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COPY

INCOMING
C0070018

Task ID #182

Canyon Fuel Company, LLC
Soldier Canyon Mine
P.O. Box 1029
Wellington, Utah 84542
(435) 637-6360 Fax: (435) 637-0108

January 29, 2004

Ms. Pamela Grubaugh-Littig
Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple
Suite 1210
Salt Lake City, UT 84114-5801

RE: Chapter 5 and Reclamation Bond Amendment, Canyon Fuel Company, LLC, Soldier Canyon Mine, C/007/018

Dear Ms. Grubaugh-Littig:

Enclosed please find four copies of the submittal to address the removal of references made to a refuse disposal site and preparation plant for the Soldier Canyon Mine in Chapter 5. This is being submitted per a conversation with Wayne Western and Jerriane Ernstsen concerning the need for this chapter to be reviewed and approved in conjunction with the revisions in Chapters 2 and 3 of the Soldier Canyon Mine M&RP. The bond has been changed to reflect the removal of both a refuse site and a preparation plant. In addition the bond has been rewritten in the preferred format.

An additional copy of the submittal has been delivered to the Price Field Office.

Please contact Vicky Miller at (435) 636-2869, if there are any questions concerning this submittal.

Sincerely yours,

Vicky S. Miller

File in:
☐ Confidential
☐ Shelf
☒ Expandable
Refer to Record No 0006 Date 01292004
In C/007/018, 2004 Incoming
For additional information

RECEIVED
JAN 30 2004
DIV. OF OIL, GAS & MINING

Cc: Chris Hansen (no enclosures)
Dave Spillman (enclosures)
Price Field Office (enclosures)

APPLICATI I FOR COAL PERMIT PROCESSI ?

COPY

Permit Change ☒ New Permit ☐ Renewal ☐ Exploration ☐ Bond Release ☐ Transfer ☐

Permittee: Canyon Fuel Company, LLC
Mine: Soldier Canyon Mine **Permit Number:** C/007/018
Title: Revisions to Chapter 5
Description, Include reason for application and timing required to implement:

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

☐ Yes ☒ No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ ☐ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# _____
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☐ Yes ☒ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☒ Yes ☐ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # _____
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain:
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☒ Yes ☐ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☐ Yes ☒ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☒ Yes ☐ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

David Spillman
Print Name

David Spillman, Engineering Manager 1/23/04
Sign Name, Position, Date

Subscribed and sworn to before me this 27 day of Jan, 2004

Notary Public

My commission Expires: 12-15, 2006
Attest: State of Utah } ss:
County of Carbon

DIONNE M. OMAN
NOTARY PUBLIC • STATE of UTAH
1015 EAST 2640 SOUTH
PRICE, UTAH 84501
COMM. EXPIRES 12-15-2006

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining
		RECEIVED JAN 30 2004 DIV. OF OIL, GAS & MINING

Form DOGM- C1 (Revised March 12, 2002)

CANYON FUEL COMPANY, LLC

SOLDIER CANYON MINE

CHAPTER 5

C/007/018

January 2004

The following Exhibits/Drawings will need to have a label placed on them. The label will acknowledge that the Refuse Disposal Site and Preparation Plant have been removed from the bonding costs and will not be constructed.

1.12-1	Surface Ownership
3.7-1	Vegetation and Wildlife Habitat
3.7-3	Vegetation and Reference Area near Refuse Disposal & Topsoil Storage Site
3.8-1	Topographic Hydrology
3.10-1	Field Survey Locations, Oct 1985
3.10-2	Raptor Nest Sites, Riparian Zones & Spring Locations
3.10-3	Game Bird and Lagomorph Distribution Map
3.10-4	Big Game Distribution Map
4.11-1	Land Use Map
5.26-2	Lagoon Site Pipeline Plan
6.22-7	Photogeologic Evaluation Map
7.21-1	Surface Water Monitoring Locations
7.21-2A	Water Rights

Chapter 5

ENGINEERING {R614-301-500}

5.10 Introduction

This chapter presents designs, maps, plans and cross-sections of the facilities and structures required to minimize the potential impacts of the Soldier Canyon Mine operations. This permit was written using R614-301-500 regulations, therefore the format does not follow the order of the R645-301-500 regulations. Although, references to a refuse disposal site and preparation plant may be made in the text, appendices, reports, plates, drawings or maps of this chapter and M&RP, these facilities will not be constructed. Many references have been removed, however removal of all references was not possible such as on Drawings 1.21-1, 3.7-1, 3.7-3, 3.8-1, 3.10-1, 3.10-2, 3.10-3, 3.10-4, 4.11-1, 5.26-2,6-22-7, 7.21-1 and 7-21-2A, etc.

5.11 General Requirements

The methods, calculations, maps, plans and cross-sections attendant to the operations of the Central Mine Facilities ~~and proposed refuse disposal site~~ and the subsequent reclamation operations are presented in the following sections. These designs are required to comply with the design in R614-301-500 regulations.

5.12 Certification

SCCC provides, in this permit application, certified cross-sections and maps of surface facilities, hydrologic structures, geologic resources, plans and engineering designs ~~for coal mine refuse areas~~, impoundments, and ~~primary~~ roads ~~applicable to the proposed refuse disposal area~~.

5.12.25 Primary Roads

I, J.T. Paluso, being a professional engineer licensed in the State of Utah, License Number UT-4028, due hereby certify that the design and construction or reconstruction of primary roads as described in the plan meet the requirements of R645-301-534.200 and R645-301-742.420.

5.13 Compliance with MSHA Regulations and MSHA Approvals

~~The design for the refuse disposal area will meet the MSHA requirements as specified in 30 CFR 77.214 and .215.~~ Soldier Creek Coal Company will comply with the requirements of both DOGM and MSHA regarding these facilities.

5.14 Inspections

All engineering inspections, except those described under R614-301-514.330, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

~~Refuse pile inspections will be performed by a professional engineer or an engineering specialist, under the supervision of a professional engineer, during placement and compaction of coal mine waste materials. More frequent inspections will be conducted if a danger or harm exists to the public health and safety or the environment. Inspections will continue until the refuse pile has been finally graded and revegetated or until a later time as required by the Division.~~

~~Such inspections will be made at least quarterly throughout construction and during the following critical construction periods.~~

~~Foundation preparation including the removal of all organic material and topsoil,~~

~~Installation of final surface drainage system, and~~

~~The final graded and revegetated facility.~~

~~The qualified registered professional engineer will provide a certified report to the Division promptly after each inspection that the refuse pile has been constructed and maintained as designed and in accordance with the approved plan and R614 rules. The report will include appearances of instability, structural weakness, and other hazardous conditions.~~

~~A copy of each inspection report will be retained at the Soldier Canyon Mine site.~~

Sediment pond and sewage lagoon inspections will be performed quarterly by a qualified person for appearance of structural weakness and other hazardous conditions. These structures will also be inspected at least yearly, until removal or release of the performance bond, by a professional engineer and a certified inspection provided to the Division. These inspections will meet the

requirements of R645-301-514.300.

A copy of each inspection report will be retained at the Soldier Canyon Mine site.

5.15 Reporting and Emergency Procedures

At any time a slide occurs which may have a potential adverse effect on public, property, health safety or the environment, Soldier Creek Coal Company (SC3) will promptly contact the Division and inform the Division of the problem and of any remedial measures planned. Similarly, if the inspections of the ~~refuse pile,~~ sediment ponds, and sewage lagoon disclose a potential hazard, SC3 will promptly notify the Division of the problem and of any remedial measures planned to alleviate the problem.

In the event of a temporary cessation of the Soldier Canyon Mine operation, SC3 will notify the Division as soon as possible and will effectively support and maintain all surface access openings to underground operations, and secure surface facilities in areas in which there are no current operations, but operations are to be resumed under an approve permit.

Before temporary cessation of coal mining and reclamation operations for a period of 30 days or more, or as soon as it is known that a temporary cessation will extend beyond 30 days, Soldier Creek Coal Company will submit to the Division a notice of intention to cease or abandon operations. This notice of the Division will be as required by R614-301-515-321.

5.20 Operations

This section presents the operations plan for the Soldier Canyon Mine operations.

5.21 General

This section presents a description of the plan for operation of the central mine facilities and topsoil site ~~and refuse disposal site~~. The general layout of the various facilities for the Soldier Canyon Mine operations are presented on Exhibits 5.21-1 and 5.21-2 ~~and Plate 5-1.~~ Maps, cross-sections, and calculations for the specific facilities are presented to support the narrative description.

The Applicant will not conduct mining activities outside the approved permit area, and any mining activity conducted within the permit area will not affect areas outside the permit area boundary.

5.21.11 Previously Mined and Presently Mined Areas

Exhibits 5.22-1 and 5.22-2 show the location and extent of past and present underground mining operations.

5.21.12 Existing Surface and Subsurface Facilities and Features

The location of all buildings in and within 1000 feet of the permit area; the location of surface and subsurface man-made features within, passing through, or passing over the permit area; each public road located in or within 100 feet of the permit area; and the location and size of the sewage lagoon, and topsoil storage site ~~and proposed refuse disposal site~~ are shown on Exhibits 1.12-1, 5.21-1, and 5.21-2. ~~5.26-1. and Plate 5-1.~~ REI's power line is shown on Exhibits 5.21-1 and 5.25.1

5.21.13 Landowners and Right-of-Entry and Public Interest Maps

Exhibits 1.12-1, 1.12-2, 5.21-1, and 5.21-2 ~~Plate 5-1 and Figure 5.26-1~~ show the owners of record of those lands both surface and subsurface, included in or contiguous to the permit area; the boundaries of land within the proposed permit area upon which the applicant has the legal right to enter and begin coal mining and reclamation operations; and the measures to be used to ensure that the interests of the public and landowners are protected as required under R614-103-234 when conducting coal mining and reclamation activities, within 100 feet of the right-of-way line or relocating a public road.

5.21.14 Mine Maps and Permit Area Maps

Exhibits 5.21-3, 5.21-4 through 5.21-8 and 5.25-1 ~~and Plate 1~~ show the boundaries of all areas proposed to be affected over the estimated total life of the coalmining and reclamation operations, sequence and timing of the mining of subareas for which additional permits will be sought, the coal mining and reclamation operations to be conducted, the lands to be affected throughout the

operation and any change in a facility or feature to be caused by the Soldier Canyon Mine operations. Also, the underground workings and location and extent of areas where subsidence is planned and where measures will be taken to prevent, control or minimize subsidence-related damage.

5.21.15 Land Surface Configuration Maps

Topographic maps used by the Applicant clearly indicate surface contours to adequately represent the existing land surface configuration within the permit area.

5.21.16 Maps and Cross-sections of the Features and Proposed Features

Maps produced by the Applicant will show the facilities, disturbed area, disturbed area boundary, explosive storage and point source discharges for their specific requirement are included within this application.

5.21.17 Transportation Facilities Maps

This application describes each road and conveyor system to be constructed and used by the Applicant as required by R614-301-527.

5.21.20 Signs and Markers

Signs and markers will be posted, maintained, and removed by the operator; will be a uniform design that can be easily seen and read; be made of durable material; and conform to local laws and regulations; and be maintained during all activities to which they pertain.

These signs shall include a mine and permit identification sign, perimeter markers, buffer zone, and topsoil markers.

5.22 Coal Recovery

Conservation of Coal Resources

The Bureau of Land Management (BLM) and the Utah Division of State Lands & Forestry govern the conservation and royalty payments of the coal located within Applicant's proposed permit boundary. Mining plans for all seams must be

approved by the BLM (43 CFR 3480 et al) and the Utah Division of Oil, Gas & Mining (Regulatory Authority) before mining can occur within the new area. This prior approval ensures the diligent development and extraction of all minable coal.

Three coal seams within the LOM area, the Sunnyside, the Rock Canyon, and the Gilson, will be mined (Exhibits 5.21-4, -5 and -6). The underground operations have been planned to yield the maximum recovery of the coal reserves using the safety of mine personnel, accepted economic mining practices, and the protection of the environment as criteria. In addition, product quality, as it pertains to present and future customer needs, was also used as a secondary criterion in planning. The plans anticipate increasing current production rates so that longwall mining can be introduced to supplement the current room and pillar operations. Adherence to these guidelines will improve mining conditions in each seam and aid in the maximum, safe recovery of the individual coal horizons. In the event that future mining technology (not yet developed) is more efficient than present technology and is compatible with the Applicant's mining operation, then these new technologies will be applied to the extraction of Soldier Canyon coal.

Although maximum recovery is an important design criteria, other factors must also be considered to ensure the protection of personnel and the environment. Coal reserves will not be recovered in the following areas:

1. Areas where the coal is less than 5 ft thick will not be mined as mining in that height is not feasible under current economic conditions.
2. Coal will only partially be mined in the immediate vicinity of shafts, portals, or any connections between seams. This will prevent subsidence and protect structures in those areas.
3. Solid coal barriers will be left intact to protect the main entries from mined out panels.
4. Solid coal barriers will be left between certain panels for roof and floor protection and to provide seal areas in the event of a fire or gas accumulation.
5. Solid coal barriers of required size will be left along the property boundaries as required by the General Safety Orders of Utah and or BLM.
6. To minimize the chances of exposure to dangerous quantities of

harmful gases or flooding of the working sections, solid coal barriers of sufficient size will generally be left around old workings.

7. In most cases, main, barrier, bleeder, and longwall panel pillars will not be recovered because of the extreme hazards associated with such recoveries.

8. Due to the minimal amount of interburden between the Rock Canyon and Gilson seams (< 30 ft a locations) only one seam may be mined in specific areas. This is because of the dangers associated with mining both seams under these conditions.

9. Coal will only partially be recovered in areas below and adjacent to the Soldier Creek drainage channel. This is for protection of surface features and facilities as described in Section 5.25.

Maximum Economic Recovery

Utilization of room and pillar and longwall mining methods will make maximum coal recovery more feasible because the mining operations will be more versatile to meet diverse mining conditions. The mine layout is designed to maximize the number of longwall panels and to minimize waste of coal reserves near the boundaries of the property.

Annual Production

Maximum annual production will not be reached until the year 1998. However, the maximum production rate for the mine will begin in 1994 and continue for approximately nine years (Table 5.22-1). At the end of this period, annual tonnage will decline until the various mine reserves have been depleted. During full production periods, the mine will experience variations in annual tonnage. This is due to the moving of the longwall section more than once during the year.

~~The Applicant maintains three work shifts per day. The labor force is anticipated to expand from approximately 120 to 160 miners and staff when maximum annual production is obtained. The average number of working days per year is 252. The Applicant presently employs 101 hourly and 33 salaried personnel.~~

Life of Mine

The life of the mine is subject to the size and geometry of the reserves, and the rate at which the reserves are mined. The projected life of the mine is shown in Table 5.22-1.

5.23 Mining Methods

Mine Plans and Layout

In 1989 J.F.T. Agapito & Associates, Inc. were contracted to evaluate and design a three-seam longwall layout for the Soldier Canyon Mine. This study consisted of executing the following activities: 1) Site Selection and Inspection of Surface Resources, 2) Instrumentation and Data Analysis, 3) Three-seam Gate Design, 4) Subsidence Evaluation, 5) Develop a Mine Plan Layout for Efficient Three-seam Extraction, 6) Develop a Ventilation Plan for the Proposed Mine Layout, and 7) Presentation of Results/Final Report. This final report, Mine Layout design and Ventilation Analysis for Soldier Creek Coal Company, is presented as Appendix 5-D and now forms the basis for the present mine plan. This proposed mine layout has provided the best compromise solution for stability, resource recovery, ventilation, haulage, production requirements and protection of surface resources. The following parameters were concluded:

Direction of Mining - Based on the cleat/joint measurements and stress measurement in the existing mine an east-west and north-south orientation was selected as the preferred direction of mining. This orientation provides the best compromise for roof and rib stability.

Panel Retreat Sequence - It is proposed that longwall panels be extracted from

Table 5.22-1

Forecasted Average Annual Coal Production
Soldier Canyon Mine
1991 - 2009
(000's tons)

Year	Continuous Miners			Longwall	Total
	Unit A	Unit B	Unit C		
1991	504	504	192	-	1,200
1992	504	277	419	-	1,200
1993	504	185	-	1,500	2,189
1994	504	234	-	2,320	3,058
1995	504	184	-	2,270	2,958
1996	504	233	-	2,320	3,057
1997	504	171	-	2,320	2,995
1998	504	185	-	2,420	3,109
1999	504	229	-	2,320	3,053
2000	504	237	-	2,320	3,061
2001	504	277	-	2,270	3,051
2002	504	277	-	2,320	3,101
2003	-	277	-	2,320	2,597
2004	-	140	-	2,420	2,560
2005	-	140	-	2,320	2,460
2006	-	277	-	2,320	2,597
2007	-	277	-	2,220	2,497
2008	-	114	-	2,320	2,434
2009	-	-	-	1,245	1,245
Totals	6,048	4,218	611	37,545	48,422

the top of the seam toward the bottom. This is referred to as "Downdip" panel retreat. While an updip retreat is beneficial for overall roof stability, the downdip was selected for methane control. This downdip retreat direction will enhance methane movement in an updip direction, away from the longwall face.

Multiple-Seam Workings Position - The proposed mine layout calls for all mains to be directly columnized. Columnization will be most important for mains, submains and bleeders in the Rock Canyon and Gilson seams due to the minimal interburden. Longwall panel gate road development will, however, be offset. Offsetting of gate pillars under the gob of the upper seam will improve the lower seam gate stability.

Longwall Panel Dimensions - The longwall dimensions selected for the mine layout range from 610 to 680 ft. wide and from 3,800 to 5,700 ft. long.

Longwall Panel Gate Road development - A two-entry, yield pillar system was selected for gate road development. This design was based on an overall evaluation of the depth of cover, cleated nature of the coal seams, thickness of coal seams, roof rock strengths and multiple-seam mining plans.

Recommended Pillar Designs - Utilizing the in-mine stress measurements, as well as an evaluation of roof, coal and floor strength properties, recommended pillar dimensions were designed for different depths. The recommended pillar designs are presented in Table 5.23-1.

Pillar Extraction

Full pillar extraction in room and pillar areas will be performed in accordance with the current approved mining plan. This provides for the recovery of the reserves in those areas by a proven method. Extraction of coal in longwall areas will be performed on panels approximately 680 ft. in width and from 3,800 to 5,700 ft. in length. The panel layout also provides for modifications should future technology develop a safer method of development or extraction.

Bleeder entries will generally be driven around all areas where full extraction, either by longwalls or continuous miners, is to take place.

