric epipedon or simple man-made horizons have formed. Aridisols have an ochric epipedon and an additional subsurface horizon. Typically the permit area falls within a zeric macroclimate. Mass wasting and erosion are common in the permit area. These factors are instrumental in the formation of Entisols.

3.4 Cont.

As the soils of the permit area are rather slow developing and in the early stages of genesis, there will be little topsoil with which to revegetate. Therefore, the topsoil removal plan must of necessity be intricate and innovative. The plans for topsoil removal and redistribution are presented in Section 3.5 and in Chaper VIII.

3.4.4.1 Projected Impacts of Mining on Soil Resources

The implementation of the reclamation and revegetation plans will minimize the impacts of mining on the soil resources. As the majority of the soils typically have less than 1% organic matter and almost no structure, it can be expected the alterations which normally occur during the long-term storage of well-developed soils will be minimal. A considerable portion of the permit area is comprised of Mancos Shale, rock outcrop, cliff and rubble land which have no topsoil at all except in isolated microsites. Disturbance in these areas will have no effect on the soil resource. The mine will not disturb the cliff area which is classified as unique wildlife habitat (Maser et al., 1979) (Dalton, 1981). Rock outcrop and badland are also special habitats which will be retained when possible (Chapter VIII).

During the construction period, some soil horizon may be lost through wind and water erosion. However, as mass soil erosion is active throughout the permit area prior to disturbance, additional losses resulting through water erosion should be minimal. Paving the roads and contemporaneous revegetation will minimize these losses.

As the soils are very thin, mechanical limitations of soil removal equipment may results in mixing of the A and C horizons, as most often no B horizon is present.

3.4 Cont.

3.4.4.2 Control Measures to Mitigate Impacts

The soils of the South Lease Coal Properties have been researched, mapped, sampled for chemical analysis and are under continuing study. The information from such study has been used to develop the soil removal, storage, redistribution and revegetation plans which are discussed in Section 3.5 and Chapter VIII.

3.4.5 Protection of Vegetative Resources

To protect the vegetative resource, surface disturbances will be minimized wherever possible. An extensive vegetation study program has begun and the permit area and areas to be disturbed have been mapped and intensively sampled (Chapter IX). A literature survey of the region is underway to aid interpretation of the vegetation data and revegetation planning.

The lower elevations of the permit area belong to the *Atriplex confertifolia* Province (Daubenmire, 1978) or Shadscale Zone (Billings, 1951), which is a shrub-steppe. Grasses may be conspicuous in this Province when the vegetation is not overgrazed, although even under excellent range conditions the vegetation is too sparse to carry fire.

The region above the cliffs falls within the *Agropyron specatum* Province (Daubenmire, 1978) or the Sagebrush Zone (Billings, 1951) and is represented by a sagebrush and grass community. The pinyon-juniper above the cliffs occurs as an edaphic climax on rocky soils and forms an ecotone with the *Artemisia tridentata* community which is found on the deeper valley soils.

3.4 Cont.

3.4.5.1 Projected Impacts of Mining on Vegetative Resources

During this permit term, the maximum disturbance will be approximately 385 acres or about 10 percent of the permit area. In the future, as the permit area increases in size to equal the proposed Mine Plan Area (MPA), the relative percent of acreage disturbed will be greatly decreased. Disturbance of vegetation is discussed in Section 9.3.2.7.

Although mining will destroy some vegetation for the life of the mine, revegetation and plant succession can be expected to result in site improvement when compared to the current range condition.

The permit area has formerly been overgrazed and some of the more desirable species such as *Eurotia lanata* have decreased. The seed mixtures for use in the revegetation plan (Section 3.5) have been proportioned to increase or maintain the more desirable species such as *E. lanata* and *Artemisia spinescens*. *Atriplex confertifolia* increases on overgrazed shadscale ranges or when these ranges have been grazed during the wrong season. This species is undesirable because of its spines and lack of drought tolerance compared to the more desirable forage species (Holmgren and Hutchings, 1972). However, if the improved range composition is to be maintained after bond release, the grazing strategies will need to be appropriately regulated by the land management agencies or owners.

3.4.5.2 Mitigating Measures to be Employed to Reduce Impacts on Vegetative Resources

Disturbance to vegetation will be minimized whenever possible. The reclamation and revegetation plans (Section 3.5) contain the major vegetation mitigation procedures.

3.4 Cont.

When feasible, disturbed areas and areas adjacent to construction will be revegetated as soon as possible after disturbance has been completed. Revegetation will commence in the first appropriate season following site preparation.

Kaiser Steel Corporation fully intends to comply with the performance standards as they apply to soils, vegetation, and reclamation in this region; however, the applicant specifically reserves the right to challenge any such law or regulation on proper legal grounds, including presently applicable laws and regulations.

3.4.5.3 Monitoring Procedures - Reference Areas and Revegetation

Reference areas will not be used for this mine. It is currently planned to use baseline data and the condition of the undisturbed vegetation types at the time of bond release for the determination of revegetation success. As the life of this mine is projected to be greater than 40 years, it is difficult to know precisely what methods will be used for the determination of revegetation success; therefore, definitive baseline data was obtained during the summer of 1981 (Chapter IX). In 40 years, range sites largely preliminary at this time, will undoubtedly be highly defined. Knowledge of vegetation in general, and the state-of-the-art for the determination of reclamation success should be more highly developed. Determination of revegetation success is discussed in Section 9.2.3.8.

The revegetated sites will be monitored on an interval recommended by DOGM. Sites adjacent to surface facilities which are seeded for the life of the mine will not be monitored as they will inevitably be disturbed during the

3.4 Cont.

removal of the adjacent facilities when the mine is closed and abandoned. Procedures for the monitoring of reclaimed sites are discussed in Section 9.8.

3.4.6 Protection of Fish and Wildlife

3.4.6.1 Projected Impacts of Mining on Fish and Wildlife

Habitat loss, small animal destruction, human activity, noise, dust and erosion are construction impacts. All except habitat loss and small animal destruction will continue during mine operation, but they will be less severe. The impacts of greatest concern to Kaiser Steel are 1) the effect of construction and operation of the pre-mine coal development in Little Park Wash on wintering mule deer and 2) the effect of the transportation corridor construction on breeding burrowing owls (and possibly black-footed ferrets) located in the prairie dog town in the bottom area.

Indirect impacts are less apparent than those discussed above. The loss of habitat will increase inter- and intraspecific competition for fewer resources as animals are displaced to surrounding undisturbed habitat.

3.4.6.2 Mitigating Measures to be Employed to Protect Fish and Wildlife

Mitigating measures for wintering deer and burrowing owls will be developed as monitoring data become available.

All land disturbed during construction will be reclaimed to achieve a post-mine land use of wildlife habitat and grazing land. The standards and procedures listed under UMC 817.97 and 817.111-817.117 will be used to guide the reclamation program.

3.4 Cont.

Dust suppression and erosion control measures will be conducted during construction and operation. All power distribution poles will be constructed in a manner safe to large, perching birds.

A wildlife education program will be made available to all mine personnel. A heightened awareness of wildlife may reduce the wildlife loss due to negligence or wanton destruction.

3.4.6.3 Monitoring Procedures

Two monitoring studies will be initiated: one to locate and quantify deer winter use of Little Park, and another to locate and quantify breeding burrowing owls. The potential existence of black-footed ferrets will be studied concurrently with the owl study. Other studies will be initiated if potential threats to wildlife become known.