Table 5.23-1

Recommended Pillar Designs
(Agapito 1991)

	Depth of Cover (Ft.)			
	1500	2000	2250	2500
Main Development				
Pillar spacing center-to-center (ft.)	80 by 80	100 by 100	N/A	120 by 120
Recommended number of entries	6	5	N/A	4 to 5
Barrier Pillars				
Recommended Pillar Widths (ft.)	250	300	N/A	350
Gate Pillars-Sunnyside seam				
Pillar spacing center-to-center (ft.)	N/A	54 by 118	54 by 138	58 by 138
Recommended number of entries	18	18	N/A	18
Gate Pillars-Rock Canyon seam				
Pillar spacing center-to-center (ft.)	N/A	56 by 120	56 by 140	N/A
Recommended number of entries	N/A	18	18	N/A
Gate Pillars-Gilson seam				
Pillar Spacing (East Block) (ft.)	N/A	N/A	53 by 138	N/A
Pillar Spacing (North Block) (ft.)	N/A	N/A	N/A	58 by 138
Pillar Spacing (West Block) (ft.)	N/A	46 by 118	N/A	N/A
Recommended Entry spans (ft.)	N/A	18	18	18

Longwall Mining

The mine layout maximized the number of panels, especially longwall panels. Main entries, submains, and panels have been aligned to minimize the waste of coal reserves near property boundaries and areas of thin coal. Coal will be mined from a longwall face approximately 680 ft. wide by a double ranging drum shear.

Longwall panels will be developed using a 2 entry system. This provides for a yield pillar, and in conjunction with the cribbing of the tailgate entry prior to longwall mining will give adequate roof control to enable safe extraction of the coal.

Multi-Seam Considerations

In order to ensure the maximum recovery of coal from all minable seams and to avoid hazardous mining conditions, the Applicant will adhere to the following guidelines during multiple seam mining operations:

a) Coal will be mined from top to bottom in accordance with standard descending seam extraction practices.

b) Where possible, mining in the upper seam will precede mining in the seam immediately below it by at least one year. This staggering of operations will allow time for the overburden to settle and stabilize before mining begins in the lower seam.

c) The protective barrier pillars for all main and submain slope entries, main haulageways, primary air courses, bleeder entries, and manways in each seam shall be superimposed whenever possible, regardless of vertical separation or rock competency.

Shafts and Interconnection of Rock Slopes

The Sunnyside and Gilson seams will be accessed through rock slopes driven from the Rock Canyon seam. In each case, an adequate number of airways will be driven from the Rock Canyon seam, as well as one beltway. The intake airway will also be used to transport men and supplies. The exact number, size and location will be determined according to mining conditions and MSHA approved roof control and ventilation plans.

Ventilation System

A detailed description of the ventilation system as well as an explanation of the methane and dust control plan is routinely reviewed and approved by MSHA. The ventilation system was designed to provide a dependable, adequate supply of uncontaminated air to all underground work areas. Air volume and velocity are sufficient to dilute, render harmless and carry away flammable, explosive or toxic gases as well as dust, gases generated by explosives, smoke and fumes.

Two ~~Joy-Axivane~~ exhaust fans provide adequate volumes of fresh air to the work areas. Fan No. 1, powered by a 500 hp (440 V) motor, is capable of moving 450,000 cfm. Fan No. 2, with an 800 hp (4160 V) motor is presently producing 645,000 cfm. Both fans are equipped with auxiliary diesel engines.

Roof Control Plan

Roof control is based on a full bolting plan: conventional supplemental materials and supports are used as needed. The plan was reviewed by MSHA and subsequently approved.

When adverse roof conditions are encountered, spot bolting is used to supplement the conventional roof control plan. In areas where spot bolting is deemed necessary, either resin or conventional roof bolts are installed on four-foot centers. Spot bolting begins in competent roof and continues until competent roof is again encountered. If necessary, wire mesh matting or rib bolts are installed in main headings to maximize the stability of these entries. All conventional bolting materials are chosen, installed, and positioned in accordance with 30 CFR 75.200-7 (a) and (b), 75.200-8, and 75.200-10.

Hydraulic props with ropes, timbers or cribs are used as breaker rows and turn props during pillar extraction. Pillar splitting procedures are in accordance with 30 CFR 75.200-11.

Projected Mine Development

Detailed maps of all three seams showing the development of the mine are presented on Exhibits 5.21-4, -5 and -6. The proposed mine plan expands the resent Soldier Canyon operation from the Rock Canyon seam to include the Sunnyside and Gilson seams. The present room and pillar methods will be supplemented with a longwall unit.

Mine Water System

Pumps ranging in size from 5 to 400 hp, using pipes 2 in. to 8 in. in diameter control incoming formation water. Water not used for dust suppression in the mine is released to Soldier Creek under authorization of NPDES Permit No. UT-0023680. Waste water is gravity fed into two sewage lagoons located 2 miles form the mine site.

When mine water is encountered, it is channeled by the natural pitch of the seam to the low areas, and from there is pumped into an underground sump. Water in the sump is used either for dust suppression in the mining sections or, after most of the suspended solids have settled out is pumped out of the mine into Soldier Creek under authority of NPDES Permit No. UT-0023680.

Hazardous Wastes

It is not anticipated that acid-forming or toxic waste will be discovered during mining. However, if these conditions are encountered, the Regulatory Authority will be notified and a plan will be developed and submitted to the Agency for approval.

Equipment

The machinery for the mine is equipped, maintained, and operated to ensure maximum safety, productivity, and quality of coal production. All underground equipment is approved by MSHA. Table 5.23-2 lists the major underground and surface equipment to be used. These lists are not exclusive and equipment design and choices may vary during the course of mining.

All pieces of stationary and mobile equipment at the mine are assigned a projected useful service life and depreciated accordingly. If the depreciation life of a particular unit expires and the equipment is still in serviceable condition with acceptable availability and maintenance costs, the service life is extended.

Mine Safety

The Applicant considers attention to health and safety of each miner to be a prime contributor to the continued success of the mining operations. The Applicant complies with all MSHA and State of Utah health and safety laws to protect the well-being of its employees. A number of safety provisions have been incorporated into the proposed mining operations to ensure compliance with those

laws.

Safety Training

The mine is equipped with modern emergency facilities and has an organized, functioning safety program. All mine employees are instructed concerning mine safety procedures and meet MSHA first aid and safety training requirements. New employees are required to attend a minimum of 40 hrs. of classroom orientation before starting work in the mine.

Fire Protection

In the event of a surface facility or mine fire, the water storage tank located on the surface and underground water sumps will be used to provide water necessary to control the fire. Water lines from the underground sumps are aligned along conveyor belt lines leading to each working face. Outlets have been installed along the water line for quick and easy access in case of any emergency. Fire hydrants and fire extinguishers are strategically located to ensure the protection of all personnel and the environment.

Water or chemical deluge systems with sprays are located at the belt drives to prevent mine fires. Fire extinguishers in operable condition are provided for all structures and equipment where they may be a potential fire hazard. All underground equipment complies with state and federal regulations and is well maintained.

Additional measures are taken to prevent mine fires. All combustible materials are so stored to minimize the potential for combustion. Suitable fire-fighting equipment is provided and trained personnel are certified to use breathing apparatus in case of a mine fire or rescue. Smoking or the carrying of any type of open flame device is prohibited in the mine and within 25 ft of the portals. These portal areas are designated fire lanes.

Each mine operation complies with the fire protection requirements outlined in MSHA regulations, 30 CFR Parts 75 and 77. A copy of MSHA's approval of plans for extinguishing potential waste fires will be submitted to the regulatory authority upon request.

Mine waste fires will be handled in a manner similar to the mine fire protection system. The system is one of, first protection, and second suppression.

Prevention is primarily a safety and training matter dealt with by an ongoing educational program concerning the need for continuous attention to fire prevention. The engineering design for the mine waste disposal areas reduced potential for spontaneous combustion by continuous compaction and covering of material. Second, the suppression system consists of fire extinguishers or fire hoses available for use should a fire develop. Operators are instructed to separate any smoldering material and compact the adjacent material. The burning material is then extinguished by appropriate methods.

Handling of Explosives

The utilization of continuous mining machines and longwall mining machines normally does not require the use of explosives. Some underground construction activities, however, such as the construction of shafts and overcasts, penetration of faulted areas or rock spars, and breaking of fallrock, may require the use of explosives. Explosives are handled in accordance with state and federal laws and are stored, transported and handled by experienced, approved, and certified personnel in accordance with Article VI, Utah General Safety Order of Utah Coal Mines, Section 48 through 53, 30 CFR 75.1300 and the manufacturer's recommendation.

Dust Control

Coal dust is controlled through good housekeeping, wetting face areas, rock dusting, and ventilation. Large quantities of coal dust are prevented from accumulating on the surface of any type of equipment capable of producing heat or sparks. All working areas and return entries are rock dusted to prevent dangerous accumulations of coal dust.

A pipeline system is provided for wetting the rib, roof, and floor surfaces for a distance of at least 40 ft from each working place, except where these areas are naturally wet. In dry working places, the face areas are kept wetted back to where rock dust has been applied.

All mining equipment or operational areas that are subject to large concentrations of dust are equipped with water sprays at the source to keep air-borne dust to a minimum.

Within the mine rockdust and continuous water spray at the mine face and transfer points protect the miners from excessive amounts of dust. ~~Monitoring has shown~~

~~that coal dust content in the air at the working face is 1.2 mg/8 hrs.~~ Haulageways are wetted and/or otherwise treated to assist in dust control.

Adequate ventilation is provided to each working face to quickly remove dust particles during the course of mining. All mine operations comply with MSHA and State of Utah laws to keep respirable dust to a minimum. Dust sampling is done as outlined by MSHA.

Diesel Emissions

Diesel equipment in the mine is used in accordance with all state and federal regulations, including the following:

1) Only diesel equipment approved by the Bureau of Mines or MSHA is used underground.
2) Diesel equipment is used only in well-ventilated areas.

All measurements and sampling are in accordance with federal and state laws.

5.24 Blasting and Explosives

The Applicant will comply with all state and federal laws in the use of explosives during the construction of the surface facilities expansion, and whenever blasting is required for the Soldier Canyon Mine. A certified blaster will direct all blasting operations with the help of at least one other person. The Applicant will make sure that all contractors working on any project are made aware of the blasting procedures. All blasting records will be kept on file at SCM for the required period of time.

All explosive containers used at the mine are built to meet or exceed the specified requirements set forth by the Mine Safety and Health Administration. The surface storage containers are placed in a position to ensure the protection of the environment and all personnel. Those containers, one for caps and one for powder, are located on the surface on skids and made of 1/4-1/2 inch steel place with wood lining of ½ inch plywood. Two five tumbler locks, adequately protected, are used. Both magazines have two vents measuring approximately 3x3 inches.

The portable container used for the transportation of explosives underground is a small metal utility trailer. The trailer is wood lined with caps and powder kept separate. As required by law, no metal screws or metal parts are exposed.

5.25 Subsidence

5.25.10 Subsidence Control Plan

Surface Features and Facilities Subject to Subsidence, Slides and Other Damage

A survey of the surface area overlaying and adjacent to the proposed mine plan area has been completed. All structures and renewable resource lands, which could conceivably be adversely affected by subsidence or other mining induced surface failure, (e.g. slides, slumps, etc.) have been identified and listed below (also see Exhibit 5.25-1).

- Questar Pipeline Company's 20-inch natural gas pipeline.
- Western Natural Gas, Inc./Resource Enterprises, Inc. (REI) degasification facilities, which include two compressor facilities, one exhauster/blower facility, four vertical boreholes and associated gas and power lines.
- Carbon County's public road 53.
- The Pine Canyon private road.
- Streams - Soldier Creek and Pine Creek
- Most surface areas are utilized for livestock grazing.

Most of the area subject to possible subsidence is currently used for low-intensity summer grazing of domestic livestock (primarily cattle and sheep). Subsidence should have no effect on grazing. No other renewable resources exist in this area. The area does, however, have a limited potential for recreational use, such as hunting. Again, subsidence should have no effect on any recreational use.

Existing structures, within the mine plan area, include the Questar natural gas pipeline and the Western Natural Gas, Inc./REI coal bed degasification facilities. The overall subsidence control plan has been designed to ensure that these facilities continue to operate, uninterrupted, and are in no way jeopardized by mining induced subsidence. (See section 5.25.13 Measures to Prevent Subsidence).

One County road passes through the permit area along Soldier Creek. Also, a single dirt road of restricted local use is located along the base of Pine Canyon. The subsidence control plan has been designed so as to prevent any damage to these roads. Subsidence should not damage the roads; however, if damage does occur, it would be slight and easily repaired.

Streams in the life of mine (LOM) area are described in detail in Sec. 7.24.2, Surface Water Information. The nature of subsidence resulting from the proposed mine plan should not significantly affect any streams.

The subsidence control plan has been designed to prevent damage to the streams. Gentry and Abel (1978) demonstrated that topographic lows (such as are the stream beds) are in fact protected in part by "piling up" of the opposite facing ridge slopes (adjacent topographic highs) during actual subsidence events. Therefore, mining induced surface fracturing should be very limited or nonexistent within the stream bed areas and readily filled.

The maximum potential subsidence boundary, which could extend beyond the present five-year term permit area, is detailed on Figure 5.25-1. This subsidence boundary was projected to the surface utilizing an angle of draw of 22.5 degrees. This projection was extended from all coal lease boundaries where a coal seam of mineable thickness exists. In areas where there are multiple seams of mineable thickness, the lower most seam was used for the subsidence projection. Please note that the maximum potential subsidence boundary was projected independently

from the approved mine plan. Therefore, the subsidence projection represents a worst case condition, where full extraction mining would occur up to all existing coal lease boundaries. While a 22.5 degree angle of draw is generally considered a conservative estimate, it was utilized to be consistent with the subsidence evaluation performed by J.F.T. Agapito and Associates, Inc. (contained within the Mine Layout Design and Ventilation Analysis - Appendix 5-D). Since the approved mine plan does not propose full extraction mining up to the coal lease boundaries, a further evaluation at a 35 degree angle of draw was performed. Results indicate that a projection of a 35 degree angle of draw from the proposed full extraction areas will not extend beyond the subsidence buffer zone as detailed. Any future mine plan modifications shall maintain a 35 degree angle of draw projection within the subsidence buffer zone unless one of the following conditions is satisfied.

- The Applicant shall demonstrate to the Division's satisfaction that there is no potential for material damage, environmental harm or damage to human health in the subsided areas.

- The Division shall accept a lesser degree angle of draw, based on detailed analysis and engineering evidence submitted by the Applicant.

In order to permit all areas which could potentially be affected by subsidence, a subsidence buffer zone has been added to the Soldier Canyon Mine Five-Year Term Permit Area (see Figure 5.25-1). This subsidence buffer zone includes approximately 1,473 acres and is included on the U.S.G.S. 7.5 minute quadrangle maps Deadman Canyon and Pine Canyon. A legal description of this additional permit area is as follows:

Township 13 South, Range 11 East, SLB&M:
Section 1: Lots 1,2,5,6 & 7, Section 12: W ½ W ½,
Section 13: NW 1/4 NW 1/4.
Township 13 South, Range 12 East, SLB&M:
Section 3: W ½ W ½, Section 10: NW 1/4 NW 1/4.
Township 12 South, Range 12 East, SLB&M:
Section 28: SW 1/4 SW 1/4, Section 29: S ½ S ½,
Section 30: SE 1/4 SE 1/4, Section 31: E ½ E ½,
SW 1/4 SE 1/4, S ½ SW 1/4, Section 32: NW 1/4 NE 1/4,
Section 33: W ½ W ½, SE 1/4 SW 1/4, S ½ SE 1/4,
Section 34: S ½ SW 1/4, W ½ SW 1/4 SE 1/4.

All surface owners, which will be affected by the incorporation of the subsidence

buffer zone, have been contacted. Subsidence buffer zone letters were sent to Carbon County, Bureau of Land Management, Questar Pipeline Company, Mrs. Louise Iriart and Newell Nelson on September 1, 1992. Copies of the signed comments can be found in Illustration 5.25-1.

We are presently working with Questar, BLM and Newell Nelson to resolve potential problems. The pending sale of Soldier Creek has made it impossible to accurately define future mine plans. In the near future, when these plans are completed, these areas of concern will be addressed.

Also, as required, a proposed public notice has been prepared for publishing within the Sun Advocate, the local newspaper ~~(see page 5-17d)~~. This public notice will fulfill the requirements for a significant permit revision, as well as, for the proposed mining activities within 100 feet of a public road.

Following approval of the subsidence buffer zone, the Applicant shall modify the appropriate maps within the MRP and surface signs within the permit area to comply with the permit revision.

5.25.11 Methods of Coal Removal

Much of the reserve area will be mined using a longwall system, or full extraction room and pillar methods. As explained by Von Schonfeldt, et al., 1980, "subsidence when uniform rarely causes problems to renewable resources such as aquifers, streams and ranch lands." Therefore, as a result of using full extraction methods the surface above the mine will lower uniformly and no significant fracturing should occur. The slight decrease in the elevation at the surface is not expected to adversely affect any existing structures, stream, or roads.

To date, no significant surface effects due to subsidence in any part of the mine permit area or adjacent areas have been observed, although some surface subsidence theoretically is expected to occur as a result of historic and current mining activities. The Applicant's proposed mining plan has been designed using technically sound criteria to prevent significant mining induced impact to surface lands or existing structures. The following paragraph of this section describes how the proposed mining procedures will affect subsidence and the extent of controlled subsidence resulting from mining.

The proposed plan consists of a single mine located in the Rock Canyon seam and accessing coal reserves in the overlying Sunnyside seam and underlying Gilson seam via underground rock slopes. The methods of coal removal will be the same for each horizon worked within the mine. The exact method for any given area of the mine will vary, depending upon surface and subsurface sensitivities, depth of overburden and multiple seam conditions. The two basic methods to be used are longwall and room and pillar mining. A detailed description of methods to be used are given in Section 5.22 and 5.23.

Room and pillar mining will be used to develop main, submain, and panel entries. In addition, this method will be used in areas which are uneconomical for longwall mining due to reserve geometry. Also room and pillar mining using limited extraction will be used in areas where high to total extraction methods are inconsistent with our subsidence control plan. Longwall mining will be used to achieve maximum extraction in those areas where it can be economically applied in harmony with the subsidence control plan.

As a result of the Applicant's proposed mining activities, some subsidence is expected to occur above much of the full extraction longwall areas. Exhibit 5.25-1 shows the areas over which maximum subsidence may result from the proposed mining activities.

(Proposed)

Public Notice
Soldier Creek Coal Company
Soldier Canyon Mine
P.O. Box I, Price, Utah 84501

Soldier Creek Coal Company has submitted to the Utah Division of Oil, Gas and Mining an application for a significant revision to the previously approved Mining and Reclamation Plan (ACT/007/018). Pursuant to R645-300-121.100, public notice is hereby given regarding this proposed permit revision.

In order to protect all areas which could potentially be affected by underground coal mining activities, a subsidence buffer zone is proposed for addition to the Soldier Canyon Mine Five-Year Term Permit Area. This subsidence buffer zone includes approximately 1,473 acres and is contained within the U.S.G.S. 7.5 minute quadrangle maps "Deadman Canyon" and "Pine Canyon". A legal description of this additional permit area is as follows:

Township 13 South, Range 11 East, SLB&M:
Section 1: Lots 1, 2, 5, 6 & 7, Section 12: W ½ W ½,
Section 13: NW 1/4 NW 1/4.
Township 13 South, Range 12 East, SLB&M:
Section 3: W ½ W ½, Section 10: NW 1/4 NW 1/4
Township 12 South, Range 12 East, SLB&M:
Section 28: SW 1/4 SW 1/4, Section 29: S ½ S ½
Section 30: SE 1/4 SE 1/4, Section 31: E ½ E ½
SW 1/4 SE 1/4, S ½ SW 1/4, Section 32: NW 1/4 NE 1/4,
Section 33: W ½ W ½, SE 1/4 SW 1/4, S ½ SE 1/4,
Section 34: S ½ SW 1/4, W ½ SW 1/4 SE 1/4.