3.4.7 Protection of Air Quality

Since the primary responsibility for overseeing compliance with air quality regulations rests with the Utah Bureau of Air Quality, all issues related to emissions and impacts were addressed in the Notice of Intent submitted to that group. The information discussed in this section and in Chapter XI is summarized from the material presented in the Notice of Intent. A copy of the Notice is included as Appendix 11.7.1 to Chapter XI.

3.4.7.1 Projected Impacts of Mining Operations on Air Quality

Emissions from the various sources on the Kaiser Steel property are not expected to exceed 250 tons/year for any pollutant. Therefore the project is not subject to Prevention of Significant Deterioration (PSD) regulations. Annual emissions of particulate and total oxides of

3.4 Cont.

nitrogen (NO_x) were estimated to be over 100 tons/year, indicating that the project is considered a significant source. However, since the NO_2 component of the oxides of nitrogen, the regulated pollutant, is unlikely to be in excess of 100 tons/year, the Kaiser Steel facility was only considered to be a major source for the total suspended particles, most of which result from fugitive emissions from the proposed mine facilities.

In order to evaluate the impact of fugitive particles, a multisource Gaussian dispersion model was used to simulate air quality impacts. The model, PAL, calculates concentrations at specified receptors using emissions estimates from point, area and line sources. Major point sources will be a surge coal pile, a rotary coal breaker and the coal pile at the rail loading facility. Emissions from a breaker refuse disposal site and fugitive and vehicular emissions on an access road were also considered as area and line sources for simulations. For the purposes of this evaluation, receptors were spaced at one kilometer intervals and worst case meteorology conditions were assumed. The calculations were performed to estimate peak 24-hour average TSP concentrations for comparison with PSD Class II increments and National Ambient Air Quality Standards. These simulations were carried out for the maximum production year when fugitive dust emissions would be greatest. In addition, simulations were made incorporating several conservative assumptions such as the use of maximum daily emissions for worst case meteorological conditions which would most typically occur at night during reduced mine operations. These assumptions are provided in the appended Notice of Intent (Appendix 11.7.1).

3.4 Cont.

Highest simulated impact values were found to occur with either east or west winds. Under these conditions the major sources are aligned with the wind and their effects are superimposed. Figures III-3 and III-4 are plots of the predicted 24-hour TSP concentration patterns (expressed in μgm^{-3}) for east and west winds. These worst case estimates can be compared to the following particulate concentration limits:

	Concentration (μgm^{-3})	
	24-hour	Annual
PSD Class II Increment	37	19
National Ambient Air Quality Standards	260	75

Areas of predicted impact in excess of the 37 μgm^{-3} are indicated in the two figures but are limited to an approximately one square kilometer area in the vicinity of the coal piles. Such peaks are typical of calculations from ground level sources since the model predicts concentrations approaching the emission rate as the distance from receptor to source becomes small.

The important point is that, for distance beyond approximately one kilometer from the major sources, neither of the 24-hour concentration limits is expected to be exceeded under the worst case conditions simulated.

Model calculations for annual concentrations could not be performed because of the lack of meteorological data. However, the Environmental Protection Agency, in its user's guide to the Valley model (a model similar to the one used here) suggests that, for isolated sources, compliance with 24-hour standards under worst case conditions typically implies compliance with the annual standards. Since peak 24-hour average concentrations were estimated

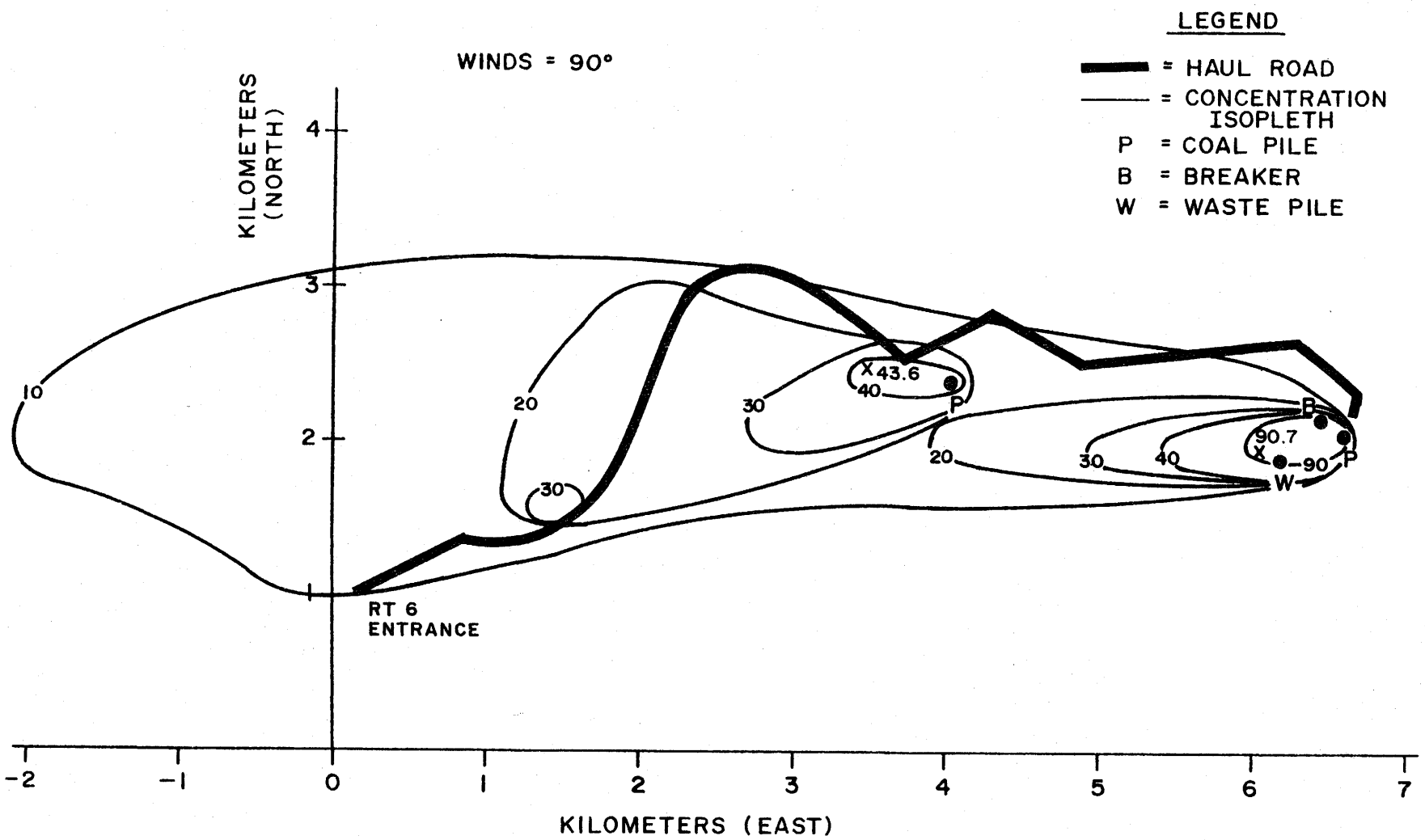


Figure III-3 24-hour average TSP concentrations (μgm^{-3})
(stability 6, windspeed 2 ms^{-1}, wind direction 90°.)

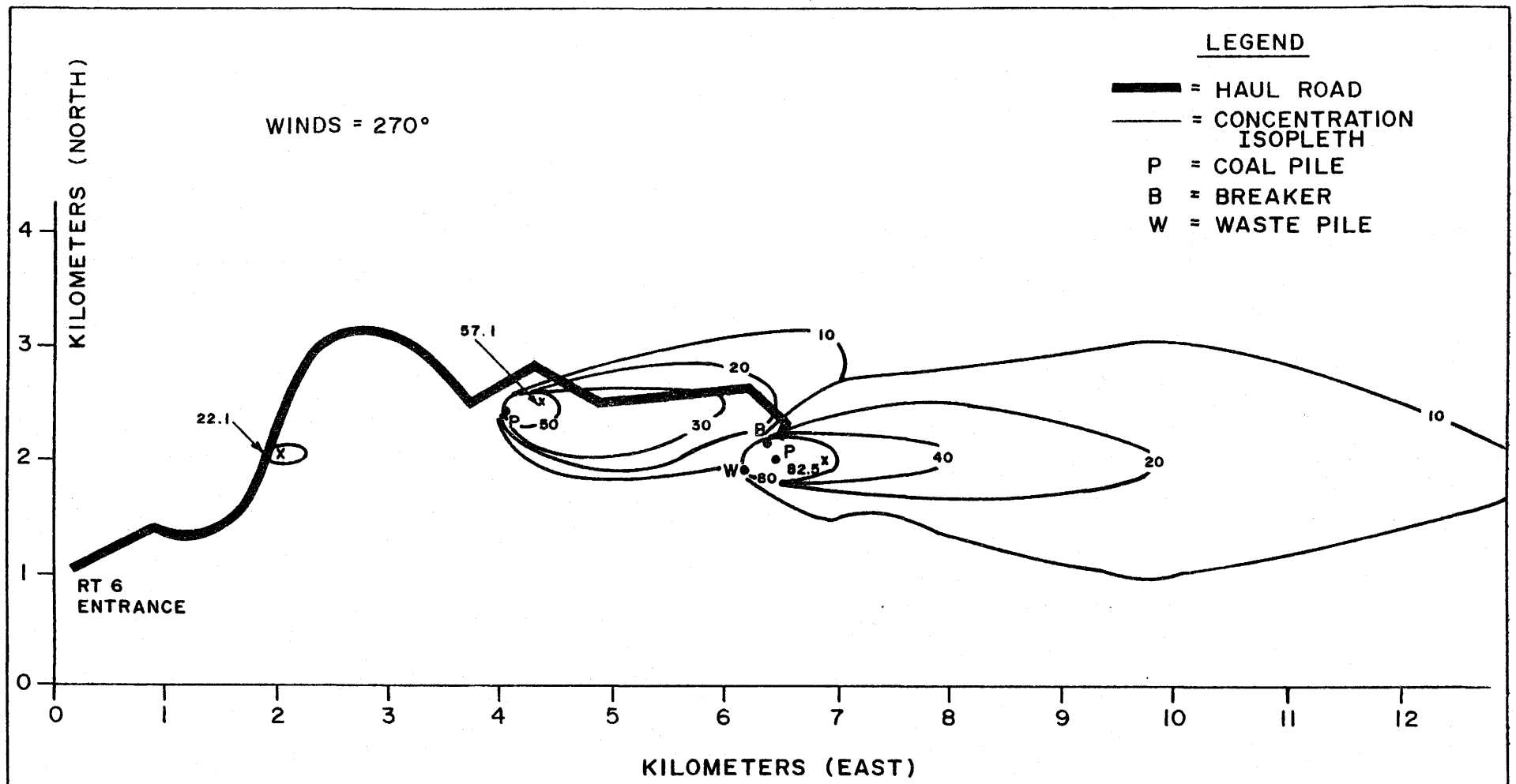


Figure III-4 24-hour average TSP concentrations (μgm^{-3})
(stability 6, windspeed 2 ms^{-1}, wind direction 270°)

3.4 Cont.

to be less than 20 μgm^{-3} beyond three kilometers of the source, the annual PSD increment of 19 μgm^{-3} will be preserved. The 24-hour maximum of 90 μgm^{-3} within the three kilometer area, when averaged over a year and weighted by a typical frequency of occurrence of wind direction patterns (10-20% for any direction), would translate into an average annual concentration of 9-18 μgm^{-3}, which also confirms compliance with PSD standards.

3.4.7.2 Mitigating Measures to be Employed to Control Air Pollutants

Most of the measures designed to reduce particulate emissions for this project are considered to be Best Available Control Technology (BACT). A summary of the major sources of emissions, the control measures to be applied, and estimated control efficiencies in reducing particulate concentrations are presented in Table III-2. This information applies to the year of maximum coal production.

3.4.7.3 Air Quality Monitoring Plans

Since emissions are not predicted to exceed the PSD limit of 250 tons/year, no air quality monitoring is required by the Bureau of Air Quality. Climatological monitoring of precipitation, using a weighing bucket gage, and temperature and relative humidity, using a hygrothermograph, is being conducted at a location near the breaker refuse pile.

3.4.8 Subsidence Control Plan

Subsidence is expected over the majority of the permit area except for the Little Park Wash and the area along the cliff face. There are no buildings or structures in the area that could be affected by any subsidence. Subsidence control and monitoring is discussed extensively in Chapter XII of this permit application.

Table III-2 Summary of Control Measures for Year of Peak Production

Emission Point	Control Method (Efficiency in %)	References
Wind erosion (refuse pile)	Compacted and revegetated (60%)	PEDCo 1977, and NAWC estimates, PEDCo (1974)
Loading (storage piles)	Stacking silos and telescoping chutes (75%)	PEDCo (1977)
Loading (refuse pile)	Gravity feed (80%) damp material (5%)	PEDCo (1977)
Unloading (storage piles)	Gravity feed (80%)	PEDCo (1977)
Vehicular traffic/ (storage and refuse piles)	Use of vehicles for maintenance only (80%)	NAWC estimate
Conveying	Fully covered conveyors (100%)	EPA Region VIII (1979)
Breaker	Baghouse (99%) *	Manufacturer's estimate
Loading trains	Gravity feed tunnel (90%)	PEDCo (1977)
Access Road	Paving	
Vehicular emissions	None	
Wind erosion (storage piles)	None	

* Other means may be used as approved by the Bureau of Air Quality

3.4 Cont.

3.4.8.1 Projected Impacts of Subsidence

No major impacts of subsidence to the surface caused by the underground mining methods proposed during the permit term are anticipated.

The coal seam is approximately 6½ feet thick, and the depth of cover ranges from 100 feet to approximately 825 feet. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden, full seam height subsidence can be expected in areas of shallow cover but subsidence will decrease as cover depth increases.

In addition, there may be surface expressions of tension cracks and fissures. Little Park Wash will be monitored for any indication of these effects due to subsidence.

3.4.8.2 Control Measures to Mitigate Impacts

The mine has been designed to minimize surface effects due to subsidence. Barriers have been included in the design to protect the Little Park Wash, property boundaries and the outcrop. These barriers are discussed in Section 3.3.2. No effects to the quality of the land resources are expected.

3.4.8.3 Monitoring Procedures to Measure Projected Impacts and Controls

Little Park Wash will be monitored. A subsidence monitoring plan is presented in Chapter XII, Section 12.4.4 of this permit application.

3.4 Cont.

3.4.9 Waste Disposal Plans

Industrial waste and coarse refuse will be generated by the project. Industrial waste will be trucked to the Sunnyside-East Carbon landfill for disposal. Coarse refuse will be disposed of on-site as indicated on Plates III-10 and III-18. The material will be compacted in lifts and the toe of the slope covered with topsoil and revegetated.

3.4.9.1 Projected Impacts of Disposal Areas on the Environment

Compaction, replacement of topsoil, and revegetation will isolate the coarse refuse from the environment. Drainage from the disposal area will be trapped by a sedimentation pond, keeping the runoff out of the surface water system. Impact on the environment is expected to be minimal.