Furthermore, Utah Highway 53, a public road, passes through the proposed buffer zone. A legal description of the specific surface area containing the public road is as follows:

Township 12 South, Range 12 East, SLB&M:
Section 28: SW 1/4 SW 1/4, Section 33: W ½ NW 1/4.

A copy of the current mine permit and the application for a significant revision is available for public inspection at the Carbon County Clerk's Office, Price, Utah, and the Utah Division of Oil, Gas and Mining. Any comments should be directed to the Utah Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

Published in the Sun Advocate _____, 1992.

The Mine Layout Design and Ventilation Analysis prepared by J.F.T. Agapito & Associates, Inc. (Appendix 5-D) also evaluated the potential surface subsidence of the proposed mine plan. Utilizing a modified National Coal Board method, which is based on measurements from western U.S. mines, it was estimated that the maximum total subsidence would be approximately 12 feet for 2 seam full extraction. A subsidence factor of 70 percent and an angle of draw of 22.5 degrees was used for the above evaluation. (The subsidence factor is the ratio of maximum surface subsidence to total mining height and the angle of draw defines the expected limits of surface subsidence beyond the boundaries of full extraction.)

5.25.12 Description of Physical Conditions

The depth of cover, seam thickness and lithology, which affect the likelihood or extent of subsidence and subsidence related damage are shown on the mine progress, interval, isopach and subsidence maps and addressed within this section and in the mine planning section.

5.25.13 Measures to Prevent Subsidence

In areas where mining may cause undesirable surface movement, steps will be taken to control or prevent subsidence. To prevent subsidence, permanent support can be achieved by selectively mining certain areas, leaving support pillars of coal, and/or by not mining specific areas.

The proposed mine plan identifies a zone of no secondary mining (Exhibit 5.25-1). This zone is designed to protect Soldier Creek, the Western Natural Gas, Inc./REI degasification facilities, the public road and a portion of the existing Questar natural gas pipeline. The route of this pipeline leaves the zone of no secondary mining as it turns east into Pine Canyon and continues northeast over the mine plan area. Since fill extraction longwall mining is proposed for this area, alternative methods of pipeline protection must be evaluated. Agapito & Associates (1991), suggest that uncovering the pipeline through this area may adequately protect it from subsidence damage. Also, the Applicant is presently in discussion with Questar Pipeline Company regarding the possible relocation of their gas pipeline around the proposed full extraction areas. Questar's preliminary reroute proposal is presented in Appendix 10 as Illustration 10.5.25-1. In any case, an agreement between Questar Pipeline Company and the Applicant

shall be executed, and incorporated into this MRP, prior to the commencement of any full extraction mining beneath the existing pipeline.

Agapito & Associates, 1991 (Appendix 5-D) specifically analyzed the potential mining impact to Pine Creek at the point of minimal overburden (approximately 1370 feet). Their analysis is as follows:

USBM (Babcock and Hooker, 1977) suggest several criteria for full extraction mining under major water bodies. These are:

* The cumulative, calculated tensile strain beneath a body of surface water of major potential size shall nowhere exceed $15x10^{-3}$. This criteria is satisfied for Pine Creek as the maximum calculated strain is $11.2x10^{-3}$, near the intersection of the Pine Creek and the longwall barrier pillars.
* Where more than one seam exists, all may be worked by total extraction provided that there is a minimum overburden thickness equal to 58 times the total thickness of all seams to be extracted. This criteria is also satisfied as the minimum overburden thickness is approximately 1350 feet.
* Where a fault which might connect mine workings with the surface stream having a vertical displacement greater than 10 ft is known to exist, no seam should totally be extracted within 50 ft of the faults. Currently, there is no known major fault in the reserve.

At the time of mine abandonment, the Applicant proposes some limited backfilling of mine entries. These entries are associated with the existing mine ventilation shaft, and lie directly beneath the Soldier Creek channel. All such entries, which have less than 100 feet of overburden shall be backfilled with available underground development waste. Backfilling of additional entries with 100 to 250 feet of overburden may also be considered, but only if these entries show significant signs of deterioration upon abandonment. It should be noted that the available information on pillar strengths and overburden characteristics indicate that backfilling is not required for long-term stability. The backfilling proposed is considered a precautionary measure only.

5.25.14 Monitoring

Subsidence monitoring will be carried out on an annual basis and will entail

direct surveys and visual surveys of the mine permit area. The major concern of the subsidence monitoring will be the renewable resources, perennial streams, perennial springs and gas line within the permit area. The methods to be used for monitoring will be ground surveys of monuments and visual surveys during water monitoring or any other surface activities. Initial subsidence monitoring began in 1987 and will continue throughout the life of mine. Annual reports will be sent to the Regulatory Authority detailing all subsidence monitoring activities. The 1987 through 1990~~0~~1 subsidence monitoring summary sheets are presented as Tables 5.25-2 through 5.25-6 respectively. Subsidence data is also located in the annual reports. Also the monuments which have been monitored through 1990 are shown on Exhibit 5.22-1 & 5.25-1.

Monitoring will entail the establishment of surface control monuments within and adjacent to the permit area. This initial survey will provide the Applicant with a base network which will be expanded each progressive year to obtain subsidence information over the permit area. The expanded network will cover the expected development for each progressive year. Each monument will have horizontal and vertical control determined during the initial survey. This information will be used as a comparison tool for all future monitoring.

Annual resurveys of the mine permit area will produce vertical control at the same sites as the previous year (i.e. the base network and all expanded networks). Information on each site will continue to be produced annually while the area underlying the site is being actively mined or is still unstable and subsiding. The subsiding areas which show no change for two consecutive years will be considered stable and will be omitted from further annual surveys. The annual subsidence survey was discontinued with the survey performed in the year 2000. No tangible surface change was noted in the surveys performed in the years following the cessation of mining as noted on Table 5.25-7. Additional survey data can be found on Tables 5.25-2 through 5.25-6 and in the annual reports.

If mining within the dropped sites happens to occur, then the sites will, again, be added to the annual surveys. Also, during random years, some of the dropped sites will be monitored as a check on their stability and any showing a significant change will be included in the following year's monitoring.

In addition to the ground surveys, aerial photogrammetric methods will be included in the surveys when the areas become too large to feasibly handle with

ground surveys. This method will be added to enhance the ground surveys and to cover larger areas as our mine expands to the boundaries. Visual checks for subsidence will be made during all surface activities, especially during water monitoring activities. These visual surveys will be used to detect surface irregularities, surface cracks, and as a check on the direct surveys or any future aerial surveys. Each year a subsidence monitoring report will be sent to the Regulatory Agency. The report will include; dates of surveys, methodology used, results obtained, and mitigative action taken to correct subsidence caused effects. This report will also include changes in the monitoring plan that may be made owing to economic conditions or technical advancement in the art of subsidence monitoring.

5.25.16 Mitigation of Damages

While no damage is anticipated as a result of subsidence from the proposed mining operations, should material damage occur in spite of prevention measures, the Applicant will repair the damage and comply with R645-301-525.230. The Applicant will notify the Regulatory Agency of any slide, rock fall or other disturbance that will have an adverse affect on the environment. If the existing gas pipeline is damaged as a result of subsidence, the pipeline will be repaired by the Applicant. If the roads mentioned earlier are damaged by subsidence, the Applicant will restore the roads to their pre-subsidence usefulness.

TABLE 5.25.7

1997 - 2000 SUBSIDENCE MONITORING SUMMARY

STATIONS 113 (113-SS), 921 (92-1 SS) and 931 (93-1SS)

	Point Description		
	113-SS	92-1SS	93-1SS
Original elevation	7755.71	7816.70	7734.21
1997 Elevation	7755.14	7816.41	7732.67
Difference (ft) Original - 1997	-0.57	-0.29	-1.54

1998 Elevation	7755.06	7816.64	7732.41
Difference (ft) 1997 - 1998	-0.08	0.23	-0.26
1999 Elevation	7755.10	7816.42	7732.68
Difference (ft) 1998 - 1999	0.04	-0.22	0.27
2000 Elevation	7755.08	7816.46	7732.47
Difference (ft) 1999 - 2000	-0.02	0.04	-0.21
Difference (ft) Original - 2000	-0.63	-0.24	-1.74
Year Point Established	1980	1992	1993

5.25.20 Subsidence Control

Soldier Creek Coal Company (SC3) will comply with all provisions of the approved subsidence control plan. SC3 will correct any material damage resulting from subsidence to surface lands, to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before subsidence.

Material damage resulting from subsidence caused to any structures or facilities will be corrected by repairing the damage or compensate the owner of such structures or facilities in the full amount of the diminution in value resulting from the subsidence.

The proposed mine plan will not operate under or in close proximity to any urbanized areas or public buildings.

Also, the mine plan is designed so that mining will not result in material damage to perennial streams or impoundments having a storage volume of 20 ac-ft or, which could result in environmental degradation or safety hazards to streams, water bodies and associated structures. Furthermore, the proposed mine plan is compatible with conservation of existing aquifers within the permit area.

5.25.30 Public Notice of Proposed Mining

Each owner of property or resident within the area above an underground mining

block and adjacent area that could be theoretically affected by subsidence, even though it may not actually occur, will be notified by mail at least six months prior to mining or within that period if approved by the Division. The notification shall contain:

a. Identification of specific areas in which mining will take place.
b. Dates of underground operations that could cause subsidence and specific structures; and
c. Measure to be taken to prevent or control adverse surface effect.

~~5.25 Refuse Disposal Site~~

~~Due to settlement of the refuse and elastic compression of the underlying bedrock, it expected that settlements on the order of 0.5 to 1.0 inches will occur following completion of the disposal area. Some differential settlement of the fill and redistributed topsoil and cover materials will also occur. This minimal settlement is not expected to result in any significant impacts to the site or reclaimed surface.~~

5.26 Mine Facilities

Central Mine Facilities

Soldier Creek Coal Company's (SC3) new surface facilities expansion and road relocation will provide the needed facilities and space to accommodate an increase in coal production and preparation for up to 3.5 million tons/year.

Surface buildings and structures that presently exist (Table 5.26-1) and those described, immediately following Table 5.26-1, will be used in connection with or to facilitate the underground coal mining activities at the Soldier Canyon Mine (SCM), located 12 miles north of Wellington, Utah. The existing and proposed facilities are shown on Exhibit 5.21-1. Construction on all proposed facilities shown in this section (5.26) will begin by September 15, 1996, and will be completed within a two year construction time frame. Any facilities not started by this date will either be deleted from the permit or the permit will be changed to show a new construction starting date.

As depicted on Exhibit 5.21-1, the surface facilities do encroach upon the county road and Soldier Creek. In order to minimize the impact on the water quality, degradation of stream channel and facilitate the road relocation, the applicant

installed approximately 885 feet of culvert. The stream culvert was installed following DOGM's approval of two previously submitted permit amendments (Illustration 10.2.2-1 and 10.2.2-2). The road relocation has been approved by the BLM and Carbon County. Approval to relocate the county road was granted by the Division on July 19, 1991.

All of the facilities presently constructed and to be constructed will be designed for the LOM. The Applicant plans to use all facilities for the normal operation of SCM and will repair or replace the facilities with items of similar performance standards throughout the LOM. The facilities expansion structures will be constructed and meet the performance standards to provide adequate compliance so that no significant harm to the environment, public health or safety will result from the use of the structures.

Measures have been taken by SC3 to ensure the protection of the landowner and public. The BLM (landowner) reviewed the road relocation project and has issued the Applicant the necessary right-of-way permit (Illustration 10.2.1-1). Carbon County has also reviewed the road relocation project and has given their approval (Illustrations 10.2.1-2 and 10.2.1-3).

The facilities and yard expansion will be fenced for security purposes and access to the facilities will be controlled by roadside gates (Exhibit 5.21-1). The fence will be a type A galvanized wire fence, will stand 7 ft. high and supported by 8.5 ft. galvanized steel posts spaced 9 to 10 ft. apart. Fence construction is in accordance with BLM's Land Management Handbook and has barbed wire suspended from the top.

~~The conveyor structure leaving the ROM transfer house will cross the county road totally enclosed, via a tube, and have a 58 foot clearance between it and the county road (Figure 5.26-1).~~

The construction of the surface facilities expansion will allow the Applicant the ability to continue their operation of SCM and improve the coal handling facilities. The initial construction drawings and plans are shown on Exhibits 5.21-1 and Exhibit 7.32-1. During the construction of the facilities, modifications to the drawings and plans may occur, but all modifications will be shown on the final as-built drawings sent to DOGM. Any modification that could alter or effect the design of the runoff controls or the stream culvert will be

sent to the state prior to construction of the facilities.

Designs of the surface facilities expansions at SCM is based on present coal handling problems, ventilation requirements and long-term needs for both at SCM. The following facilities will be constructed during 1992/1993, except for the Portals that were started in October 1989 and completed in August 1991.

1. Three Portals into the Rock Canyon seam will provide additional intake air capacity and will allow SCM to change their underground conveyor facilities.

2. Fourth North #1 belt will connect the underground conveyor system to the surface facilities. This belt has been designed to carry coal from the mine at 3600 tons per hour. The belt will be covered for the total length that it is exposed on the surface.

~~3. The Transfer House with Crusher will be enclosed and equipped with water sprays. Coal will be transferred from the Fourth North #1 belt, crushed to 5"x 0 and then onto the silo conveyor belt.~~

~~4. Silo conveyor belt will accept coal from the Fourth North #1 belt and has been designed to handle 3600 tons per hour. This belt will be covered for the entire length. This belt will discharge coal into the silos. It will have a dribble pan/tube where the belt crosses the county road. The transfer points from the belt to the silos will be enclosed and equipped with water sprays.~~

~~5. The silos will accept coal from the silo conveyor belt. One silo will be equipped with an overflow chute to provide for emergency ground storage.~~

~~6. Vibrating feeders will be placed within the silos and ground storage facility to draw coal from the facilities and dump the coal onto the reclaim belt.~~

~~7. A Reclaim Tunnel will be placed beneath the silo pads. The vibrating feeders will be anchored to the tunnel and a reclaim belt will be placed within and anchored to the tunnel.~~

~~8. The Reclaim Conveyor Belt will accept coal from the vibrating feeders and convey the coal to the Preparation plant. This belt will be covered for the total length that it is outside the reclaim tunnel.~~

~~9. The Baum Jim Preparation Plant will be enclosed and house the equipment necessary for washing coal as needed. Two crushers will be enclosed within the preparation plant. Due to the location of the crushers, water sprays are not anticipated. One crusher will be used to size coal to 2"x 0 when coal quality is such that washing is not necessary and the system is by-passed. The other crusher will be used for the cleaned coal at the and of the washing cycle. Processed coal will then be transferred to the truck bin belt. Refuse from the washing process will be transferred to the refuse bin conveyor.~~

10. An Ash Analyzer, used in monitoring coal quality, will be located along the coal conveyor belt at the coal bins.

11. The Truck Bin Conveyor Belt will ~~accept coal from the preparation plant and will~~ convey and discharge coal to the truck bins. The transfer point from the belt to the truck bins will be enclosed and equipped with water sprays.

12. Two 600 ton Truck Bins will accept the coal from the truck bin belt and discharge the coal into coal haulage trucks. The bins will be equipped with sensors that will automatically open and close the dump gates of the bins.

~~13. The Refuse Conveyor Belt will accept refuse from the preparation plant and will convey and discharge refuse to the truck bin. The transfer point from the belt to the truck bin will be enclosed, but not equipped with water sprays~~.

14. The 300 ton Truck Bin will accept the refuse from the refuse conveyor belt and discharge the refuse into refuse haulage trucks. ~~Refuse will be hauled to the waste rock disposal site.~~

~~15. Thickener Tank is used in the recovery of coal fines from the washing process. These fines settle out through the use of polymers and are then~~

~~sent to a filtering disc where the caked fines are discharged onto the truck bin conveyor and blended with the coal.~~

16. Power Poles will be repositioned and several new poles added to provide electrical power to the facilities.

17. Substation 46 KV will be constructed to supplement the present power source needed to operate the new facilities.

18. A culvert has to be placed into the natural channel of Soldier Creek to allow for the construction of the facilities and to protect this water resource. The culvert was designed for the 100-year, 24-hour storm event.

19. County Road will be relocated eastward to facilitate SCM's expansion. The new road will be built using current and prudent engineering practices. The road will be a county road and maintained by the County.

20. Access Roads into the expansion will provide an access to the mine portal area and haulage facilities. These access roads will be classified as primary roads and constructed to meet all prudent regulations.

21. A Concrete Protection Pad has been placed over the gas line to permit haulage of men and material over the gas line and into the portal area.

22. Drainage controls will be placed within the expansion to provide runoff control for the surface facilities, yard expansion, and undisturbed drainage. Additionally, several operational drainage controls may be upgraded to provide the necessary facilities to handle the design event.

23. Fences and Gates ~~will be~~ were placed along the county road and across the culvert in the stream to limit any unauthorized access to the surface facilities expansion. Also, the fence enclosing the present storage yard will be removed and relocated to accommodate the new facilities.

24. Other miscellaneous items may be added to the design to improve the overall operation of the facilities, but all such items will be listed and shown on the as-built drawing that will be submitted to DOGM.

Topsoil Storage Site

The Topsoil storage site was constructed to handle the storage needs of the mine. The site is located approximately 2.5 miles southwest of the mine and is located within 100 feet of a public road (Exhibit 5.21-2).

The storage site is 4.5 acres, of which only 2.3 acres is presently being used for the storage of topsoil, substitute topsoil and landscape boulders/riprap. ~~Upon approval of the refuse disposal site, the remaining acreage will be used for the storage of topsoil and subsoil that will be harvested prior to placement of refuse.~~

Refuse Disposal Site

Previous submittals have included sections on a refuse disposal site. These references have been omitted from this document since this site is no longer proposed for the Soldier Creek Mining operation. The operational history has shown little need for such a site. Disposal, if any should occur, will be at a permitted disposal site.

~~The refuse disposal site is located approximately 3.0 miles southwest of the mine site. The construction of the site is necessary for disposal of coal mine waste that will be generated during operation of the preparation plant and other underground operations.~~

~~No buildings or utilities are planned for the operation of the refuse disposal area. Facilities will include the access road, the refuse disposal area, diversion ditches for the disturbed and undisturbed areas, and a sediment pond. The access road is discussed in sections 5.27 and 5.34 of this application. The refuse pile is addressed in sections 5.28 and 5.36 of this application. The diversion ditches and sediment pond are discussed in sections 5.32, 5.33 and Chapter 7.0 of this application.~~

5.26.20 Utility Installations and Support Facilities

5.26.21 Utility Installations

Questar Pipeline

A Questar Pipeline Company gas line passes through the property in a northeasterly direction. The pipeline was constructed in 1962-1963 and is

presently in use (Exhibit 1.12-1).