3.4.9.2 Control Measures to Mitigate Impacts

Control measures will be compaction, revegetation, and isolation from surface water runoff.

3.5 Reclamation Plan

The reclamation plan has been carefully designed to be capable of reestablishing seral plant communities which have the potential to develop, through the means of soil-plant-animal succession, into communities capable of supporting the proposed postmine land-uses of wildlife habitat, livestock grazing and recreation.

3.5.1 Contemporaneous Reclamation

As the life of this proposed mine is very long, reclamation adjacent to disturbances which remain for the life of the mine is especially important and will be emphasized. All areas disturbed by construction will be revegetated in the first appropriate season following the completion of construction and after they have been prepared for revegetation.

Temporary facilities which have been abandoned and removed will be revegetated in the first proper season following completion of preparation for seeding. Otherwise, the majority of reclamation will not occur until the closure and abandonment of the mine itself.

3.5.2 Soil Removal and Storage

Topsoil will be removed and stored prior to disturbance. A detailed topsoil removal and storage plan is presented in Section 8.7.

3.5.3 Final Abandonment

3.5.3.1 Sealing of Mine Openings

Shaft openings shall be effectively capped or filled. If filled, such filling shall be for the entire depth of the shaft. For the first 50 feet from the bottom of the coalbed, the fill shall consist of

3.5 Cont.

noncombustible material. If capped, the cap shall consist of a six-inch thick concrete cap or other equivalent means. Caps shall be equipped with a vent pipe at least two inches in diameter extending for a distance of at least 15 feet above the surface of the shaft.

Slope or drift openings required to be sealed shall be sealed with solid, substantial, noncombustible material such as concrete blocks, bricks, or tile or shall be completely filled with noncombustible material for a distance of at least 25 feet into such openings.

The plugging and management of drill holes will adhere to the procedures stipulated by the USGS as detailed in Appendix 3.7.1.

3.5.3.2 Removal of Surface Structures

(a) At the conclusion of mining, in approximately 40 years, all surface structures, as now planned, will be dismantled, removed and the land graded to blend with the surrounding areas.

(b) Outlying facilities including portals, ventilation shafts, substations, structures, equipment and material storage area, power transmission lines, and unit train loadout will be dismantled, removed, sealed if necessary, and graded.

(c) Coal refuse and industrial waste disposal facilities will be in areas approved by MSHA and the Utah State Department of Health. During the period the disposal sites are being actively used, they will conform to applicable state regulations such as degree of slope, compaction, coverage with inert material and hydrologic protection. Upon completion of mining activity,

3.5 Cont.

these areas will be scarified, covered with topsoil or a soil capable of supporting plant life, and revegetated.

Ancillary areas such as roads and borrow pits will be graded, contoured and revegetated.

(d) It is anticipated some roads will be left to provide access for grazing and recreation activities. Those roads not left for future use will be contoured, the soil replaced, and the areas revegetated.

3.5.3.3 Dispostion of Ponds and Diversions

(a) Sedimentation Ponds: It is proposed to leave some sedimentation and erosion control ponds for livestock and wildlife watering use upon completion of mining. Retention of such facilities will be decided on a site specific basis in consultation with DOGM personnel.

Should any sediment control ponds be no longer needed when reclamation of the disturbed area is completed, they will be filled, contoured, covered with soil, and revegetated.

(b) Diversions: Diversion structures will be reclaimed in compliance with performance standards when they have served their purpose.

3.5.4 <u>Backfilling and Grading Plans</u>

3.5.4.1 Recontouring

Recontouring is not a major factor for underground mines because of the relatively small extent of surface disturbance. Grading plans intend to create final contours approximately to those of the pre-mine landscape.

3.5 Cont.

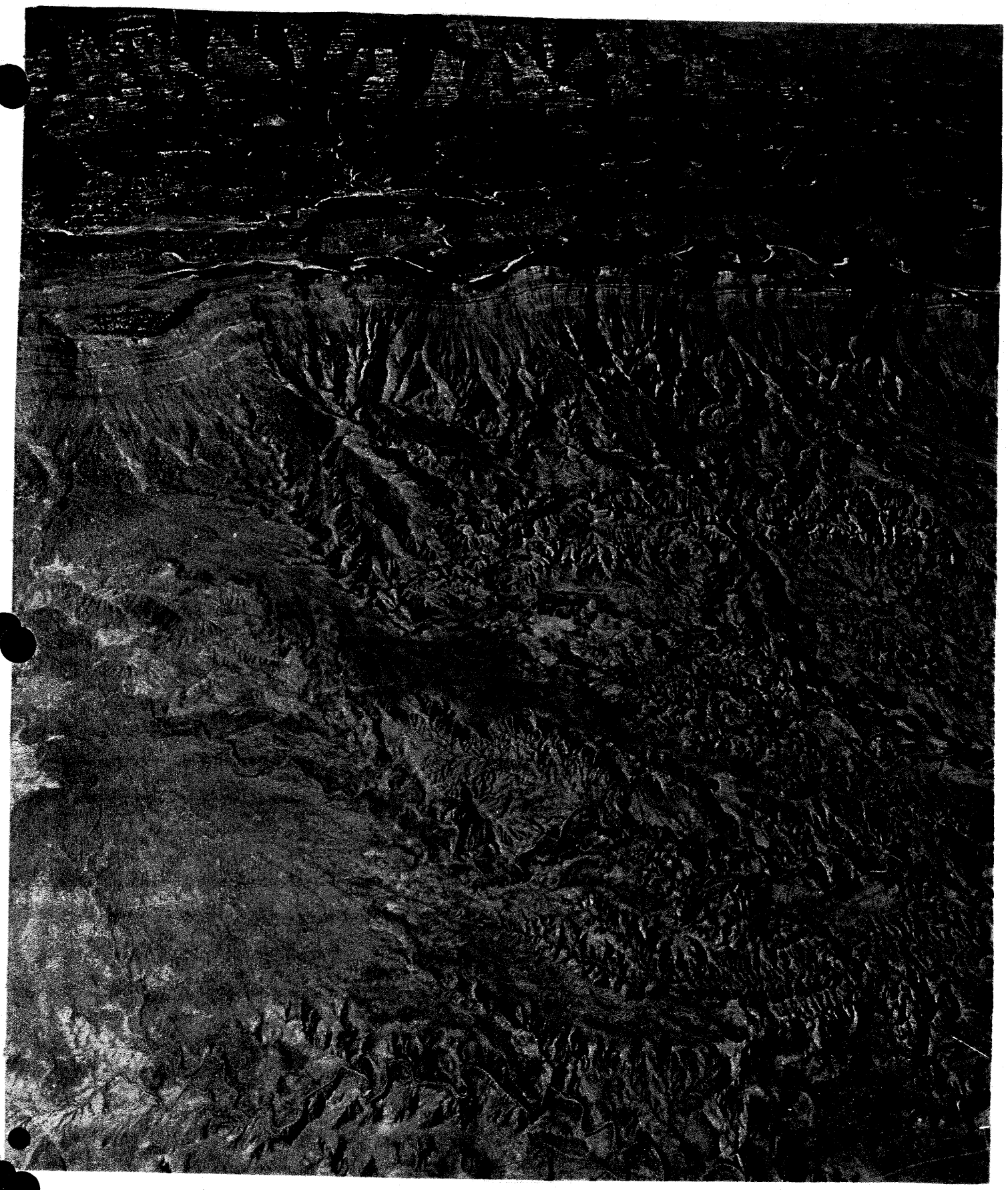
The postmine landscape and soil redistribution and stabilization are discussed in Chapter VIII.

Grading shall be in accordance with UMC 817.101 through 817.105; however, a partial variance from requirement 817.106 is necessitated at this proposed mine location for those areas below the cliffs. As described in Sections 8.3 and 8.9, the soils and geologic structure of the area are presently undergoing mass erosion and wasting. The potential for mulching to prevent this from occurring in the small reclaimed sites surrounded by vastly eroding areas is discussed in Section 8.9. Photograph III-3 illustrated the gully patterns typical of part of the permit area. Rill patterns too small to see on the photograph are described in Section 8.3.

Section 816.106 requires all rills and gullies greater than nine inches deep to be filled and revegetated, yet economic practicality, the laws of geology and soil development limit the feasibility of this requirement. To attempt to prevent the reestablishment of the natural rill and gully patterns would require enormous diversion ditches across the alluvial fans uphill from revegetated sites. Preventing the reestablishment of natural drainage patterns on the revegetated sites would create an anomalous physiognomy foreign to this region.

This plan for grading proposes to regrade and revegetate only those rills or gullies which may devastate revegetation efforts and not those rills or gullies which form in the process of reestablishing preexisting patterns.

As no topsoil will be used to cover areas originally comprised of Mancos Shale, special care will be taken in regrading to deeply cover any areas



PHOTOGRAPH III-3

GULLY PATTERNS OVER THE PERMIT AREA
· SOUTH LEASE COAL PROPERTY ·

3.5 Cont.

contaminated by coal as this material creates additional water repellency characteristics (Miyamoto et al., 1977).

3.5.4.2 Removal or Reduction of Highwalls

There will be no highwalls created from this operation.

3.5.4.3 Terracing and Erosion Control

Terracing for erosion control will be done at the coarse refuse disposal area (Plate III-18, sheets 1 and 2).

3.5 Cont.

3.5.4.4. Soil Redistribution and Stabilization

A detailed soil redistribution plan is presented in Section 8.8. The general intention of the plan is to reconstruct sites similar to the pre-mining landscape. The areas to be disturbed are usually small. For the purpose of aesthetics, postmine land uses, and management, the best plan is to blend the disturbed areas into the immediately adjacent sites. When the disturbed site is made in an irregular pattern, the "edge effect" can be increased, improving the site for some species of wildlife (Thomas et al., 1979). Site improvements can also be expected to result from revegetation with a mixture of species of superior composition.

The subsoil strata may be ripped prior to the placement of the A horizon to reduce compaction and improve infiltration which is generally poor in most of the soils to be disturbed.

The redistributed soils will be seeded and mulched immediately after preparation to assure stabilization. This procedure will also minimize the opportunity for inadvertent soil losses which may result from wind or water erosion prior to seeding.

3.5.5. Revegetation Plan

This revegetation plan has been drafted so that Kaiser Steel Corporation will meet the minimum requirements of the Permanent Performance Standards for revegetation UMC 816.111-816.117 and 816.97. The primary postmine land uses are to be grazing land for cattle, horses and wildlife habitat. For purposes of plant species selection, emphasis has been placed on the habitat requirements of deer, cattle, antelope, prairie dogs and burrowing owls.

3.5 Cont.

For purposes of planning, it will be assumed that if the major habitat requirements are met for prairie dogs, the major requirements will also be satisfied for the burrowing owl.

Each disturbed area will be planted with a mixture of plant species designed to establish seral communities capable of developing by means of plant succession into communities similar to those represented on the unmined site. However, for those pre-mine communities which are in a state of disclimax or retrogressive succession, such as the sagebrush type, where the good forage grasses have been replaced by annual species (Section 9.3), perennial forage species will be planted in an attempt to bring the community to a higher level of secondary succession.

The results of revegetation may be expected in many instances to improve the current range condition by improving the quantity and diversity of perennial warm and cool season forage grasses on sites both above and below the cliffs.

3.5.5.1 Soil Preparation

Any necessary soil nutrients as may be indicated by soil testing and/or correlation and field calibrations will be spread on the soil surface prior to planting. There is currently much controversy concerning the use of fertilizers. Most native species being used are undoubtedly adapted to lower requirements for nitrogen and phosphorous (Section 9.7). Unfortunately, more soil test correlations have been done for agricultural crops than for agronomic species.

Planting will be done immediately following topsoil redistribution and prior to the formation of any soil crusts. Disking of topsoil will not be practical

3.5 Cont.

in most cases either because of the thinness of the topsoil or the relative rockiness in many of the soils. However, the subsoil may be disked or ripped prior to topsoil placement.

The use of rocky soil will be an advantage in most cases because the stones create microsites more suitable to the establishment of plants, and are helpful as water harvesting mechanisms (Evans and Young, 1972; Harthill and McKell, 1979). In New Mexico the use of rock topsoil as a mulch has also been successful (Wolfe, 1981).

3.5.5.2 Seeding and Transplanting

Seeding - The postmine land uses of grazing land and wildlife habitat dictate the need to use species important for the forage and habitat requirements of the major species using the land. The selection of plant species was based primarily upon commercial availability, adaptability to the limitations inherent in the soils, importance for use on grazing land and use for wildlife habitat.

In order to establish a diverse, effective cover of vegetation, several different seed mixtures have been developed (Tables III-3 through III-8).

All species chosen presently occur at the minesites and are found to be valuable for supporting the postmine land uses. The forage value of the species to be planted is shown in Section 9.7.

The species to be seeded are generally native to the state. They have been derived from existing plant communities and from various literature sources. Availabilities were ascertained from the Native Plants Nursery Index (Wolfe, 1979) and through research agencies such as the SCS.

Table III - 3 Seed mix for the *Artemisia* (sagebrush) vegetation type on the South Lease, Utah

Plant Species	Percent of Mix	Number Seeds/ Pound	Drill Rate/A@	Broadcast Rate/A@
Shrubs				
Artemisia nova	*T	-	-	-
A. tridentata	5	2,576,000	.04	(.06).25
Atriplex canescens	T	T	T	T
A. corrugata	T	T	T	T
Eurotia lanata	10	150,000	1.5	2.2
Forbs				
Achillea lanulosa	T	-	T	T
Astragalus cicer	T	-	T	-
Gilia aggregata	T	-	T	T
Hedysarum boreale	T	-	T	T
Linum lewisii	T	-	T	T
Penstemon subglaber	T	-	T	T
Sphaeralcea coccinea	T	-	T	T
Grasses				
Agropyron smithii	10	110,000	2	3
A. spicatum	10	117,000	2	3
A. trachycaulum	5	160,000	.75	1
Bouteloua gracilis	5	712,000	.15	.25
Elymus salina	35	unknown#	-	-
Oryzopsis hymenoides	5	235,000	.5	.75
Poa secunda	5	unknown#	-	-
Sporobolus cryptandrus	5	5,298,000	.04	(.06).25
Stipa comata	5	115,000	1	2

*T = Trace amount

= Kaiser Steel Corporation is working on the development of seed sources

@ = Pure live seed pounds

Table III - 4 Seed mix for the *Atriplex-Artemisia-Hilaria* vegetation type at the South Lease, Utah.