Methane Recovery Facilities

Resource Enterprises, Inc.'s (REI) methane collection facility offices and storage yard are located within the mine permit boundary. These facilities include gas collection and pump systems, office, bathhouse and storage yard (Exhibit 5.21-1). REI's methane gas recovery operation exploits the coalbed gas resource by working in unison with the underground mining operation. This operation holds permits and approval from the Mine Safety and Health Administration and the BLM. The produced gas is sold to Questar Pipeline Company and injected into their pipeline which passes through the Applicant's permit area.

Power Supply

Utah Power provides electrical power for the entire mining operation. Presently, two substations distribute power to the underground equipment and surface facilities with a third substation, planned for construction during the facilities expansion (Exhibit 5.21-1). The existing substations and the planned substation, are and will be 46 KV. The electrical system complies with all federal, state and local requirements. The transmission lines were constructed by Utah Power & Light and Electrical Contractors and have raptor-resistant towers to minimize the potential for adverse impacts to wildlife (Figure 5.26-3).

Disturbance caused by company own transmission lines is very minimal. Transmission poles are spaced approximately every 200' - 400'. Disturbance at each site is usually limited to a 2' diameter area. Using Soil Conservation Service formulas:

$$Q = \frac{(P - 0.S)^2}{P + 0.8S}$$

$$S = \frac{1000}{CN} - 10$$

S = Watershed storage factor (inches)
P = Rainfall depth (inches) = 1.90" 10 year-24 hour event
CN = Runoff curve number (dimensionless) = 75
Q = Direct runoff volume (inches) = .333" calculated

The total runoff from each site is .65 gallons. This runoff is very minimal and due to vegetative cover and low flow velocities, erosion is not a problem. If

erosion should become a problem, sediment control structures such as straw bales and silt fences could be used. Refer to Figure 5.32-1 ~~page 5-50a~~ for sediment control structures.

Diesel generators provide emergency power to the ventilation fans in the event of a power failure.

Communications

A telephone system tied into the U.S. West Communication's system provides direct communication between the portal area in Soldier Canyon and the central facilities area. A sufficient number of hook-ups have been installed to provide easy access in case of an emergency.

In addition, an independent, private system is functioning. This system includes hook-ups in the mine to provide communication with the portal and central facilities areas. It was designed for easy and rapid access to maximize safety and complies with all current MSHA requirements.

The Applicant's coal mining and reclamation activities will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by gas, electric and telephone lines which pass over, under or through the permit area, unless otherwise approved by the owner of those facilities and the Division.

5.26.22 Support Facilities

All support facilities incident to the operation of Soldier Canyon Mine will operate in accordance with a permit issued for the mine. Support facilities will be located, maintained, and used in a manner that prevents or controls erosion and siltation, water pollution, and damage to public or private property; and to the extent possible using the best technology currently available minimizes additional damage to fish, wildlife and related environmental values; and minimizes additional contributions of suspended solids to stream flow or runoff outside the permit area. Any such contributions will not be in excess of limitations of Utah or Federal law through adequate design and operation of appropriate water pollution control facilities.

~~A step-by-step progression through the coal conveyance facilities, potential waste material and water discharges is shown on Figure 5.26-1. and 5.26-2.~~

~~1.0 Liquid discharges from the facility during normal operations and maintenance operations are discussed below.~~

~~1.1 Washdown Effluent from the Covered Portion of the #1 Raw Coal Transfer Conveyor~~

~~This will be routine maintenance operation to take care of any coal spillage that remains after the material has been shovel cleaned. The effluent will be collected in a catch pan fitted with a ½" aperture screen. +1/2" material will be shovel cleaned off the screen. Material and water passing through the screen will be directed to the yard drainage collection ditch below. Hose output would be 35 to 50 gallons per minute.~~

~~1.2 Washdown Effluent from the Silo Reclaim Area Including the Conveyor Extension~~

~~This will be a routine maintenance operation for coal spillage in the area that remains after shovel cleaning. The hose water and coal will be washed down to a collection sump at the rate of 35 to 50 gallons per minute. The collection sump will be fitted with a ½" aperture screen. Plus ½" material will be shovel cleaned off the screen. Material and water passing through the screen will be pumped via units (111A) and (111B) into the yard drainage collection ditch adjacent to the silo. Each pump is capable of 75 gallons per minute and only one pump should be operated at one time. Pump start-up and shut-down is controlled by high and low level float controls.~~

~~Any silo pad drainage water that may pass through the reclaim hopper together with any water drainage from the silo contents will also eventually end up in the collection sumps.~~

~~1.3 Effluents from the Coal Preparation Plant~~

~~There should be no discharges from the plant during normal operations as it uses a closed loop concept.~~

~~During coal washing operations the plant requires an addition of water to make-up for the losses contained in the moisture added to the refuse and cleaned coal product. These losses are in the order of 19 gallons per minute.~~

~~All water used inside the plant is reclaimed and recycled. Washdown water used both during washing hours and non-washing hours is also reclaimed.~~

~~Unless there is a simultaneous failure of both clean-up sump pumps in the plant, all liquids contained within the plant that pass onto the ground floor will pass to either the fine coal (jig) sump or in an emergency situation to the sediment pond via the yard area ditch. Mr. Michael D. Herkimer, Division of Water Quality (DWQ), told Tom Paluso on August 13, 1992, that Soldier Creek would be allowed to discharge to the sediment pond during emergencies. DWQ would have to be notified of these discharges.~~

~~A copy of our present NPDES permit is on page 5-39b, Illustration 5.26-1.~~

~~In the event that a surplus of water exists in the plant due to operator error, the floor clean-up sumps are fitted with manually operated, valve by-pass pipes delivering the water to the sediment pond via the drainage ditch.~~

~~1.4 Drainage from Loadout Bins~~

~~Depending upon the length of time that the material is stored in the specification coal and refuse bins, there may be some drain down of the surface moisture.~~

~~This water will pass via the yard area into the drainage ditches. Extra dewatering capacity has been included in the preparation plant in the refuse circuit to minimize this problem.~~

~~2.0 Liquid Discharges from the Facility During Maintenance Operations~~

~~Other than the preparation plant, There should be no additional liquid discharges from the rest of the facilities that are not described in Section 1.0.~~

~~2.1 Preparation Plant~~

~~Most maintenance situations can be handled without any outside discharges of liquids.~~

~~There are, however, three major liquid storage vessels forming part of the preparation plant that may affect this.~~

~~1. The fine coal (jig) sump which contains approximately 43,000 gallons~~

maximum

2. The clarified water sump containing 9,300 gallons.

3. The thickener containing approximately 90,000 gallons.

The thickener and the fine coal sump contain a mixture of water and fine coal (minus 100 mesh and 0.75 mm respectively) during normal washing operations.

The fine coal sump is fitted with high and low level drain connections, discharging to the floor. In the event that too much water was allowed to accumulate in that circuit due to operator error, the high level drain could be utilized to drain off excess liquid. If this was done during operations, the liquid would contain fine coal. During shut down periods the liquid would be "clear". The drainage would pass via the floor collection sump pump to either the fine coal sump for solids recovery or directly to the sediment pond via ditch if the liquid was "clear". The above scenario would also apply if ever the entire sump had to be drained in which case every effort would be made to recover the solids portion of the contents via the cyclone and disc filter circuit.

It should be noted that during normal operations, the jig itself retains approximately 27,000 gallons of the sump contents. This amount will always remain in the jig unless it is physically drained.

The jig would require draining to perform certain maintenance operations. The water would pass into the fine coal sump and any overflow of the sump would be dealt with as described earlier.

The clarified water sump is fitting with a low level drain that discharges onto the floor. The water would then pass into the floor collection sump pump for disposal to either the fine coal sump or sediment pond as described earlier.

The thickener is fitted with a variety of devices to ensure efficient operation and maintenance facilities. It has high and low level drains each piped to the yard area drainage ditch. The thickened sludge from the bottom discharge cone is extracted via dual outlet pipes and pumps (1 operating, 1 standby). Each pipe and pump system is equipped with high pressure water connections for preventative flushing to ensure optimum working conditions after shutdown.

The thickener tank has sludge level sensing device which tells the operator

~~exactly where the separation is between the thickened sludge and clarified water.~~

~~For a planned thickener drain down (i.e. with all ancillary equipment working) the thickened sludge would be evacuated via the underflow pumps and recovered via the disc filter. The remaining "clear" water would then be drained via the ditch to the sediment pond. On a sludge worst case basis, approximately half the thickener contents could be sludge, leaving approximately 45,000 gallons of "clear" water to be directed to the pond.~~

~~For a worst case unplanned emergency thickener drain down (i.e. no thickener rake rotation availability), the following is one possible procedure.~~

~~1. Remove as much sludge as possible via the underflow pumps, disc filter, etc.~~
~~2. Drain the fine coal sump (recovering any solids) discharging "clear" liquid to the pond.~~
~~3. Use the high level drain on the thickener to discharge the "clear" liquid to the pond.~~
~~4. Bring in the external sludge pump and transfer material to the fine coal sump.~~
~~5. Repair/re-instate thickener~~
~~6. Pump transfer fine coal sump sludge back to thickener.~~

~~As stated in Section 7.42-3, the Applicant will discharge from the plant only if no precipitation event is occurring, unless operational and safety hazards are imminent.~~

~~3.0 Anticipated Oversize and Undersize Waste Material~~
~~There is only one size of waste material produced by the preparation plant which is not added to the specification coal conveyor, this is the refuse product. The typical amount is shown on the flowsheet. This will vary depending on the raw coal quality.~~

Culinary Water

The Applicant purchases all culinary water from authorized ~~D& D Equipment and Supply~~ distributors ~~of Helper, Utah~~. ~~D&D~~ The distributor purchases culinary water from Price City and Wellington City public water loadouts. ~~Deliveries are made twice a day and total approximately 3,000 gal.~~ The holding tank at the mine

site has a capacity of 60,000 gal.

Sanitary Wastewater

Soldier Canyon Mine uses a total containment lagoon system constructed in the fall of 1982 to treat wastewater. The system includes a metal septic tank, a sewer line and 2 self-contained lagoons having a surface area of 0.14 ac each (Exhibit 5.26-2).

The septic tank located at the mine site is coated according to Underwriters Laboratories, Inc. specifications UL 70 and is used to collect all solids before releasing the water into the 4 in. line. The water is then transported to the lagoons, approximately 11,655 linear feet southwest of the main facility area, by the 4 in. gravity flow line. Along the line there are several cleanouts to ensure proper functioning. The water exits the pipeline and empties into the containment lagoons which consist of two clay-lined cells with a designed capacity of over 3,200 gal. of wastewater per day. Each cell is lined with clay to limit seepage to 0.125 in. per day. The embankment slopes are 3:1 and are riprapped.

A contract hauler transports sludge from the septic tank to the Wellington wastewater treatment plant for disposal or to the sewage lagoons. The hauler is qualified to dispose of sludge.

The wastewater system was designed by Horrocks and Carollo Engineers with all plans and designs approved by the Utah Division of Health. The location of the lagoon and the pipeline system are shown on Exhibit 5.26-2. The lagoon is surrounded by Type A galvanized wire fencing to keep out deer and other large mammals. Sludge remaining after evaporation will be disposed of on-site or may be used for soil reclamation. Dikes and the area around the lagoons have been successfully revegetated.

Mobile Screening Unit

The Applicant will at times use a mobile screening unit to screen run-of-mine coal at the mine site. The screening unit is proposed to be used occasionally, until the new surface facilities can be constructed. The screener will be placed adjacent to the existing ground storage stockpile and coal will be supplied for screening via a front-end loader. The screened coal will be stockpiled, and the coarser material will be placed back on to the original stockpile and transported

to Banning for processing. Exhibit 5.21-1a shows the approximate location of the screener and associated screened coal stockpiles.

5.26.3 Water Pollution Control

Industrial Wastewater

Any ground water which is encountered is collected in sumps and pumped into Soldier Creek in accordance with 614-301-731 and 614-301-751 and the National Pollutant Discharge Elimination System (NPDES), Permit No. UT-0023680 (Table 5.26.2). In accordance with R614-301-731.222.2 the Applicant will notify the Regulatory Authority within five days of receipt of analytical results that indicate noncompliance with permit conditions. At least every three months monitoring data will be submitted to the Division.

Wastewater produced from mine equipment washdown or facilities cleanup very widely in volume and concentration of wastes. These wastes are treated in grease and sediment traps at the sources and either recycled or discharged to the sediment pond.

5.26.4 Air Pollution Control

Coal mining and reclamation activities will be conducted in accordance with R614-301-420 and the Air Quality Approval Order issued by the Utah Division of Air Quality (Appendix 4-D).

5.27 Transportation Facilities-Road Classification

Central Mine

There is one main road leading to Soldier Canyon Mine, Soldier Creek Road. This 30 ft. wide public road, maintained by Carbon County, is paved to the mine site. Beyond the mine the road is graveled for several miles, branching in Sec. 32 T12S, R12E with one branch going northeast through Nine Mile Canyon and the other to the northwest. Other portions of the permit area may be reached by sporadically maintained trails and jeep trails. Mine staff infrequently use (4 time per year) ranch roads to access water monitoring locations (Exhibit 7.21-1).

The No. 1 exhaust fan, two ventilation slopes, water tank, and access road are located directly northwest of the main mine buildings (Exhibit 5.21-1). These

facilities were constructed in 1975-76 as part of a major improvement and rehabilitation project of the existing mine. Specific details of the area are shown in Figure 5.27-1.

Table 5.26-2

NPDES Effluent Limitations
(Permit No. UT 0023680)

During the period beginning immediately (July 1, 1991) and lasting through March 31, 1996, the permittee is authorized to discharge from Outfalls 001, 002, 003 and 004. During the permit period, discharge from Outfalls 005, 006 and 007 is only authorized upon completion of a final construction inspection by Utah Bureau of Water Pollution Control and authorized by the Bureau to place the facilities in operation. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Monthly Average	7-Day Average	Daily Maximum	Sample Type a/	Frequency
Flow, M^3/day, gpd	N/A	N/A	N/A	2/month	Measured b/
Total Suspended Solids, mg/L	25	35	70	2/month	Grab
Iron (Total), mg/L	N/A	N/A	2.0	1/month	Grab
Total Dissolved Solids, mg/L c/	N/A	N/A	1,200	2/month	Grab
Oil and Grease, mg/L	N/A	N/A	10	1/month	Grab

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken for compliance with the monitoring requirements specified above shall be taken at the discharge points prior to mixing with the water in Soldier Creek.

a/ See Definitions, Part I.A.

b/ For the intermittent discharges, the duration of the discharge shall be reported.

c/ In addition to the concentration limitation, the total amount of Total Dissolved Solids (TDS) discharged from all outfalls is limited to five tons (10,000 pounds) per day.

Design and construction of the No. 1 exhaust fan and associated road preceded the regulations pertaining to surface effects of underground coal mining (i.e., Utah Code Annotated U.C.A. 40-10-1 et seq). The access road, as constructed, does not fully comply with these regulations (specifically R614-301-527.100 and R614-301-534 Primary Roads) However, the Applicant believes for the following reasons, that the existing road meets or exceeds the performance standards intended by complying with R614-301-527.100 and R614-301-534.

1. All runoff from the road is conveyed directly to the central facilities sedimentation pond. This sedimentation pond provides the best available runoff treatment to prevent additional contributions of suspended solids to the natural drainage.

2. Adequate drainage and erosion controls have been constructed and maintained by the Applicant.

3. The horizontal and vertical alignment of the road has provided acceptable access while minimizing the area disturbed. Alternative alignments were very limited due to the extreme rugged terrain of the area.

4. Road cuts and embankments constructed in 1975-76 have demonstrated adequate stability.

5. Final reclamation for the site has been addressed and approved.

The surface expansion will involve the relocation of the county road and the establishment of two primary roads. The county road will be constructed according to the County and BLM specifications. As shown by the County and BLM approvals, the road satisfies their requirements. Although the County will operate and maintain the new road, the Applicant will maintain reclamation liability for the area throughout the bond liability period.

The two primary roads will be constructed and maintained according to the regulations. The primary road leading into the yard will split in order to access the haulage facilities. The other primary road will access the new portals. Exhibit 5.21-1 and Figure 7.32-1 show the new location of the roads and typical design. As-built drawings and certification of the primary roads will be submitted upon completion of construction of the new operations.

Sewage Lagoons

Accessing the sewage lagoon is an ancillary road, approximately 1,000 ft. in

length extending from the Soldier Creek Road to the sewage lagoon (Exhibit 5.26-1). Mine staff infrequently use this (4 times per year) to inspect the lagoon and diversion structures.

Topsoil Storage Site

Accessing the topsoil storage site is a ancillary road, approximately 100 ft. in length extending from the Soldier Creek Road to the storage site (Exhibit 6.1-1). The road will only be used when material is to be stockpiled and for monitoring diversion structures and vegetation. The designs, specifications, and plans for this road are presented or discussed in Section 5.34 of this application.

~~Refuse Disposal Site~~

~~The refuse material will be transported from the mine site to the disposal site via the county road. The access road to the refuse disposal area is located approximately 3 miles from the mine site. The trucks conveying refuse to the site will not be overloaded, therefore, spillage and wind losses should not occur in route. If any spillage does occur, it will be cleaned up and transported to the disposal site as soon as practical.~~

~~The access road will be classified as a primary road and will be used for the purpose of hauling refuse to the site for disposal and water for dust suppression. The road will consist of a paved all-weather surface from the county road to the crest of the ephemeral drainage (See Plate 5-1). The road into the drainage will consist of a graveled surface which will be treated to minimize dust and maintenance. Life of this road will be for the life of the facility, following which the road will be reclaimed. The location of the all-weather section of the road will not change during the life of the road, while the gravel portion will have a dynamic location depending on the location of the active refuse disposal area. The designs, specifications, and plans for these roads are presented or discussed in Section 5.34 of this application.~~

~~A secondary road, for access to the sediment pond and water monitoring wells, will be located and constructed in the bottom of the drainage from the head of the drainage to the sediment pond location. The road will consist of a graveled surface which will be treated to minimize dust and maintenance. The life of this road will also be for the life of the facility, however, due to incremental enlargement of the refuse pile, the length of the road will decrease as the pile size increases. The designs, specifications, and plans for this road are~~

~~presented or discussed in Section 5.34 of this application.~~

5.27.2 Transportation Facilities

The present coal haulage conveyor used in carrying coal from the underground workings to the surface facilities is a 42 in. wide conveyor belt. The conveyor extends beyond the portal to the coal loadout bin. The belt conveyor, constructed in 1976, has a rated capacity of 1,000 tons/hr.

On the surface, the coal is conveyed to and stored in a 600 ton surge bin with automatic truck loading equipment capable of loading 250 tons/hr. Constructed during June and July 1977, the 600 ton capacity loadout bin provides sufficient storage to accommodate production fluctuations.