Plant Species	Percent of Mix	Number Seeds/ Pound	Drill Rate/A@	Broadcast Rate/A@
Shrubs				
Artemisia spinescens	20	#		
Atriplex confertifolia	20	65,000	6.7	10
A. cuneata	5	30,300	3.6	5.4
Chrysothamnus viscidiflorus	10	890,000	2.5	3.7
Ephedra torreyana	5	-	-	-
Eurotia lanata	10	150,000	2.5	2.2
Forbs				
Astragalus asclepiadoides	*T	-	T	T
Eriogonum inflatum	T	-	T	T
Sphaeralcea coccinea	T	-	T	T
S. leptophylla	T	-	T	T
S. parvifolia	T	-	T	T
Grasses				
Bouteloua gracilis	5	712,000	.2	.4
B. hirsuta	T	-	T	T
Hilaria jamesii	15	159,000	2	3
Oryzopsis hymenoides	5	235,000	.5	.75
Sporobolus cryptandrus	5	5,298,000	.04	.03

*T = Trace amount

= Kaiser Steel Corporation is working on the development of seed sources

@ = Pure live seed pounds

Table III - 5 Seed mix for *Atriplex-Astragalus* vegetation type on the South Lease, Utah.

Plant Species	Percent of Mix	Number Seeds/ Pound	Drill Rate/A@	Broadcast Rate/A@
Shrubs				
Artemesia spinescens	10	#		
Atriplex confertifolia	10	65,000	3.4	.5
A. corrugata	5	100,900	1	1.6
A. cuneata	5	30,300	3.6	5.4
A. gardneri	10	110,000	2	3
Chrysothamnus viscidiflorous	5	890,000	.12	.18
Ephedra torreyana	*T	-	T	T
Eurotia lanata	20	150,000	3	4.4
Forbs				
Astragalus asclepiadoides	T	-	T	T
Eriogonum inflatum	T	-	T	T
Sphaeralcea coccinea	T	-	T	T
Townsendia incana	T	-	T	T
Grasses				
Hilaria jamesii	20	159,000	2.7	4.1
Oryzopsis hymenoides	5	235,000	.5	1.0
Sporobolus cryptandrus	10	5,298,000	.04/.25	.06/.25

*T = Trace amount

= Kaiser Steel Corporation is working on the development of seed sources

@ = Pure live seed pounds

Table III - 6 Seed mix for *Atriplex*-Badland on the South Lease, Utah.

Plant Species	Percent of Mix	Number Seeds/ Pound	Drill Rate/A@	Broadcast Rate/A@
Shrubs				
Artemisia spinescens	15	#	-	
Atriplex canescens	5	30,000	3.6	5.4
A. corrugata	10	100,900	2.2	3.2
A. cuneata	10	30,300	7	10.8
A. gardneri	5	110,000	1	3
Cercocarpus intricatus	T*	-	T	T
Eurotia lanata	20	150,000	3	4.4
Forbs				
Astragalus asclepiadoides	T	-	T	T
Eriogonum gordonii	T	-	T	T
E. inflatum	T	-	T	T
Sphaeralcea coccinea	T	-	T	T
Grasses				
Bouteloua gracilis	5	712,000	.15	.25
B. hirsuta	T	T	T	T
Hilaria jamesii	10	159,000	1.4	2
Oryzopsis hymenoides	10	235,000	1	3
Sporobolus cryptandrus	10	5,298,000	.1	.3

*T = Trace amount

= Kaiser Steel Corporation is working the development of seed sources

@ = Pure live seed pounds

Table III - 7 Seed mix for the *Pinus-Juniperus* and *Juniperus* vegetation types on the South Lease, Utah.

Plant Species	Percent of Mix	Number Seeds/ Pound	Drill Rate/A@	Broadcast Rate/A@
Shrubs				
Artemisia nova	5	907,000	.12	.18
Cercocarpus intricatus	T*	-	T	T
C. ledifolius	5	51,900	2.1	3.15
C. montanus	5	59,000	1.9	2.8
Ephedra torreyana	T	-	T	T
E. viridis	T	-	T	T
Forbs				
Achillea lanulosa	T	-	T	T
Gilia aggregata	T	-	T	T
Hedysarum boreale	T	-	T	T
Machaeranthera tanacetifolia	T	-	T	T
Penstemon subglager	T	-	T	T
Grasses				
Bouteloua gracilis	20	712,000	.6	1
B. hirsuta	10	#	-	-
Elymus salina	30	#	-	-
Koeleria cristata	5	#	-	-
Oryzopsis hymenoides	10	235,000	-	2
Poa secunda	5	#	-	-
Sporobolus cryptandrus	5	5,298,000	.02	.03

*T = Trace amount

= Kaiser Steel Corporation is working on the development of seed sources

@ = Pure live seed pounds

Table III - 8 Seed mixes for sediment control structures on the South Lease, Utah

Plant Species	Percent of Mix	Number Seeds/ Pound	Broadcast Rate PLS#/A@
		Above the Cliffs	
Agropyron spicatum	50	117,000	13.96
Bouteloua gracilis	10	712,000	.5
Elymus salina	30	unknown	6.0
Oryzopsis hymenoides	10	235,000	1.5
		Below the Cliffs	
Atriplex confertifolia	20	65,000	10
Atriplex cuneata	30	30,300	32
Hilaria jamesii	50	159,000	10

@ PLS = Pure Live Seed

3.5 Cont.

The species to be seeded comprise both warm and cool season perennials. Few of the forbs are commercially available. The majority of annuals that are present in the pre-mine vegetation are weedy increasers or pioneer species. These will not be seeded since they are amply self-perpetuating when suitable habitat is present. Additionally many species, such as *Halogeton glomeratus* are undesirable (Photograph III-4).

The seed mixtures may vary year to year depending upon seed availability and the commercial development of new species. Research concerning the adaptability of native species is currently being developed in cooperation with the local U.S. Soil Conservation Plant Materials Center.

The amounts of seed to be planted will vary depending on the planting method to be used and the percent germination and purity of the seed. If the seed is to be drilled, an amount equal to two times the normal rate for range reseeding is to be used. If the seed is to be broadcast, three times the normal rate will be used. These rates are based upon the recommended rates for critical areas (Merkel and Herbel, 1973; EPA, 1975). These rates may be adjusted based on site specific experience.

Some plant materials necessary for use in revegetation are currently not commercially available. Kaiser Steel Corporation has instigated procedures with the SCS and private growers to develop seed sources for some of the species for which seed or stock is not available. Other forb and shrub seed will be hand-collected from the site as the areas to be seeded are not generally large and only small amounts of seed are needed.

3.5 Cont.

Photograph III-4. Invasion of overgrazed and disturbed range by *Halogeton glomeratus*, an unpalatable and poisonous species.

3.5 Cont.

Transplanting - Most of the areas to be disturbed are relatively small in area, therefore use of natural invasion of coniferous species may be depended upon in most cases.

As most of the shrubs (*Atriplex* species) are easily established by seed, it is not intended to use many transplants, except above the cliffs. Areas selected for transplants of trees and shrubs will be determined on a site specific basis. Numbers of transplants per acre for each vegetation type are presented in Table III-9.

Methods of seeding and transplanting are discussed in Section 9.7.

3.5.5.3 Mulching

All reseeded areas will be mulched to reduce erosion, increase germination, improve ground moisture and reduce soil surface temperatures. The primary method to be used for mulching seeded areas is planned to be an application of native hay, normally applied with a blower at the rate of about two tons per acre. The hay will either be crimped or sprayed with an application of wood fiber and a liquid tackifier.

This method of mulching has proven successful at the York Canyon Mine for obtaining germination and establishment and preventing any major erosion. Under this treatment 3-4 inches of precipitation during the growing season were adequate for plant establishment without irrigation (Wolfe, 1981). Jute matting or excelsior blankets may be used to treat localized trouble areas.

Where rock occurs naturally in the topsoil, it will be retained as much as possible within the limitations of the equipment. The rockier soils will be

Table III - 9 Tree Stocking Rates*

Vegetation Type	Species	Number/Acre
Juniperus savannah	*Juniperus osteosperma*	30
	Pinus edulis	1
Pinus-Juniperus Cliffbottom	*Juniperus osteosperma*	24
	Pinus edulis	38
Pinus-Juniperus Clifftop	*Juniperus osteosperma*	150
	Pinus edulis	98

* = Live stock

3.5 Cont.

replaced on slopes and in habitat types similar to their origin when possible. On BNE2 soils, boulders may also be placed on the surface for wildlife cover.

Some experimentation concerning mulch treatments may be used on initial, temporarily revegetated sites. Additionally, a literature study concerning the importance and use of an algae crust for purposes of erosion control and nitrogen fixation has been instigated.

3.5.5.4 Management

Irrigation - The necessity for irrigation is uncertain at this time. No irrigation will be needed for types above the cliffs.

There are no precipitation records available from the area of the major surface disturbances below the cliffs. Woodside is in a different vegetation zone than the mine site, as is Sunnyside, Utah (Chapter XI). However, vegetation can be established under a low precipitation regime without irrigation when hay is sprayed with wood fiber and a liquid tackifier (Wolfe, 1981). If irrigation should become necessary, developed mine water will undoubtedly be available for use. The necessity for irrigation may be established through the use of test plots and/or additional literature review.

Pest and Disease Control Measures - The newly seeded areas planted adjacent to the construction areas for the life of the mine may need protection from cattle grazing during establishment because no stock fencing is planned along roads and remote facilities.

If necessary, a temporary fence of a single electric strand powered by a solar energized system may be used. The larger disturbed areas of the main facilities are to be fenced for security purposes.

3.5 Cont.

The reclaimed sites will be checked periodically for signs of insect and rodent damage. Necessary insect and rodent control will be carried out under guidance from the Animal, Plant, Health Inspection Service, the U. S. Fish and Wildlife Service or the Utah State Cooperative Extension Service.

Weed Control - All seed purchased for planting will be labelled in accordance with Section 201 of the Federal Seed Act. This Act limits or restricts the presence of seeds of certain noxious plant species.

Native hay used as a mulch will help to minimize the growth of weedy annuals. The use of native hay also provides an additional desirable seed source. Chemical control of weeds will necessarily be kept to a minimum as this means of control may be hazardous to the environment. Herbicides, if needed, will be chosen selectively according to a reliable source such as Vallentine (1977). As registration and restrictions for range herbicides are subject to continual change, current state and federal clearance will be checked and compliance with current regulations maintained.

After bond release, it will be the responsibility of the public land management agencies or land owners involved to implement good grazing, recreation and wildlife management techniques.

3.5.5.5 Revegetation Monitoring

Revegetated areas will be monitored on a schedule recommended by DOGM. Monitoring of revegetated sites planted adjacent to surface facility sites which may be disturbed during mine closure and final revegetation, such as road shoulders, etc., is not planned. Revegetation monitoring is discussed in Section 9.8.

3.5 Cont.

3.5.6 Schedule of Reclamation

As discussed in Section 3.5.2 contemporaneous reclamation will be done during the construction period. However, in most cases, this is not final reclamation. Any facility which is permanently abandoned during this permit term will be reclaimed according to the reclamation and revegetation plans.

3.5.6.1 Detailed Timetable for Completion of Each Major Step in Reclamation

Formulation of a detailed timetable for reclamation of an underground coal mine is not possible for practical purposes. The life of this proposed mine is projected to be about 40 years. Table III-10 illustrates a general reclamation and revegetation schedule which will be instigated upon the permanent abandonment of any facility.

Table III-10 Reclamation and Revegetation Schedule

Operation	Month											
	J	F	M	A	M	Ju	Jul	A	S	O	N	D
Structure Removal	X*	X	X	X	X	X	X	X	X	X	X	X
Back filling & Regrading	X	X	X	X	X	X	X					
Soil Redistribution			X#	X				X	X			
Fertilize			X#	X				X	X			
Seed			X#	X					X	X	X	
Mulch			X#	X					X	X	X	
Transplant			X	X	X					X	X	

X* = Procedure may appropriately be accomplished any time during this month

X# = Depending on annual snowfall

3.5 Cont.

Seeding in this area is typically done in the fall according to recommdations from the local SCS office (George Cook, personal communication). Regional precipitation is greatest in the fall season, although it generally appears to be spread fairly evenly throughout each month. Therefore, it is possible seeding may also be successfully completed in the early spring (Thornburg, 1981).

Fall planting is also recommended for shrub seeds because of the stratification period necessary for many native shrubs (Monsen and Christensen, 1975).

A weather station has been installed on site and based on record accumulations over the 40-year life of the mine, the proposed season of seeding may be critically evaluated. Transplanting, depending upon the site and aspect, may successfully be completed during the dormant fall or spring seasons.

3.5.6.2 Reclamation Monitoring

Reclamation and revegetation are generally inspected and monitored by DOGM and OSM. Revegetation monitoring is discussed specifically in Section 9.8. Disturbed acreages and reclaimed areas will be surveyed on a regular basis and reports made according to the requirements of CFR 211.62.

3.5.7 Cost Estimate for Reclamation

3.5.7.1 Cost Estimate of Each Step of Reclamation

Table III-11 identifies the various disturbed areas within the South Lease Permit Area and their areal extent. The total disturbed area amounts to 385 acres of which 360 acres represents the area to be reclaimed at the completion of mining, and 25 acres are roads to be left for postmining use. Not included are 15 acres to be reclaimed contemporaneously.

3.5 Cont.

Table III-11

Disturbed Acreages

ID	Description	Acres
ACC	access from Hwy to permit area	135
MN	main complex & loadout areas	200
UPR	upper shaft & facility area	40
	Total	385

The estimated costs for reclamation for various disturbed areas are summarized in Table III-14.

Additional supportive information is as follows:

(a) The salvage value of buildings and surface facilities is assumed to be sufficient to cover the costs for their dismantling and removal.

(b) Wage rates are based on UMWA rates as set forth in the 1981 labor contract. For simplication, an average rate plus fringes is used for all classifications, consisting of:

	$/hour
Base wage rate	14.12
COLA	.85
Fringe benefits	7.83
UMWA trust and benefit funds	1.10
Total	23.90

This translates into $173.28 per 7¼-hour shift. The labor cost shown in Table III-6 also includes a 5% add-on to the calculated value.

(c) Equipment to be used is assumed to be owned by Kaiser Steel. The cost for its usage is assumed at 40% of Blue Book construction equipment rental

3.5 Cont.

rates and operating cost is 100% of the Blue Book value. These costs are listed in Table III-12. Equipment hours are based, in part, on the Caterpillar Performance Handbook and on past experience.

Table III-12

Equipment Usage and Operating Costs

(based on 1981 figures)

Equipment	Usage Cost $/hour	Operating Cost $/hour	Total Cost $/hour
D-9 dozer	30.00	26.80	56.80
992	42.00	58.25	100.25
Tractor w/lowboy	7.50	16.50	24.00
5-ton flat bed	3.80	9.30	13.10
10-ton fork lift	8.70	7.60	15.80
Motor grader	21.50	21.40	42.90
4000 gal. water truck	5.00	9.10	14.10
Backhoe	4.50	9.30	13.80
35-ton end dump	21.00	25.60	46.60
10-ton crane	11.50	9.20	20.70
600 CFM compressor	7.00	9.80	16.80
300 amp welder	3.00	4.25	7.25
1/2-ton pickup	3.50	5.30	8.80

Note: Equipment usage cost at 40% of Blue Book rental rate.
Operating cost at 100% of Blue Book value.