The coal is then trucked (42 ton/load) by a contract hauler down the canyon 19.3 miles to the Banning Siding Loadout facility ~~operated by Coal Service Company~~. The Applicant performs no additional processing or preparation on the coal before shipment. ~~However, Coal Service does~~ The operator maintains a crusher at the train loadout facility which reduces the product to 2x0 in.

~~As shown on Exhibit 5.21-1, the coal haulage, storage, preparation and loadout facilities will be improved to accommodate any projected increase in coal production up to 3.5 million tons per year. The flow sheet (Figure 5.26-2), shows the flow of coal exiting the mine, via the 4th North conveyor, and the step-by-step progression through the coal conveyance system. Exhibit 5.26-1 shows the conveyor profiles to be constructed, used and maintained upon completion of the new surface facilities.~~

~~Two ground storage stockpiling locations will be used in connection with the facility expansion (Exhibit 5.21-1). One, is located adjacent to the coal silos and will occur as a result of overspillage from #2 coal silo. The other ground storage is adjacent to the existing loadout bin and present coal stockpiling area. The coal stockpiling capacities will be approximately 3000 tons and 10,000 tons respectively.~~

~~When the new facilities are operational, the present conveyor structure will no longer be used and eventually removed. The portion of the existing conveyor that conveys coal to the loadout bin will remain and may eventually be used to provide~~

~~the operation with the facility to stockpile the approximate 10,000 tons of coal ground storage adjacent to the loadout bins.~~

5.28 Handling and Disposal of Coal, Overburden, Excess Spoil and Coal Mine Waste

During the construction of the facilities and further development of the new portals, excavated and underground development material will be generated. The Applicant will temporarily store this material on site (Exhibit 5.21-1a) until the material can be utilized in the construction of pads and roads for the facilities. ~~Any excess material will be removed from the central facilities and placed at refuse disposal site for final placement.~~ During the backfilling of the culvert extension, underground development material was placed at least 8 feet up from the bottom of the culvert to minimize any chance of saturation. The material was analyzed (Illustration 10.2.6-1) and approved by the Division for use as backfill. This will be used for backfilling of the highwalls during reclamation. All underground development materials used in backfilling and grading operations during construction of the new facilities will be accounted for in the reclamation plan and will be placed at the bottom of the highwalls and covered with at least 4 feet of nontoxic and noncombustible material.

~~Until the Applicant's refuse disposal site is constructed,~~ The temporary stockpiling of underground development waste and/or excess spoil will be placed as shown on Exhibit 5.21-1a. Presently, the only anticipated underground development waste will be generated during the grading of the portal roadways. Therefore, a maximum of 1000 yd^3 of underground development waste and/or excess spoil will be stored on the operations pad. ~~Upon approval of the refuse disposal site, all excess material will be transported to the site for final placement.~~

Sampling of all future coal mine waste and excess spoil ~~temporarily stockpiled for longer than 3 months~~ will be, by a composite sample and, analyzed according to Table 6 of the "Utah Guidelines for Management of Topsoil and Overburden". ~~Additional sampling will be performed on material placed since the previous sample.~~ Lab results will be submitted to DOGM with the annual report. In the event that acid and toxic forming materials are identified, the Division will be notified and additional sampling of the material will be performed to define the extent of the problem material.

The sampling program and runoff control, developed by the Applicant, will

minimize the potential for any adverse impact to the environment as required by R614-301-731.300.

Overburden material that will be used for pad and other construction at the mine site were sampled for possible toxic contaminants. Representative samples of the overburden and underburden were taken from a previously completed portal exploration cut. Initial samples were taken on 5/8/89 with subsequent resampling completed on 9/30/89. Respective analysis sheets are presented as Illustration 10.2.6-2. (Note: the second analysis was requested by DOGM due to unusually low values originally determined for neutralization are acid potential. Additional detail on % sulfur and % calcium carbonate were also requested).

Based on the 9/30/89 sample analysis, the following values have been determined.

Parameter	Overburden	Underburden
Total Sulfur as S,%	0.03	0.10
Calcium Carbonate as $CaCO_3$,%	20.3	18.8
Acid Potential*	0.94	3.12
Neutralization Potential*	203.00	188.00
Acid Base Potential*	202.06	184.88

*Reported as Tons $CaCO_3$/1000 Tons Material

~~Refuse Disposal Site~~

~~Only a small area of the refuse pile is anticipated to be active at any one point in time. To minimize the area exposed and the area disturbed, the refuse pile will be constructed in segments. Figure 5-1 shows a typical plan view and cross section of the pile operation. The operation of the refuse disposal facility will consist of the following procedures: development of the area of disposal, refuse placement and pile construction, regrading and covering of filled pile sections, and reclamation of the active segment of the pile.~~

~~Site Development~~

~~The development of the initial segment of the refuse disposal area will consist of the construction of the runoff control facilities, stripping of vegetation and topsoil from areas to be disturbed during the initial segment, and excavation of the subsoil from these areas. The location of the runoff control facilities are presented in the EarthFax Engineering, Inc. report (see Appendix 7-J). These facilities will be constructed prior to any development activities. The runoff control facilities will consist of undisturbed diversion ditches above the facility, disturbed area collection via the existing natural drainage channel below the active refuse disposal area, and a sediment pond. Design plans for~~

these facilities are presented in Section 5.33 and Chapter 7 of this application.

Prior to the placement of any refuse for the initial or any subsequent segment of the pile, all vegetative cover shall be removed from the area for refuse placement. After removal of the vegetation from the given segment, the topsoil shall be removed, stockpiled, and properly protected for future reclamation purposes. The topsoil stripping plan is presented in Chapter 2 of the application. The topsoil will be stockpiled at the temporary topsoil stockpile area indicated on Plate 5-1.

A portion of the sub-soil materials beneath the topsoil will also be removed, stockpiled, and protected. This material will be used as fill to cover the refuse following regrading of a prior segment of the pile. The subsoil stripping plan is also presented in Chapter 2 of this application. This material will also be stockpiled at the temporary stockpile area.

Refuse Pile Construction

The refuse pile construction and placement of material for each segment of the refuse pile will be constructed in 100 foot wide benches with horizontal lifts not to exceed three feet. The refuse material shall be dumped from haul trucks and reworked by suitable earth moving equipment capable of spreading, compacting, and leveling the lifts. This method will assist in achieving the desired densities and prevent the formation of large voids in the refuse materials. Additional compaction for each lift can be achieved by controlling the routing of the loaded haul trucks to cover the entire surface of a given segment of a lift evenly. All construction slopes of the fill outface should not be steeper than 2h:1v. The final exterior slopes of the fill outface should not be steeper than 3H:1V.

The refuse material generated from the coal preparation plant will consist of sandstone, shale and bony coal. The gradation of this material will range from +3/8 inch to -5 inches. All materials -3/8-inch will be shipped with the coal. Due to the anticipated coarse, open graded nature of the refuse material, most quality control work for the pile will be on a visual basis. Conventional in-lace density tests will not give reliable results under these circumstances.

Based on preliminary analyses of material similar to that which will be placed in the refuse site, no acid or toxic-forming problems are anticipated (copies of

~~the laboratory results are presented in Appendix 6-B). Samples of the refuse will be collected quarterly when the site is receiving material and will be analyzed for acid and toxic-forming potential. Should a problem be identified, a mitigation plan will be prepared and submitted to DOGM for approval within 30 days of receipt of the analysis. Once the mitigation plan is approved, all identified potential acid and/or toxic-forming materials will be disposed of in accordance with the approved plan.~~

~~Noncoal waste and fines from the preparation plant will not be deposited at the refuse disposal site. Noncoal waste will be handled as indicated in Section 7.47. Fines from the preparation plant will be shipped with the coal. The only spoil anticipated from the mine will be from the cleaning of the facilities area sediment pond and excavated material directly related to the facilities expansion.~~

~~Regrading and Covering~~

~~Once the lifts of each segment of the pile reach the proposed top elevation for that segment of the pile, the surface of the refuse will be regraded to conform with the proposed final topographic configuration. This material will then be covered with the fill which has been previously removed and stockpiled from a prior segment of the pile. It is planned that future operations of the facility will allow fill and topsoil stripped from expansion sections to be placed directly on areas which have been regraded and are ready to be covered. This will minimize the amount of double handling of the materials. This regrading and covering will be conducted in accordance with the regrading and reclamation plans addressed in Section 5.37 and 5.40 of this application.~~

~~The final segment of the refuse pile will have an outslope of 3h:1v. This slope will facilitate the reseeding of the area.~~

~~Following the regrading and cover placement on the current site segment, the stockpiled topsoil will be spread over the regraded segment and will be treated according to the redistribution plan presented in Chapter 2 of this application. Additionally, the current segment of the site will be reseeded and revegetated according to the plan submitted in Chapter 3 of this application.~~

5.29 Management of Mine Openings

During operation of the Soldier Canyon Mine, access to all mine openings are controlled by the operator during working and nonworking hours. For security reasons, the central mine facilities, except for the parking lot, are fenced and access controlled by gates.

Any mine entry that is temporarily inactive, but has a future useful life, will be protected by barricades or other covering devices, fenced, and posted with signs to prevent access into the entry and to identify the hazardous nature of the opening. These devices will be periodically inspected and maintained in good condition by the Applicant.

Permanent sealing of underground openings is discussed in Section 5.51 of this application.

5.30 Operational Design and Plans

5.31 General

The design for the Soldier Canyon Mine facilities and associated sediment control structures are presented in this section.

5.32 Sediment Control

The design of sediment control structures is presented in Chapter 7 of this application. The designs are intended to minimize the disturbance to the hydrologic balance by distributing the smallest practical area and through contemporaneous reclamation ~~to stabilize the regraded and contoured refuse material as soon as practical~~. These activities will result in a reduction of the runoff and sediment rate and volume expected from the site area.

5.33 Impoundments

Central Mine

The only impoundment at the mine site is the temporary sediment pond used for the purpose of sediment control during the life of mine and reclamation operations. The pond was initially designed by Vaughn Hansen Associates in July 1979 and subsequently modified by EarthFax Engineering, Inc. in March 1991. The design of the pond is presented in Chapter 7 of this application. A geotechnical

investigation performed on July 14, 1986 of the sediment pond embankment, based on site specific soils information, has shown that adequate safety factors can be maintained. The EarthFax report indicates that the sediment pond has a minimum safety factor for the inslope and outslope of 2.60 and 1.79 respectively. At the same time random compaction tests averaged 95 percent of the maximum dry density as determined by ASTM D-1557. This information is also presented in Appendix 7.

During the pond construction all vegetative and organic materials were removed and the foundation prepared to resist failure. Slope protection is provided against erosion by the existing stand of vegetation.

~~Refuse Disposal Site~~

~~No permanent impoundments are planned for the refuse disposal area. The only impoundment planned is the temporary sediment pond used for the purpose of sediment control during the life of the disposal and reclamation operations. This pond has been designed by EarthFax Engineering, Inc. The sizing and hydrologic design of the pond is presented in Chapter 7 of this application. A geotechnical investigation of the proposed sediment pond was conducted by EarthFax Engineering, Inc. and is presented in Appendix 5-A. The EarthFax report indicates that the sediment pond will have a minimum 1.5 static safety factor and a minimum 1.2 seismic safety factor.~~

~~The physical design of the sediment pond requires that the foundation and abutments be cleared of all vegetative and organic matter. The foundation site will be excavated to the design depth. The top 9-inches of the area for embankment construction shall be scarified and recompacted to 90 percent of the maximum dry density as determined by ASTM D1557. Moisture content during compaction should be maintained a +/-2 percent of the optimum as determined by ASTM D1557.~~

~~The embankment fill material shall be placed in horizontal lifts not to exceed 12-inches in thickness prior to compaction. Embankment materials shall be compacted to 90 percent of the maximum dry density as determined by ASTM D1557. Moisture content during compaction should be maintained a +/-2 percent of the optimum as determined by ASTM D1557.~~

~~Embankment materials shall be free of organic material. The ML materials~~

~~identified in test pit TP-1 shall be used in the construction of the embankment. No refuse materials shall be used in the embankment fill.~~

~~During the embankment construction, the CMP pipes for the principle and emergency spillways shall be placed at an average gradient of 2.5 percent through the embankment. Structural fill within 2.0 feet of the CMP pipes shall be hand-compacted to a dry density of at least 90 percent of ASTM D1557 at a moisture content of +/- 2 percent of the optimum. During the placement and compaction of the fill along the CMP pipes, the pipes should be preloaded to prevent them from pushing up and out to alignment. Preloads should be maintained until at least one of the pipe diameter has been placed and compacted. Two anti-seep collars within minimum dimensions of four feet by four feet shall be placed around each of the CMP pipes, at 30-foot spacings along the length of the pipes. The anti-seep collars shall have water tight connections to the CMP pipes.~~

~~To prevent erosion, the interior and exterior slopes of the embankment should be vegetated with the temporary seed mix as discussed in Section 3.31 of this application.~~

5.34 Roads

General

The primary roads associated with the Soldier Canyon Mine will be located, in so far as practical, on the most stable available surfaces. The roads will be surfaced with rock, crushed gravel, asphalt or other material approved by the Division as being sufficiently durable for the anticipated volume of traffic and weight and speed of vehicles using the road. They will be routinely maintained. ~~to include repairs to the road surface, bladeing, filling potholes and adding replacement gravel or asphalt.~~ It will also include revegetation, brush removal, and minor reconstruction of road segments as necessary. Culverts will be installed that are designed, installed, and maintained to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the roads. All roads will meet the requirement of R645-301-534.200 and R645-301-742.420.

Central Mine

The surface expansion of the central mine facilities will produce two primary roads. The primary road leading into the yard will split in order to access the

haulage facilities. The other primary road will access the new portal area. Exhibit 5.21-1 and Figure 5.34-1 show the location of the roads and typical design. For the interim, until the facilities are constructed, the primary roads will not fit the typical design. During construction activities, it would not be practical to asphalt and install the permanent LOM road surface and half-round diversion ditches. Therefore, the Applicant proposes, for the interim, that a graveled road surface and earthen ditches be constructed.

Drainage from the roads will be collected in road side ditches and conveyed under the roads via drainage culverts. These ditches and culverts are sized to handle the 10 year 6 hour precipitation event. The designs for these structures are discussed in Chapter 7 of this application. To minimize erosion and sediment from the road outslope, the outslopes of the road will be vegetated.

The area not designated as a primary road will be the pad area. The pad areas will be used for mine related storage and activities. Due to the storage of mine related material, the travel paths in these areas will be ever changing in response to the amount of material at the site.

The county road was realigned for approximately 1235 ft. (Exhibit 5.21-1) to accommodate the surface facilities expansion. The road design was performed by Creamer & Noble Engineering. The Applicant designed its runoff control and treatment facility, to control and treat all runoff from the realigned portion of the county road. The design and layout of these structures are discussed in Chapter 7 of this application. Also shown with this information, is a typical design of the county road.

The county will maintain and operate their road, but the Applicant will assume the relocation and reclamation costs during reclamation of the Soldier Canyon Mine. Upon reclamation, the county road will be relocated to its approximate pre-alignment location as shown on Exhibit 5.53-1.

Sewage Lagoons

The ancillary road extending from the county road to the sewage lagoon is an earthen road with two 18" drainage culverts. This road is a remnant of the old county road, once used for travel, up Soldier Canyon. Due to the infrequent use of this road, very little maintenance is performed. The road site ditches and culverts are inspected and maintained as necessary.

Topsoil Storage Site

Access to the topsoil storage site is by an ancillary road extending from the county road. This access road is constructed as shown on Figure 5.34-2 with two 18" drainage culverts. The design of these culverts is discussed in Chapter 7. To minimize erosion along the road outslopes, riprap was placed on the outslopes. As required by the regulations, culverts will be inspected to ensure that they are functioning as per design.

~~Refuse Disposal Site~~

~~The access road, classified as a primary road, will consist of a paved all-weather surface from the county road to the crest of the ephemeral drainage (see Plate 5-1). The road into the drainage will consist of a graveled surface which will be treated to minimize dust and maintenance. The all-weather section of the road will not change, while the gravel portion will have a dynamic location depending on the location of the active refuse disposal are. The designs, specifications, and plans for these roads are presented in Appendix 5-B.~~

~~The stability of the road was also addressed in the EarthFax Engineering, Inc. geotechnical report. As indicated in Appendix 5-A, the road will have a minimum static safety factor of at least 1.3.~~

~~Drainage from the road will be collected in road side ditches and conveyed under the road via drainage culverts. These ditches and culverts are sized to handle the 10 year-6 hour precipitation event. The designs for these structures are discussed in Chapter 7 of this application.~~

~~During the life of the road and disposal facilities, SCCC will maintain the access road as necessary to provide adequate access to the site and to prevent environmental damage which might result from the road. To minimize erosion and sediment from the road outslopes, the outslopes of the road will be vegetated with the temporary seed mix as discussed in Section 3.31 of this application.~~

5.35 Spoil

No significant excess spoil will be developed by the underground mine. The only anticipated spoil will be from the materials collected in the sediment pond and during construction of the facilities. This limited volume of material will be removed from the pond and construction site, and transported to ~~the~~ a refuse

disposal area (see Section 5.36).

Therefore, no other plans have been developed to handle other significant volumes of spoil materials.

5.36 Coal Mines Wastes

~~The Applicant will not conduct any mining and reclamation activities within the proposed refuse disposal facility until such time as the plans contained within this application have been reviewed and approved by the Division.~~

~~A general description of the refuse pile construction procedures is presented in Section 5.28 of this chapter. A geotechnical investigation of the refuse pile foundations, conducted by EarthFax Engineering, Inc., indicates an anticipated static safety factor of at least 1.5. The data for this investigation are presented in Appendix 5-A.~~

Previous submittals have included sections on a refuse disposal site. These references have been omitted from this document since this site is no longer proposed for the Soldier Creek Mining operation. The operational history has shown little need for such a site. Disposal, if any should occur, will be at a permitted disposal site. Refuse disposed of in the facility will be placed in a controlled manner, as discussed in Section 5.28~~, and will not result in any impounding of water~~.

5.37 Regraded Slopes

5.37.10 Geotechnical Analysis

Analyses were performed to determine the stability of cut slopes associated with the Soldier Canyon Mine. The results of these analyses are contained in Appendix 7-E, Part A-3 Slope stability Analysis.

5.37.20 through 5.37.25 Regrading of Fills

At this time, it is Soldier Creek's intention that all fill areas will be regraded to achieve approximate original contour or to achieve a reclaimed surface which blends into the natural contours of the surrounding areas. The contours representing the proposed reclaimed surface are shown on Map 760a.

~~Refuse Disposal Site~~

~~As discussed in Section 5.28, once the refuse reaches the design elevation, the refuse material will be regraded to the surface configuration conforming to the proposed topography of the final regraded surface. This proposed surface is indicated on Plate 5-2. The slopes of the final refuse pile will be quite flat (10H.1V) over most of the upper surface of the pile. In the immediate area of the lower portion of the restored drainage channel and along the final face of the refuse pile, the slopes will be 3H.1V. This slope configuration will maximize the refuse material storage volume, while maintaining a reclaimable slope. It will also simulate the pediment surface in the surrounding area and the steeper slopes of the incised drainages.~~

~~The cross-sections indicated on Plate 5-2 were used to estimate the volumes of topsoil, fill, and refuse. These volume determinations are presented in Appendix 5-C.~~

5.40 Reclamation Plan

5.41 General

5.41.10 through 5.41.40 Permanent Closure of all Facilities

When Soldier Creek Coal Company permanently ceases operation of its Soldier Canyon Mine it will be totally reclaimed in accordance with the R614 Rules and this permit. All underground openings will be sealed and backfilled. All surface equipment, facilities, and structures will be removed, except as described in Section 5.52 below. The proposed postmining land use, and performance standards of the State Program will be achieved through reclamation

efforts as described below.

5.42 Narratives, Maps, and Plans

5.42.10 Timetable

A timetable of the final reclamation activities is shown in Table 5.42-1.

5.42.20 through 5.42.32 Final Surface Configuration

Contours representing the final reclaimed surface are shown on Map 760a. Soldier Creek Road will be relocated to its approximate original location and will remain to achieve postmining land use. The main channel of Soldier Creek and the west tributary to Soldier Creek will be reconstructed and will remain after final reclamation. Three culverts will remain to protect the environment after final reclamation. These culverts are described in Section 7.60. All other equipment, structures, and facilities will be removed and reclaimed.

In order to determine the feasibility of achieving the reclaimed surface shown on Map 760 a mass-balance calculations were done. These calculations show that there is more fill material available than is required to achieve the final reclaimed surface. But there is not so much excess material that disposal of the excess material is a problem. The excess cut material (20,602 cy)will be spread over the entire mine site adding approximately 6 inches to the final reclamation surface. The additional six inches will not change the contours on Exhibit 542a, this exhibit was re-certified in 2004.

The following procedure was used to calculate the cut and fill material balance for reclamation purposes:

A map showing the projected reclaimed contours was placed over a map showing the disturbed contours. Wherever the contour lines of these two maps intersected points were marked and the differences in the two intersecting contour lines were calculated. If the intersecting contour lines showed that the existing surface had to be cut to achieve the reclamation surface then the difference at the point of intersection was given a positive value to indicate that material would be available. If the contours indicated that the existing surface would have to be raised to meet the reclamation surface then the difference at that intersection

point was given a negative value to indicate that fill material would be needed. Cut and fill contours were then drawn for the disturbed areas. The contour lines were drawn on a two foot contour interval except in one area where less detail was needed and a ten foot contour interval was used. The areas between contour lines were then measured using a planimeter. Each area was measured two to four times and the average of the measurements was used. The conversion factor for the planimeter which was used is 1.5254 times the planimeter reading to get the area in square inches. Since maps having a scale of 1 inch equals 50 feet were used the areas in square inches were then multiplied by 2,500 to get the measured area in square feet. The thickness of cut or fill was determined by using the average values of the two thickness contours bounding an area. For example, to determine the thickness of the area measured between the 2 foot and 4 foot contour lines, the average of 3 was calculated. This thickness multiplied by the measured area results in the volume of cut or fill for the area. If an area was bounded by a contour line on the lower limit but not on the upper limit then the thickness was determined by adding one fourth of the contour interval to the value of the bounding contour. For example, if an area was measured within a 10 foot contour line but there was no 12 foot contour line, the thickness assigned to the area bounded by the 10 foot contour was 10.5 feet. This assumption is based on the fact that the area within the 10 foot contour line is greater than 10 feet in thickness but the maximum thickness within this area is less than 12 feet. Areas outside a 0 thickness contour line, or between a 0 cut thickness contour and a 0 fill thickness contour, were assumed to be approximately balanced regarding cut and fill volumes. In these areas there may be an actual net cut or fill amount, but since the differences in the existing surface and the reclamation surface are too small to contour the actual net amounts will be very small with reference to the total volumes involved. As will be discussed below there is excess fill material available so if there is a small deficiency in fill material in these "balanced areas" there is ample fill material available. If these "balanced areas" contain slightly more material than is needed, the additional volume available will not significantly impact the disposition of the excess fill material available from the rest of the project.

TABLE 5.42-1

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
Excavate Culvert	+0	31.45	-29.35	8,008	+1	8,008
	+2	25.14	-21.90	12,356	+3	37,067
	+4	21.90	-19.02	10,983	+5	54,914
	+6	19.02	-15.95	11,707	+7	81,952
	+8	15.95	-13.11	10,830	+9	97,473
	+10	13.11	-4.81	31,652	+11	348,173
	+12	4.81	-3.85	3,661	+13	47,592
	+14	3.85	-2.91	3,585	+15	53,770
	+16	2.91	-2.15	2,898	+17	49,270
	+18	2.15	-1.15	3,814	+19	72,457
	+20	1.15	-0.58	2,174	+21	45,648
	+22	0.58	-0.05	2,021	+23	46,487
	+24	0.05	-	191	+24.5	4,672
	+2	1.11	-0.50	2,326	+3	6,979
	+4	0.50	-0.33	3,241	+5	16,207
	+6	0.33	-0.07	992	+7	6,941
	+8	0.07	-0.01	229	+9	2,059
	+10	0.01	-	38	+10.5	418
	+12	3.10	-1.29	6,902	+13	89,732
	+14	1.29	-0.84	1,716	+15	25,741
	+16	0.84	-0.55	1,106	+17	18,801
	+18	0.55	-0.24	1,182	+19	22,462
	+20	0.24	-0.05	725	+21	15,216
	+22	0.05	-	191	+22.5	4,290
Parking Area	+0	6.05	-3.47	9,839	+5	49,194
	+10	3.47	-1.34	8,123	+15	121,841
	+20	1.34	-	5,110	+22.5	114,977
No.1 Fan	+0	12.28	-9.00	12,508	+1	12,508
	+2	9.00	-1.61	28,182	+3	84,545
	+4	1.61	-0.97	2,441	+5	12,203

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+6	0.97	-0.52	1,716	+7	12,013
	+8	0.52	-	1,983	+8.5	16,856
	+4	0.59	-0.43	610	+5	3,051
	+6	0.43	-0.35	305	+7	2,136
	+8	0.35	-0.31	152	+9	1,373
	+10	0.31	-0.26	191	+11	2,097
	+12	0.26	-0.23	114	+13	1,487
	+14	0.23	-0.15	305	+15	4,276
	+16	0.15	-0.10	191	+17	3,241
	+18	0.10	-0.02	305	+19	5,797
	+20	0.02	-	76	+20.5	1,564
Central Facilities	+0	9.14	-5.00	15,788	+1	15,788
	+2	4.93	-3.60	5,072	+3	15,216
	+4	3.60	-2.82	2,975	+5	14,873
	+6	2.82	-1.94	3,356	+7	23,491
	+8	1.94	-0.89	4,004	+9	36,038
	+10	0.89	-	3,394	+11	37,334
	+12	0.07	-	267	+12.5	3,337
	-0	14.42	-7.98	24,559	-1	-24,559
	-2	7.98	-6.29	6,445	-3	-19,334
	-4	6.29	-4.62	6,369	-5	-31,843
	-6	4.62	-1.73	11,021	-7	-77,147
	-8	1.73	-0.33	5,339	-9	-48,050
	-10	0.33	-	1,258	-10.5	-13,214
	+0	0.07	-0.03	153	+1	153
	+2	0.03	-	114	+2.5	286
	+0	0.50	-0.05	1,716	+1	1,716
	+2	0.05	-0.01	153	+3	458
	+4	0.01	-	38	+4.5	172
	+0	1.72	-0.91	3,089	+1	3,089

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+2	0.91	-0.56	1,335	+3	4,004
	+4	0.56	-0.23	1,258	+5	6,292
	+6	0.23	-0.07	610	+7	4,271
	+8	0.07	-	267	+8.5	2,269
New Portal Area	-0	16.67	-11.37	20,212	-1	-20,212
	-2	1.44	-1.00	1,678	-3	-5,034
	-4	1.00	-0.46	2,059	-5	-10,296
	-6	0.46	-0.20	992	-7	-6,941
	-8	0.20	-0.09	419	-9	-3,775
	-10	0.09	-	343	-10.5	-3,604
	-2	0.85	-0.29	2,136	-5	-12,813
	-10	0.29	-0.14	572	-11	-6,292
	-12	0.14	-	534	-12.5	-6,674
	-2	9.08	-7.08	7,627	-3	-22,881
	-4	7.08	-5.10	7,551	-5	-37,754
	-6	5.10	-3.38	6,559	-7	-45,915
	-8	3.38	-1.91	5,606	-9	-50,453
	-10	0.12	-	458	-11	-5,034
	-10	1.79	-0.98	3,089	-11	-33,978
	-12	0.98	-0.46	1,983	-13	-25,779
	-14	0.46	-0.18	1,068	-15	-16,017
	-16	0.18	-	686	-16.5	-11,326
	+0	0.70	-0.16	2,059	+1	2,059
	+2	0.16	-0.07	343	+3	1,030
	+4	0.07	-0.01	229	+5	1,144
	+6	0.01	-	38	+6.5	248
New Facilities	+0	0.70	-0.16	2,059	+1	2,059
	+2	0.16	-0.07	343	+3	1,030
	+4	0.07	-0.01	229	+5	1,144
	+6	0.01	-	38	+6.5	248

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	-0	4.37	-3.32	4,004	-1	-4,004
	-2	3.32	-2.35	3,699	-3	-11,097
	-4	2.35	-1.53	3,127	-5	-15,635
	-6	1.53	-1.01	1,983	-7	-13,881
	-8	1.01	-0.47	2,059	-9	-18,531
	-10	0.47	-	1,792	-10.5	-18,816
	-0	22.14	-19.27	10,945	-1	-10,945
	-2	19.27	-16.78	9,496	-3	-28,487
	-4	16.78	-14.64	8,161	-5	-40,804
	-6	14.64	-11.18	13,195	-7	-92,363
	-8	11.18	-9.00	8,313	-9	-74,821
	-10	9.00	-6.91	7,970	-11	-87,672
	-12	6.91	-3.00	14,911	-13	-193,840
	-14	3.00	-1.28	6,559	-15	-98,388
	-16	1.28	-0.30	3,737	-17	-63,533
	-18	0.30	-	1,144	-18.5	-21,165
No.2 Fan Area	+0	8.48	-2.72	21,966	+1	21,966
	+2	2.72	-1.50	4,652	+3	13,957
	+4	1.50	-	5,720	+4.5	25,741
	+0	0.50	-0.10	1,525	+1	1,525
	+2	0.10	-0.02	305	+3	915
	+4	0.02	-	76	+4.5	343
	-0	0.70	-0.55	572	-1	-572
	-2	0.55	-0.31	915	-3	-2,746
	-4	0.31	-	1,182	-4.5	-5,320
Balanced Areas	0	21.85	-	83,325	0	0
	0	1.71	-	6,521	0	0
	0	12.62	-	48,126	0	0
Subtotal Cut Areas				277,850	Cut Volume	1,847,684

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
Subtotal Fill Areas				222,027	Fill Volume	1,341,545
Subtotal Balanced Areas				137,972	-	-
Total Area				637,849	Net Volume	506,139

The entire disturbed area was measured for cut and fill volumes. The areas of cut and fill are shown on Map 5.42a, Reclamation Volumes. The actual measurements and calculated volumes for each area are shown in Table 5.42-1 below.

In addition to cut material being used to fill the areas necessary to achieve the reclaimed surface, material will be required to backfill shafts and portals on the property. It was assumed that the material backfilled into the portals will stand at the angle of repose inby the fill. It was also assumed that the shafts will require 10 percent more material than calculated because some of the material will flow into the entries at the bottoms of the shafts. These additional amounts of fill are listed as "Internal Embankments". Table 5.42-2 shows the volume of fill material required to backfill the shafts and portals. Although the proposed 20 foot diameter ventilation shaft is included in the mass balance calculations the costs associated with reclaiming it are not included in this application. The reasons for this are: it is almost certain that the shaft will be constructed and allowance must be made for providing material to backfill it; the cost of reclaiming the new shaft and fan installation will be included in the permit amendment to obtain approval for construction of this facility.

TABLE 5.42-2

PORTALS	NUMBER	WIDTH	HEIGHT	VOLUME OF FILL REQUIRED
	3	20 Feet	16 Feet	15,360
	3	24 Feet	14 Feet	14,112
	2	20 Feet	8 Feet	2,560

SHAFTS	NUMBER	DIAMETER	DEPTH	VOLUME OF FILL REQUIRED
	1	16 Feet	105 Feet	21,112
	1	20 Feet	300 Feet	94,248
Volume Required				147,392
Additional Internal Embankments (30° Angle of Repose)				39,276
Total Volume Required				186,668

Part of the cut/fill volumes determined by the contouring method above consisted of the volume of the large Soldier Creek bypass culvert. The volume of the culvert was measured because it was shown below surface on the disturbed surface contour map and it was removed on the reclaimed surface contour map. The volume of the culvert must be subtracted from the measured volume of material available. The area of the culvert is 239 square feet and it is 893 feet long which results in a volume of 213,427 cubic feet.

The net material available after the disturbed surface has been graded to match the reclamation contours and the culvert volume is subtracted is 292,712 cubic feet. To backfill the portals and shafts requires 186,668 cubic feet which leaves 106,044 cubic feet or 3,928 cubic yards of material. Additionally there are 6,764 cubic yards of topsoil and substitute topsoil located in the topsoil storage area which will also be used to achieve reclaimed contours. This makes the total amount of material which is available but not needed to achieve the reclaimed surface 10,692 cubic yards. The reclamation channel design requires that 6,699 cubic yards of riprap and 3,211 cubic yards of filter gravel be used. This material will replace fill material. This brings the total excess cut material to 20,602 cubic yards. The excess cut material (20,602 cy)will be spread over the entire mine site adding approximately 6 inches to the final reclamation surface. The additional six inches will not require a change to the contours on Exhibit 542a, this exhibit was re-certified in 2004. ~~At this time Soldier Creek Coal Company commits to use all excess material to provide a portion of the cover required to be placed over the wash plant refuse material. It is estimated that the refuse pile will cover and area of approximately 64 acres. If the excess material from the mine area is spread over 64 acres it will form a cover just over 2.3 inches thick. It is the intention of Soldier Creek Coal Company to contemporaneously reclaim the refuse pile. At final reclamation the only portion of the refuse pile which will not have been reclaimed will be~~

~~the final face, which is estimated to be 3 acres in size. If, at this time, the excess material from the mine site is spread over the final face of the refuse pile it will provide a cover of fill material slightly in excess of 4 feet in thickness. This will actually enhance the reclamation effort of the refuse pile. Disposal of this material is environmentally feasible.~~

Topsoil is available from several sources. The topsoil storage site contains 2,970 cubic yards of topsoil and 3,794 cubic yards of substitute topsoil. A small topsoil storage pile near the sediment pond contains 310 cubic yards of topsoil. The material under the parking area contains an estimated 3,920 cubic yards of substitute topsoil. The total amount of topsoil and substitute topsoil available is around 10,994 cubic yards or 296,838 cubic feet. The total central mine disturbed area is approximately 14.6 acres. Of this about 10.3 acres are pre-SMCRA. The balance of 4.3 acres, or 187,308 square feet, is post-SMCRA disturbance. Of this 187,308 square feet 32,400 square feet will be paved for the replacement of County Road 53 and 21,400 square feet will be riprapped for reclamation of Soldier Creek. This leaves 133,508 square feet of post-SMCRA area. If 1 foot of topsoil or substitute topsoil is placed on the post-SMCRA area, 133,508 cubic feet of growing media will be required. This leaves 163,330 cubic feet of growing media to place over the pre-SMCRA disturbed area which is around 448,668 square feet in size. The sediment pond is 48,126 square feet in area and 10,595 square feet of stream channel will be riprapped leaving 389,947 square feet to be covered with growing media. The available growing media will provide a cover of just over 5 inches over the pre-SMCRA disturbed area.

While the areas which are assumed to be approximately cut/fill balanced do not contribute to the amount of cut or fill material involved, these areas will be graded to achieve a surface which matches the reclamation contours. The volume of grading associated with each of these areas was determined by measuring the approximate cut area and multiplying the area by the estimated average contour elevation difference. Reclamation cost calculations include grading costs for the amount of material to be graded and topsoil spreading and seeding costs for the area of each of these locations. The area and grading volume for each area is shown on Map 5.42a.

It is planned that the sediment pond will remain intact during final reclamation to treat disturbed area runoff. The material which was used to construct the sediment pond will be used to totally reclaim the sediment pond area. There is

approximately 4500 cubic yards of topsoil and substitute topsoil in the sediment pond embankment. This material will provide a 2.5 foot cover of growing media for reclamation of the sediment pond area. The fact that the sediment pond will be reclaimed some time after the rest of the mine is reclaimed does not affect the final mass-balance calculations or the reclamation cost calculations since the ultimate contoured surface will be achieved regardless of the timing of specific phases of reclamation.

During final backfilling and grading, any fill material, which has been or will be determined to be unsuitable, will be placed at the lowest level against highwalls. Suitable fill material will then be placed over the unsuitable material. The application of topsoil will be as described in Chapter 2. Otherwise, fill material will be backfilled and graded in the most efficient and effective manner at the time of reclamation in order to achieve reclamation performance standards. The locations of where fill materials are available and where backfilling is required along with the volumes associated with each are shown on Map 5.42a. This map shows where and how much material will be excavated and where and how much material will be backfilled.

~~Refuse Disposal Site~~

~~Reclamation Plan~~

~~As indicated, no facilities will remain after operations are reclaimed. Upon cessation of operations, due to the phased construction and reclamation of the refuse pile, it is estimated that few facilities will remain to be reclaimed. These facilities will consist of the access road, the active portion of the refuse pile, the sediment pond and associated runoff control structures, and the temporary topsoil storage area.~~

~~The reclamation of the refuse disposal site will consist of site regrading, fill and topsoil placement, reseeding, and soil stabilization. The specific configuration for site regrading are presented as s topographic contour map and cross-sections (see Plate 5-2 and Appendix 5-C). As discussed in Sections 2.40, 5.28 and 5.37, the area will be graded and smoothed to the final topographic configuration. The refuse material will be reworked to break down the large pieces of refuse and then will be compacted by at least three passed of a compactor or other piece of construction equipment with comparable load distribution. The all-weather road surface will be removed and the length of the road area will be ripped to a depth of at least 12 inches. Construction staking~~

~~will ensure that proper grades are being maintained.~~

~~Following the regrading, the fill and topsoil stored in the temporary topsoil storage area will be distributed according to the plan presented in Section 2.40 of this application. During the placement and distribution of the fill and topsoil, efforts will be made to maintain a uniform thickness over the entire area to be reclaimed.~~

~~Once the soil materials are distributed, the seed bed will be prepared. This will be done in accordance with the topsoil plan presented in Section 2.40 and 2.43 of this application. The seed bed preparation will include scarification and addition of soil nutrients and amendments.~~

~~Reseeding will be conducted in accordance with the revegetation plan presented in Section 3.41 of this application. The reseeding will be conducted in the fall of the year to allow the greatest possibility of revegetation success.~~

~~Following the reseeding, the soils will be stabilized by application of a mulch as described in Sections 2.44 and 3.41.23 of this application. This practice will assist in minimizing the erosion and maximize the potential for revegetation success.~~

Reclamation Timetable

As indicated above, to ensure a good revegetation effort, the reclamation schedule needs to be planned to allow regrading, redistribution of topsoil, and seed bed preparation to be completed to allow seeding in the fall of the year, just prior to the first snows. This schedule is presented in Table 3.41-1 and 5.42-1 of this application.