(d) Costs for seeds and plants (trees, shrubs, etc.) are based on purchases made in 1981 for Sunnyside mines projects. Mulching costs were estimated by Native Plants of Salt Lake City. Following are the cost breakdowns:

3.5 Cont.

Table III-13

Seed & Plant Application Costs

	Acres	$/Acre	Total Cost
Grass seeds	360	100	$ 36,000
Trees & shrubs	215	550	118,250
Mulch & fertilizers	300	1500	450,000
			$604,250

Equivalent to $604,250 ÷ 360 acres = $1678/acre (say $1700/acre)

Table III-14

Estimated Reclamation Costs

ID	# Men	Shifts /man	Labor Cost $	Equip & Matl. $	Veg. Cost $	Total Cost $	Acres	$/acre
Postmining Reclamation:								
ACC	8	25	36,400	37,500	221,000	294,900	130	2270
MN	12	80	174,700	120,000	323,000	617,700	190	3250
UPR	10	20	36,400	30,000	68,000	134,400	40	3360
				Total & Average:		$1,047,000	360	$2910/acre
Contemporaneous Reclamation:								
GEN	5	20	18,200	30,000	25,500	73,700	15	4915
				Grand Total & Average:		$1,120,700	375	$2990/acre

3.5 Cont.

3.5.7.2 Forecast of Performance Bond Liability During Permit Term and Forecast of Liability for Mine Life

Referring to the estimated reclamation costs in Table III-14, the forecasted performance bond liability during the permit period should equal the estimated contemporaneous reclamation of $73,700.

The forecasted performance bond liability for the life of the mine should equal the total estimated reclamation cost of $1,120,700.

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3.7 Appendix

3.7.1 USGS Stipulations Covering Surface Drilling Diagrams

Appendix 3.7.1

USGS STIPULATIONS COVERING SURFACE DRILLING PROGRAMS

1. Archeological, historical and endangered species clearances are required prior to the approval of any operation.

2. Any operation will immediately cease upon the discovery of any significant archeological or historical site. The Area Mining Supervisor shall be immediately notified of any such find.

3. When artesian flows or water horizons with possible development potential are encountered, the Area Mining Supervisor and the surface management agency shall be notified immediately so that a determination can be made concerning their development potential. Where possible, clean water samples shall be collected by the operator for analysis by the USGS.

4. Drill holes shall be cemented with proper slurry from the bottom to the collar. The lessee shall be responsible for the proper plugging of each hole unless a written request to keep the hole open is made by the Area Mining Supervisor. If drill hole cannot be fully cemented, possibly due to sloughing or fractures, the Area Mining Supervisor must be notified, and his instructions for subsequent plugging followed.

5. The slurry shall be made using 5.2 - 5.5 gallons of water per bag of cement. The drill stem shall be lowered to the bottom of the hole and sufficient slurry pumped through the stem to fill 200 feet of the hole. The drill stem will then be raised 200 feet and the process repeated. The drill hole shall be completely plugged using this method.

6. The Area Mining Supervisor shall be notified as to the time when the first hole is to be plugged so that a representative of his office can arrange to observe the procedure if circumstances permit. Subsequent observations of other holes being plugged will be arranged as deemed necessary.

7. The hole location is to be marked by placing an approved marker such as a capped pipe, steel fencepost, or metal plate in the concrete plug. Such markers are to show hole number, year drilled, lessee name, and as feasible, the section, township, and range in which hole is located. Top of concrete plug, if located in cultivated field, must be set below normal plow depth (10 to 12 inches).

8. Mud pits must be backfilled and leveled. Liquids or mud in the pits must be pumped out and removed from the premises or allowed to dry before they are backfilled.

9. Drill sites must be cleaned and all material, including drill cuttings, foreign to the natural setting must be buried or removed. Trash will be removed from the area. Revegetation of disturbed area will generally be required. If excavation is required in preparing a drill site, topsoil will be stockpiled separately. Before the drill site is permanently abandoned, the location will be regraded to a natural contour and the topsoil redistributed. Type, method, and scheduling of revegetation will be specified by the surface management agency through the Area Mining Supervisor.

10. The Area Mining Supervisor shall be notified as to the anticipated completion date of the program.

11. A monthly report shall be submitted to the Area Mining Supervisor within 10 days after the end of the month. It will include:

    (1) The holes completed during the month and the total depth of each hole.
    (2) The date each hole was completed.
    (3) The date each hole was plugged.
    (4) The type of drilling plug or core.

12. The following reports shall be submitted to the Area Mining Supervisor in duplicate after the completion of the program:

    (1) Hydrologic logs using the attached form.
    (2) Geophysical and lithologic logs and all geologic interpretations of each log.
    (3) Coal analysis.
    (4) Total acreage of surface disturbed per hole, including acreage disturbed by access roads.

Note: All information submitted must contain the lease number. All logs must contain the surface elevation of drill hole and the location of the drill site. The sites will be located using coordinates and or measured distances from the nearest section line.

3.8 Plates

Plate III-1	Proposed Surface Facilities
Plate III-2	Five Year Mine Plan
Plate III-3	Projected Mine Plan
Plate III-4	Projected Mining Sequence
Plate III-5	Plan View Sedimentation Control Structures
Plate III-6	Existing BLM Road from Horse Canyon
Plate III-7	Initial Access Slope from Little Park Wash Area
Plate III-8	Slope Bottom
Plate III-9	Temporary Coal Stockpile
Plate III-10	Surface Facilities (Sheets 1 and 2)
Plate III-11	Man Slope
Plate III-12	Coal Slope
Plate III-13	Slope Conveyor Profile and Sections
Plate III-14	Rotary Breaker Station and Initial Truck Loadout Facility
Plate III-15	Power Distribution Schematic
Plate III-16	Typical Powerline Structures
Plate III-17	Site Preparation Cross Sections for Proposed Lower Surface Facilities. (Sheets 1 and 2).
Plate III-18	Proposed Rotary Breaker Refuse Pile Cross Section. (Sheet 1 and 2)
Plate III-19	Typical Longwall and Continuous Mines Panels
Plate III-20	Proposed U.S. Highway 50 and 6 Grade Separation
Plate III-21	Proposed Railroad Spur Line and Access/Haul Road at U.S. Highway 50 & 6
Plate III-22	Proposed Railroad Spur Line at D & RGW RR. Mainline
Plate III-23	Proposed Railroad Spur Line & Access/Haul Road Sta. 25+00 to Sta. 55+00

3.8 Cont.

Plate III-24	Proposed Railroad Spur Line & Access/Haul Road Sta. 55+00 to Sta. 85+00
Plate III-25	Proposed Railroad Spur Line & Access/Haul Road Sta. 115+00 to Sta. 145+00
Plate III-26	Proposed Railroad Spur Line & Access/Haul Road Sta. 115+00 to Sta. 145+00
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Plate III-28	Proposed Typical Sections Sta. 127+00 & Sta. 141+00
Plate III-29	Proposed Railroad Spur Line & Coal Loadout Loop Sta 175+00 to Sta. 205+00
Plate III-30	Proposed Railroad Spur Line & Coal Loadout Loop Closure Sta. 205+00 to Sta. 227+75
Plate III-31	Proposed Access/Haul Road Sta. 167+00 to Sta. 197+00
Plate III-32	Proposed Access/Haul Road Sta. 197+00 to Sta. 227+00
Plate III-33	Proposed Access/Haul Road Sta. 227+00 to Sta. 257+60