Following the revegetation efforts, the sediment control structures; consisting of diversions, containment berms, and sediment pond; will remain in place until the revegetated sites have been adequately protected. It is anticipated that the sediment pond will remain in place until at least two years after the last augmented seeding of the reclaimed surface.

~~The reclamation of the sediment pond will be accomplished by using the original access road for the observation wells, around the Anderson Reservoir. The topographic configuration of the reclaimed sediment pond area is presented on~~

~~Plate 5-3. Following reclamation of the sediment pond, the access road will be reclaimed.~~

5.42.40 Bond Release

Before seeking bond release Soldier Creek will provide a description of the structures, which will remain in place. These structures will be maintained, during the reclamation monitoring period, and will be renovated if necessary. Insurance will be provided that all temporary structures will be removed and reclaimed.

5.42.50 Sedimentation Ponds

The sedimentation pond at the Soldier Canyon Mine will remain in place until such time as effluent limitations and vegetative requirements have been met. The sedimentation pond will then be removed and reclaimed. As described above and in Section 7.60, the material used to construct the sedimentation pond will be used to reclaim it to the final contours as shown on Map 760a. The reclaimed sedimentation pond area will then be monitored and maintained for an additional 10 year period.

5.42.60 through 5.42.63 Roads

As part of the 1991 facilities expansion at the Soldier Canyon Mine, a portion of the County ~~Soldier Creek~~ Road was relocated. Upon final reclamation, the road will be reconstructed in its approximate original location. Culverts, necessary to maintain the integrity of the road, will be permanently installed and will be maintained during the reclamation monitoring period. All other roads in the permit area will be removed and reclaimed. Culverts and bridges associated with the reclaimed roads will be removed. Access to the reclaimed roads will be prevented by the use of large boulders or other type of acceptable barriers.

5.42.70 through 5.42.71 Mine Openings

When no longer needed for mining operations, all entry ways or other openings to the surface from the underground mine will be sealed and backfilled. The permanent closures will be constructed to prevent access to the mine workings by people, livestock, and wildlife. Also, they will keep any potential surface

drainage from entering the sealed entries.

Because of the geology of the coal seam, the entries will slope away from the portal pad; therefore, there should be no gravity discharge of water from the underground mine. Furthermore, there are low concentrations of acid producing and no iron producing elements found in any of the coal seams to be mined. The Applicant does not anticipate any discharge from the permanently abandoned mine portals. The analysis of the overburden and underburden indicates an absence of any acid or toxic material.

The abandonment procedures for the portal and shaft openings are in accordance with MSHA procedures (30 CFR 75.1771) and are as follows:

* Slope or drift openings required to be sealed under 75.1711 shall be sealed with solid, substantial, incombustible material, such as concrete blocks, bricks or tile, or shall be completely filled with incombustible material for a distance of at least 25 feet into such openings.
* Shaft openings required to be sealed under 75.1711 shall be effective capped or filled. Filling shall be for the entire depth of the shaft and, for the first 50 feet from the bottom of the coalbed, the fill shall consist of incombustible material. Caps consisting of a 6-inch thick concrete cap or other equivalent means may be used for sealing. Caps shall be equipped with a vent pipe at least 2 inches in diameter extending for a distance of at least 15 feet above the surface of the shaft.

This procedure for permanent closure of portal entries is shown on Figure 5.42.1. Exposed coal outcrops will be covered with a minimum of 4 ft. of non-combustible earth material to protect against spontaneous combustion. The Applicant will submit detailed design drawings and specifications for sealing the shafts to the Regulatory Authority and MSHA for approval prior to permanent closure of the openings.

5.42.72 through 5.42.74 Disposal of Spoil and Waste

Excess spoil and coal mine waste will be placed in the lowest level of the final fill under cover of unsuitable fill material. This will be done in such a way

as to ensure that reclamation performance standards are achieved.

Noncoal mine wastes, ~~when in use~~ will be stored to prevent fires, contamination or other hazards. These wastes will be temporarily disposed of in a metal trash bin until permanently disposed of in an offsite state-approved solid waste disposal facility. During final reclamation, no noncoal mine wastes will be disposed of onsite. All such wastes will be removed from the mine site and disposed of in a state-approved solid waste disposal facility.

5.42.80 Estimate of Reclamation Costs

Reclamation of the Soldier Canyon mine consists of demolition of the existing facilities, site preparation-seeding, and rebuilding the portion of County Road 53 which was relocated.

~~Cost data used in the following calculations are primarily from the Means Heavy Construction Cost Data and Means Site Work Cost Data, 1991 Editions. The reasonableness of these data were verified by comparing to results obtained from the Caterpillar Performance Handbook. For example:~~

~~According to the Caterpillar book a Cat 215B Hydraulic Excavator with a 1 cubic yard bucket will have a 30 second cycle time under severe conditions, with an average operator, and 75 percent job efficiency. A "c" fill factor range indicates that the average bucket load will contain 0.8 cubic yards. Absolute productivity of this machine under the assumed conditions is 96 cubic yards per hour. However, this does not allow for spotting time or move time.~~

~~The Means books list the productivity of a 1 cubic yard excavator as 400 cubic yards per day. This indicates that using the Means data is probably conservative. Certain assumptions and calculations could be made which may result in lower calculated reclamation costs. However, the Means data, based on actual performance, provide calculated costs which have greater assurance of covering the actual costs of reclamation.~~

~~Demolition of Existing Facilities:~~

~~The following costs are taken from the 1991 Means Heavy Construction Cost Data. All costs include equipment, labor, overhead, and profit.~~

~~Fencing, Chain Link, remove only $1.38/lin. foot~~
~~Pipe Removal, 4" steel$5.60/lin. foot~~
~~Pavement Removal, bituminous, 4" to 6" $5.80/sqr. yard~~
~~Concrete Removal, 7" to 24" $185.00/cu. yard~~

~~Building Demolition, incl. disposal~~
~~Steel $0.19/cu. foot~~
~~Concrete $0.27/cu. foot~~
~~Mixture of types, average$0.20/cu. foot~~
~~Small Buildings, wood$0.21/cu. foot~~

Table 5.42-3 lists each structure to be demolished as part of reclamation at the Soldier Creek Mine. ~~This table also indicates the cost of demolition.~~ Refer to the Soldier Canyon reclamation bond for demolition costs.

TABLE 5.42-3

DESCRIPTION	MATERIAL	SIZE	~~COST/UNIT~~	~~AMOUNT~~
Office	Mixture	132,000 cu.ft.	~~0.20/cu.ft.~~	~~$26,400~~
Warehouse	Mixture	15,950 cu.ft.	~~0.20/cu.ft.~~	~~3,109~~
Old Shop	Mixture	192,000 cu.ft.	~~0.20/cu.ft.~~	~~38,400~~
New Shop	Mixture	45,936 cu.ft.	~~0.20/cu.ft.~~	~~9,190~~
Training Rm.	Mixture	17,748 cu.ft.	~~0.20/cu.ft.~~	~~3,550~~
Amb. Garage	Mixture	11,600 cu.ft.	~~0.20/cu.ft.~~	~~2,320~~
Bath House	Mixture	96,000 cu.ft.	~~0.20/cu.ft.~~	~~19,200~~
Storage Shed	Mixture	32,400 cu.ft.	~~0.20/cu.ft.~~	~~6,480~~
Security Shack	Wood	512 cu.ft.	~~0.21/cu.ft.~~	~~108~~
~~Stoker Bin~~	~~Steel~~	~~1000 cu.ft.~~	~~0.19/cu.ft.~~	~~190~~
Control Bldg.	Mixture	1430 cu.ft.	~~0.20/cu.ft.~~	~~286~~
8,000 Gal. Tank	Steel Concrete	1,070 cu.ft. 50 cu.yd.	~~0.19/cu.ft.~~ ~~185.00/cu.yd.~~	~~203~~ ~~9,250~~
4,000 Gal. Tank	Steel Concrete	535 cu.ft. 34 cu.yd.	~~0.19/cu.ft.~~ ~~185.00/cu.yd.~~	~~102~~ ~~6,290~~
1,000 Gal. Tank	Steel	134 cu.ft.	~~0.19/cu.ft.~~	~~26~~

DESCRIPTION	MATERIAL	SIZE	~~COST/UNIT~~	~~AMOUNT~~
1,500 Gal. Tank	Steel Concrete	201 cu.ft. 3 cu.yd.	~~0.19/cu.ft.~~ ~~185.00/cu.yd.~~	~~38~~ ~~555~~
60,000 Gal. Tank	Steel	8,022 cu.ft.	~~0.19/cu.ft.~~	~~1,525~~
Loadout Bin (2)	Mixture	30,000 cu.ft.	~~0.20/cu.ft.~~	~~6,000~~
Septic Tank	Steel	9,000 cu.ft.	~~0.19/cu.ft.~~	~~1,710~~
Fan No.1	Mixture	15,400 cu.ft.	~~0.20/cu.ft.~~	~~3,080~~
Fan No.2	Mixture	15,300 cu.ft.	~~0.20/cu.ft.~~	~~3,060~~
Crib Wall	Concrete	120 cu.yd.	~~185.00/cu.yd.~~	~~22,200~~
Sewage Pipe	4" Steel	10,600 ft.	~~5.60/lin.ft.~~	~~59,360~~
Substation 1	Concrete	18 cu.yd.	~~185.00/cu.yd.~~	~~3,330~~
Substation 2	Concrete	30 cu.yd.	~~185.00/cu.yd.~~	~~5,550~~
Belt Conveyor	Mixture	57,000 cu.ft.	~~0.20/cu.ft.~~	~~11,400~~
Portals (3)	Concrete	228 cu.yd.	~~185.00/cu.yd.~~	~~42,180~~
Portals (5)	Concrete	370 cu.yd.	~~185.00/cu.yd.~~	~~68,450~~
~~Refuse Bin~~	~~Mixture~~	~~6,667 cu.ft.~~	~~0.20/cu.ft.~~	~~1,333~~
~~Prep. Plant~~	~~Mixture~~	~~187,500 cu.ft.~~	~~0.20/cu.ft.~~	~~37,500~~
~~Thickener~~	~~Mixture~~	~~9,620 cu.ft.~~	~~0.20/cu.ft.~~	~~1,924~~
~~Silos (2)~~	~~Concrete~~	~~300,000 cu.ft.~~	~~0.27/cu.ft.~~	~~81,000~~
~~Transfer Bldg.~~	~~Mixture~~	~~12,500 cu.ft.~~	~~0.20/cu.ft.~~	~~2,500~~
Culvert Ends	Concrete	2,000 cu.ft.	~~0.27/cu.ft.~~	~~540~~
Culvert	Steel	53,580 cu.ft.	~~0.19/cu.ft.~~	~~10,180~~
Ditch	Concrete	1,170 cu.ft.	~~0.27/cu.ft.~~	~~316~~
Small Culverts	Steel	4,700 cu.ft.	~~0.19/cu.ft.~~	~~893~~
~~ROM Conveyor~~	~~Mixture~~	~~19,000 cu.ft.~~	~~0.20/cu.ft.~~	~~3,800~~
~~Reclaim Conv.~~	~~Mixture~~	~~11,250 cu.ft.~~	~~0.20/cu.ft.~~	~~2,250~~
~~Spec. Coal Conv.~~	~~Mixture~~	~~4,500 cu.ft.~~	~~0.20/cu.ft.~~	~~900~~
~~Refuse Conv.~~	~~Mixture~~	~~810 cu.ft.~~	~~0.20/cu.ft.~~	~~162~~
Parking Lot	Asphalt	1865 sq.yd.	~~5.80/sq.yd.~~	~~10,817~~
Office Park.	Asphalt	716 sq.yd.	~~5.80/sq.yd.~~	~~4,153~~
Old Yard Road	Asphalt	2,881 sq.yd.	~~5.80/sq.yd.~~	~~16,710~~
New Yard Road	Asphalt	2,055 sq.yd.	~~5.80/sq.yd.~~	~~11,920~~

DESCRIPTION	MATERIAL	SIZE	~~COST/UNIT~~	~~AMOUNT~~
Relocated Road and New Portal Road	Asphalt	4,453 sq.yd.	~~5.80/sq.yd.~~	~~25,830~~
Fencing	Chain Link	2,000 ft.	~~1.38/ft.~~	~~2,760~~
Powerline	Wire	2,500 ft.	~~4.18/ft.~~	~~10,450~~
~~Subtotal Demolition Cost~~				~~$579,480~~

~~Grading and Backfilling.~~

~~The following costs were taken from 1991 Means Heavy Construction Cost Data and 1991 Means Site Work Cost Data. All costs include labor, equipment, materials, overhead, and profit.~~

~~Excavating, Dozer, 200 HP, 300' Haul, Common $4.56/c.y.~~

~~Excavating, Hyd. Excavator, 1 c.y. Bucket$3.76/c.y.~~

~~Backfilling, 200 HP, FEL, 300' Haul, Common Earth$1.67/c.y.~~

~~Hauling, 12 c.y. Dump Truck, 4 Mile Round Trip $4.15/c.y.~~

~~Scarify Topsoil, 200 HP Dozer$16.75/1000~~

~~Spread Topsoil, 75 HP Dozer & Articulated Loader$15.50/c.y.~~

~~Seeding, Tractor Spreader$21.00/1000~~

~~Seed Mix$296.25/acre~~

~~Silt Fence, Installed$2.95/l.f.~~

~~Wall, Solid Concrete Block$7.35/s.f.~~

~~Slab, On Grade, 6", No Finish$94.00/c.y.~~

~~Seedlings, Planted$2.00 each~~

~~Mulching$1,300/acre~~

The topsoil storage site contains 2,970 cubic yards of topsoil, 3,794 cubic yards of substitute topsoil, and 1,337 cubic yards of rock for riprap. The costs in ~~Table 542b~~ the bond include the cost of hauling these materials from the storage site to the mine site to be used in reclamation. Also 8,573 cubic yards of additional riprap and filter gravel will be hauled in from an outside source. These hauling costs are also included. The storage site contains 590 cubic yards of topsoil to be used to reclaim the storage site. The costs listed in the ~~table below~~ bond include the cost of redistributing this topsoil on the storage site.

~~It is assumed in the cost calculations that all silt fences will be replaced five times during the reclamation period.~~

~~Table 5.42-4 lists grading, cutting, filling, topsoiling, and seeding activities and costs associated with reclamation of the Soldier Canyon Mine.~~

TABLE 5.42-4

ACTIVITY	QUANTITY	~~COST/UNIT~~	~~AMOUNT~~
Central Mine Facility			
Excavate Culvert	42,827 cu.yd.	~~3.76/cu.yd.~~	~~$161,030~~
Seal Portals	2,510 sq.ft.	~~7.35/sq.ft.~~	~~18,450~~
Seal Shaft	3.8 cu.yd.	~~94.00/cu.yd.~~	~~357~~
Grade Balanced Areas	14,022 cu.yd.	~~4.56/cu.yd.~~	~~63,940~~
Excavate Cut Areas	25,683 cu.yd.	~~3.76/cu.yd.~~	~~96,568~~
Backfill Shaft	860 cu.yd.	~~1.67/cu.yd.~~	~~1,436~~
Backfill Portals	2,215 cu.yd.	~~1.67/cu.yd.~~	~~3,700~~
Backfill Fill Areas	47,179 cu.yd.	~~1.67/cu.yd.~~	~~78,790~~
Grade to Reclaim Contour	23,397 cu.yd.	~~4.56/cu.yd.~~	~~106,690~~
Scarify Subgrade	631,706 sq.ft.	~~16.75/1000 sq.ft.~~	~~10,581~~
Haul Topsoil From Storage Site to Central Facility	2,970 cu.yd. Topsoil 3,794 cu.yd. Sub. 1,337 cu.yd. Rock	~~4.15/cu.yd.~~	~~33,620~~
Spread Topsoil	15,500 cu.yd.	~~15.50/cu.yd.~~	~~240,250~~
Seed Mine Site	631,706 sq.ft.	~~21.00/1000 sq.ft.~~	~~13,266~~
Plant Seedlings	14.5 acres	~~2.00 each 15/acre~~	~~435~~
Mulch	14.5 acres	~~1300.00/acre~~	~~18,850~~
Silt Fence	Phase 1 - 54,925 ft. Phase 2 - 8,775 ft.	~~2.95/ft.~~	~~187,915~~
Lay Rock Riprap and Filter Gravel	9,910 cu.yd.	~~27.00/cu.yd.~~	~~267,570~~

ACTIVITY	QUANTITY	~~COST/UNIT~~	~~AMOUNT~~
Haul in Additional Riprap and Filter Gravel	8,573 cu.yd.	~~4.15/cu.yd.~~	~~35,578~~
Install Culverts	185 ft.	~~20.00/ft.~~	~~3,700~~
Seed Mix	14.5 acres	~~296.25/acre~~	~~4,296~~
Topsoil Storage Site and Sewage Lagoons			
Fill Sewage Lagoons	6,222 cu.yd.	~~4.56/cu.yd.~~	~~28,372~~
Spread Topsoil - Topsoil Storage Site	590 cu.yd.	~~15.50/cu.yd.~~	~~9,145~~
Spread Topsoil Sewage Lagoons	890 cu.yd.	~~15.50/cu.yd.~~	~~13,795~~
Seed Topsoil Storage Site	201,505 sq.ft.	~~21.00/1000 sq.ft.~~	~~4,232~~
Seed Sewage Lagoons	87,120 sq.ft.	~~21.00/1000 sq.ft.~~	~~1,830~~
Plant Seedlings	6.6 acre	~~2.00 ea. 15/acre~~	~~198~~
Mulching	6.6 acre	~~1,300/acre~~	~~8,580~~
Seed Mix	6.6 acre	~~296.25.acre~~	~~1,957~~
Scarify Sewage Lagoons & Topsoil Storage Site	288,625	~~16.75/1000 sq.ft.~~	~~4,835~~
Fence Removal	2,875 ft.	~~1.38/ft.~~	~~3,968~~
Reconstruct County Road 53			
Sub base	3,600 sq.yd.	~~0.44/sq.yd.~~	~~1,584~~
Grade subgrade	3,600 sq.yd.	~~0.12/sq.yd.~~	~~432~~
Asphalt 4"	3,600 sq.yd.	~~6.35/sq.yd.~~	~~22,860~~
		~~Subtotal Site Preparation and Seeding Cost~~	~~$1,448,810~~

~~These costs do not include the cost of reclaiming the proposed No.3 Ventilation Fan and the associated shaft and access road. A permit amendment will be submitted to obtain approval to install the No. 3 Fan and that amendment will include the cost of reclaiming this specific facility.~~

Table 5.42-5 below lists the activities and costs associated with the reclamation of the refuse disposal site. It is assumed that as the refuse pile is being filled contemporaneous reclamation will take place. Final reclamation will then consist of reclaiming the final face of the refuse pile and removing and reclaiming the access roads and sediment pond. Under the current reclamation plan reclamation of the mine site will result in 20,602 cubic yards of excess fill material. Table 5.42-5 includes the costs of hauling this material from the mine to the refuse pile and spreading this material over the refuse pile.

TABLE 5.42-5

Activity	Quantity	Cost/Unit	Amount
Primary Access Road			
Remove Asphalt	1,560 sq.yd.	5.00/sq.yd.	$9,050
Spread Topsoil	1,800 cu.yd.	15.50/cu.yd.	27,900
Remove Culverts	100 ft.	7.45/ft.	745
Grading	3,600 cu.yd.	4.56/cu.yd.	16,416
Mulch	0.65 acre	1300.00/acre	845
Seed Mix	0.65 acre	296.25/acre	193
Spread Seed	28,314 sq.ft.	21.00/1000 sq.ft.	595
Scarify	28,314 sq.ft.	16.75/1000 sq.ft.	475
Remove Signs/Delineators	6 Signs 44 Posts	7.85 each	393
Secondary Access Road			
Ripping	3,388 cu.yd.	1.68/cu.yd.	5,692
Remove Culverts	185 ft.	7.45/ft.	1,378
Grading	2,400 cu.yd.	4.56/cu.yd.	10,944
Spread Topsoil	5,000 cu.yd.	15.50/cu.yd.	77,500
Mulch	2.1 acre	1300.00/acre	2,730
Seed Mix	2.1 acre	296.25/acre	622
Spread Seed	91,476 sq.ft.	21.00/1000 sq.ft.	1,921
Scarify	91,476 sq.ft.	16.75/1000 sq.ft.	1,533
Remove Signs/Delineators	120	7.85 each	942

Activity	Quantity	Cost/Unit	Amount
Refuse Site Sediment Pond			
Remove Fence	1,350 ft.	1.38/ft.	1,863
Remove Culverts	200 ft.	7.45/ft.	1,490
Backfilling	6,600 cu.yd.	1.67/cu.yd.	11,022
Spread Topsoil	4,650 cu.yd.	15.50/cu.yd.	72,075
Seed Mix	2.0 acre	296.25/acre	593
Spread Seed	87,120 sq.ft.	21.00/1000 sq.ft.	1,830
Mulching	2.0 acre	1300.00/acre	2,600
Scarifying	87,120 sq.ft.	16.75/1000 sq.ft.	1,460
Refuse Disposal Pile			
Grading	2,000 cu.yd.	4.56/cu.yd.	9,120
Spread Topsoil	7,600 cu.yd.	15.50/cu.yd.	117,800
Seed Mix	3.0 acre	296.25/acre	900
Spread Seed	130,680 sq.ft.	21.00/1000 sq.ft.	2,745
Mulching	3.0 acre	1300.00/acre	3,900
Haul Excess Fill From Mine	20,602 cu.yd.	4.15/cu.yd.	85,500
Grade Excess Fill	20,602 cu.yd.	4.56/cu.yd.	93,945
		Subtotal	$566,717

Table 5.42-6 summarizes all of the reclamation costs plus engineering and contingency costs of 10 percent each of the subtotal cost.

TABLE 5.42-6

Summary of Reclamation Costs

Demolition Costs	$579,480
Site Preparation and Seeding Costs	1,448,810
Refuse Site Reclamation	566,717
Mobilization and Demobilization of Equipment	2,000

~~Demolition Costs~~	~~$579,480~~
~~Subtotal~~	~~$2,597,007~~
~~Engineering 10%~~	~~259,701~~
~~Contingency 10%~~	~~259,701~~
~~Escalation Rate .77%/year (Rounded)~~	~~121,500~~
~~Total Reclamation Cost~~	~~$3,237,909~~

5.50 through 5.51 Sealing of Underground Openings

When any underground opening is no longer needed and is to be abandoned, it will be sealed as described in Section 5.42.70 above.

5.52 through 5.52.20 Permanent Features

At this time it is not anticipated that there will be any constructed depressions or permanent impoundments as part of the final reclamation.

5.53 through 5.53-24 Backfilling and Grading

Backfilling and grading will be done so as to create a reclaimed surface which ~~matches the final reclamation contours shown on Map 760a. This~~ will achieve approximate original contour and will allow the reclaimed surface to blend with the surrounding surfaces. Highwall and depressions will be eliminated as shown on Map 760a. The postmining slope of the reclaimed areas will not exceed the angle of repose as determined by the slope of similar material in place surrounding the reclaimed area. ~~The waste rock site will be graded to a slope which is less than the angle of repose.~~

Postmining contours as shown on Map 760a were designed giving consideration to stream channel design and runoff control. This will minimize erosion and water pollution.

Spoil will be used to backfill areas where fill is required as shown on Map 5.42a, and will be placed at the lowest level possible and will be covered with material, which will provide a growing media for reclamation vegetation.

When backfilling and grading have been completed, the entire area will be

scarified to provide a "~~toothed~~ roughened" surface on which topsoil will be placed. This will prevent slippage of the topsoil. It is not anticipated that terraces will be used in final reclamation.

~~5.53.25 through 5.53.42 Refuse Piles~~

~~The refuse disposal site will be regraded to provide the final configuration depicted in Plate 5-2. This surface will have a long term static safety factor of at least 1.3 (see Appendix 5-A). Additionally, the surface will minimize erosion and water pollution both on and off site and will support the postmining land use. The surface configuration will consist of a gentle 10H:1V slope across the top of the site, simulating the pediment surface found in the surrounding area, and an incised drainage with 3H:1V sideslopes in the lower part of the restored channel. The face of the refuse pile outslope will also be graded at a 3H:1V slope. This will aid in achieving reclamation success. No cut-and-fill terraces are proposed to be used during the reclamation.~~

~~Based on the chemical characteristics of the proposed refuse material, SCCC proposes that the regraded surface be covered with 24-30 inches of fill material and 6-12 inches of topsoil. This fill material will be a nontoxic and noncombustible material. As presented in Chapters 2 and 3 of this application, the feasibility of using this fill depth will be demonstrated through the use of revegetation test plots.~~

~~It is not anticipated that refuse will be stored underground.~~

Exposed coal seams, acid and toxic forming materials, and combustible materials will be covered with nontoxic and noncombustible materials to prevent combustion or other impact on reclamation.

The use of cut-and-fill terraces is not anticipated in the reclamation of the Soldier Canyon Mine.

5.53.60 through 5.53.65.3 Approximate Original Contour

Much of the disturbance at the Soldier Canyon Mine is pre-SMCRA and information is not available concerning the original contour of these disturbed areas. All areas which have been disturbed post-SMCRA will be reclaimed to the approximate original contour. Pre-SMCRA areas will be returned to the best estimate of approximate original contour and will be contoured to blend in with undisturbed

topography adjacent to the disturbed areas. The proposed reclaimed surface of the central mine area is represented by contour lines on Map 760a. No exceptions from these proposed contours are requested.

5.53.70 through 5.53.83 Surface Coal Mining Reclamation Activities

No surface coal mining will be conducted at the Soldier Canyon Mine.

~~5.53.90 Regrading of Settled and Revegetated Fills~~

~~As the refuse disposal site is filled with material from the was plant it will be contemporaneously reclaimed. Any portion of the waste rock site, which is filled to the approximate final contour for that portion will be graded, covered, and vegetated according to R614 and this permit. This will result in most of the surface of the refuse disposal site being completely reclaimed before final reclamation, except for the final face of the pile which will be reclaimed during final reclamation. Since, the reclaimed part of the refuse disposal site will have been graded, settled and vegetated prior to final reclamation, regrading of the reclaimed part of the refuse disposal site during final reclamation will not be required. Only the unreclaimed face of the refuse disposal site will be reclaimed during final reclamation.~~

5.60 Performance Standards

All mining and reclamation operations at the Soldier Canyon Mine will be conducted in accordance with these R6~~14~~45 Rules and this permit.

OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT
BOND AMOUNT COMPUTATION

Applicant: Soldier Creek Coal Company

Permit Number: ACT/007/018

Date: 6 March 1995

Number of Acres: 21.82

Type of Operation: Underground Coal

Location: Soldier Canyon; Carbon County, Utah

Prepared by: Gary E. Taylor

Without Surface Expansion

Project SC[3]

Date 6 March 1995

WORKSHEET NO. 2

STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Listing of Buildings to be Demolished:

Item	Type of Construction Material	Volume (cubic feet)	Unit Cost Basis	Demolition Cost
1)	See Attached Sheet			
2)				
3)				
4)				
5)				

Total Cost = $_____

Other Items to be Demolished:

Debris Handling and Disposal Costs:

TOTAL DEMOLITION AND DISPOSAL COST = $929,758

Data Sources: Means Construction Cost Data, 1995, Edition 53

TABLE 5.42–3

DESCRIPTION	MATERIAL	SIZE	UNIT	COST/UNIT	AMOUNT
OFFICE	Mixture	132,000	cu. ft.	$0.23	30,360
FOUNDATIONS	Included in Warehouse				
DISPOSAL					
WAREHOUSE	Mixture	15,950	cu. ft.	$0.23	3,669
FOOTINGS		993	sq. ft.	$14.91	14,806
WALLS		1,852	sq. ft.	$7.41	13,723
FLOORS		8,059	sq. ft.	$2.78	22,404
DISPOSAL		251	cu. yd.	$6.40	1,606
OLD SHOP	Mixture	192,000	cu. ft.	$0.23	44,160
FOOTINGS	Concrete	766	sq. ft.	$14.91	11,421
WALLS	Concrete	1,828	sq. ft.	$7.41	13,545
FLOORS	Concrete	6,033	sq. ft.	$2.78	16,772
DISPOSAL		195	cu. yd.	$6.40	1,248
NEW SHOP	Mixture	45,936	cu. ft.	$0.23	10,565
FOOTINGS	Concrete	256	sq. ft.	$14.91	3,817
WALLS	Concrete	674	sq. ft.	$7.41	4,994
FLOORS	Concrete	4,110	sq. ft.	$2.78	11,426
DISPOSAL		105	cu. yd.	$6.40	672
TRAINING RM.	Mixture	17,748	cu. ft.	$0.23	4,082
FOUNDATIONS	Included in New Shop				
DISPOSAL					
AMB. GARAGE	Mixture	11,600	cu. ft.	$0.23	2,668
FOUNDATIONS	Included in New Shop				
DISPOSAL					
BATH HOUSE	Mixture	96,000	cu. ft.	$0.23	22,080
FOOTINGS	Concrete	715	sq. ft.	$14.91	10,661
WALLS	Concrete	1,590	sq. ft.	$7.41	11,782
FLOORS	Concrete	4,197	sq. ft.	$2.78	11,668
DISPOSAL		153	cu. yd.	$6.40	979
STORAGE SHED	Mixture	32,400	cu. ft.	$0.23	7,452
FOOTINGS	Concrete	431	sq. ft.	$14.91	6,426
WALLS	Concrete	4,906	sq. ft.	$7.41	36,353
FLOORS	Concrete	4,080	sq. ft.	$2.78	11,342
DISPOSAL		261	cu. yd.	$6.40	1,670
SECURITY SHACK	Mixture	512	cu. ft.	$0.23	118
STACKING TUBE	Steel	2,500	cu. ft.	$0.21	525
FOUNDATIONS	Concrete	34	cu. yd.	$95.00	3,230
DISPOSAL		34	cu.yd.	$6.40	218
CONTROL BLDG.	Mixture	1,430	cu. ft.	$0.23	329
8,000 GAL. TANK	Steel	1,070	cu. ft.	$0.21	225
FOOTINGS	Concrete	60	sq. ft.	$14.91	895
WALLS	Concrete	300	sq. ft.	$7.41	2,223
FLOORS	Concrete	200	sq. ft.	$2.78	556
DISPOSAL		17	cu. yd.	$6.40	109
4,000 GAL. TANK	Steel	535	cu. ft.	$0.21	112
FOOTINGS	Concrete	60	sq. ft.	$14.91	895

WALLS	Concrete	300	sq. ft.	$7.41	2,223
FLOORS	Concrete	200	sq. ft.	$2.78	556
DISPOSAL		17	cu. yd.	$6.40	109
1,000 GAL. TANK	Steel	134	cu. ft.	$0.21	28
FOUNDATIONS	Concrete	0	cu. yd.	$95.00	0
DISPOSAL		0	cu.yd.	$6.40	0
1,500 GAL. TANK	Steel	201	cu. ft.	$0.21	42
FOUNDATIONS	Concrete	0	cu. yd.	$95.00	0
DISPOSAL		0	cu.yd.	$6.40	0
60,000 GAL. TANK	Steel	8,022	cu. ft.	$0.21	1,685
FOUNDATIONS	Concrete	52	cu. yd.	$95.00	4,940
DISPOSAL		52	cu.yd.	$6.40	333
LOADOUT BIN	Mixture	15,000	cu. ft.	$0.23	3,450
FOOTINGS	Concrete	810	sq. ft.	$14.91	12,077
DISPOSAL		53	cu. yd.	$6.40	339
SEPTIC TANK	Steel	9,000	cu. ft.	$0.21	1,890
FAN NO. 1	Mixture	15,400	cu. ft.	$0.23	3,542
FAN NO. 2	Mixture	15,300	cu. ft.	$0.23	3,519
CRIB WALL	Concrete	120	cu. yd.	$212.00	25,440
SEWAGE PIPE	4" Steel	10,600	cu. ft.	$6.35	67,310
SUBSTATION 1	Concrete	18	cu. yd.	$212.00	3,816
DISPOSAL		18	cu. yd.	$6.40	115
SUBSTATION 2	Concrete	30	cu. yd.	$212.00	6,360
DISPOSAL		30	cu. yd.	$6.40	192
BELT CONVEYOR	Mixture	57,000	cu. ft.	$0.23	13,110
FOOTINGS	Concrete	352	sq. ft.	$14.91	5,248
DISPOSAL		37	cu. yd.	$6.40	237
PORTALS (3)	Concrete	228	cu. yd.	$212.00	48,336
PORTALS (5)	Concrete	370	cu. yd.	$212.00	78,440
CULVERT ENDS	Concrete	74	cu. yd.	$212.00	15,688
CULVERT	Steel	53,580	cu. ft.	$0.21	11,252
DITCH	Concrete	43	cu. yd.	$212.00	9,116
SMALL CULVERTS	Steel	4,700	cu. ft.	$0.21	987
PARKING LOT	Asphalt	1,865	sq. yd.	$6.60	12,309
OFFICE PARK	Asphalt	716	sq. yd.	$6.60	4,726
OLD YARD ROAD	Asphalt	2,881	sq. yd.	$6.60	19,015
NEW YARD ROAD	Asphalt	2,055	sq. yd.	$6.60	13,563
RELOCATED ROAD AND NEW PORTAL ROAD	Asphalt	4,453	sq. yd.	$6.60	29,390
FENCING	Chain Link	2,000	ft.	$2.29	4,580
POWERLINE	Wire	2,500	ft.	$4.81	12,025
ON-SITE DISPOSAL		30,563	cu. yd.	$6.40	195,603
Subtotal Demolition Cost					$953,376

Project Soldier Creek Coal

Date 25 April 1995

WORKSHEET NO. 5

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

Rough Grade

Characterization of Dozer Used (type, size, etc.):

D9N Dozer with "U" Blade - 650 Cy/Hr.

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.):

300 LF + 5% Effective Grade, Material is fill and well blasted.

Productivity Calculations:

Operating Adjustment Factor = .75 (operator factor) × .80 (material factor) × .83 (work hour factor) × .9 (grade factor) × .94 (weight correction factor) × 1.0 (production method/blade factor) ×

.80 (visibility) × .96 (elevation) × .80 (direct drive transmission) = .26

Net Hourly Production = 650 (normal hourly production) yd^3/hr × .26 (operating adjustment factor) = 168.25 yd^3/hr

Hours Required = 90,820 (volume to be moved) yd^3 ÷ 168.25 (net hourly production) yd^3/hr = 532.82 hrs

Assume three dozers are required for 179.93 Hr./Ea.

Data Sources:

Caterpillar Perfromance Handbook; Edition 24

Project Soldier Creek Coal

Date 25 April 1995

WORKSHEET NO. 6

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE--GRADING

Earthmoving Activity:

Spread Topsoil

Characterization of Dozer Used (type, size, etc.):

Caterpillar - D4C

Description of Dozer Use (push distance, % grade, blade effective length, operating speed, etc.):

300 L.F. + 5% Effective Grade

Productivity Calculations:

Operating Adjustment Factor = .75 (operator factor) x 1.20 (material factor) x .83 (work hour factor) x .9 (grade factor) x .94 (weight correction factor) x 1.0 (production method/blade factor)

.80 (visibility) x .88 (elevation) x .80 (direct drive transmission) = .36

Hourly Production = 2.2 (speed) mi/hr x 15.42 (eff. blade width) ft x 5280 ft/mi x 1 ac/43,560 ft^2 = 4.11 ac/hr

Net Hourly Production = 4.11 (hourly prod.) ac/hr x .36 (op. adj. factor) = 1.46 ac/hr

Hours Required = 21.82 ac ÷ 1.46 ac/hr = 14.92 hrs

Data Sources:

Caterpillar Perfromance Handbook, Edition 21

Project SC^3

Date 6 March 1995

WORKSHEET NO. 8

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

Loading Topsoil and Riprap

Characterization of Loader Used (type, size, etc.):

Caterpillar 966 E

Description of Loader Use (origin, destination, grade, haul distance, etc.):

50 LF + 2% Effective Grade

Productivity Calculations:

Cycle time = .08 (haul time (loaded)) + .06 (return time (empty)) + .55 (basic cycle time) = .69 min

Net Bucket Capacity = 5.0 yd^3 (heaped bucket capacity) x .95 (bucket fill factor) = 4.75 yd^3

Net Hourly Production = 4.75 yd^3 (net bucket capacity) ÷ .69 min (cycle time) x 50 min/hr (work hour factor) = 344.20 yd^3/hr

Hours Required = 12,241 yd^3 (volume to be moved) ÷ 344.20 yd^3/hr (net hourly production) = 35.56 hrs

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project Soldier Creek Coal

Date 25 April 1995

WORKSHEET NO. 8

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

Backfill Portals

Characterization of Loader Used (type, size, etc.):

915 Eimco LHD

Description of Loader Use (origin, destination, grade, haul distance, etc.):

250 L.F. 0% Grade

Productivity Calculations:

Cycle time = 1.14 (haul time (loaded)) + 1.14 (return time (empty)) + .41 (basic cycle time) = 2.71 min

Net Bucket Capacity = 6 (heaped bucket capacity) yd^3 x .8 (bucket fill factor) = 4.80 yd^3

Net Hourly Production = 4.80 yd^3 (net bucket capacity) ÷ 2.71 min (cycle time) x 50 min/hr (work hour factor) = 88.56 yd^3/hr

Hours Required = 32,778 yd^3 (volume to be moved) ÷ 88.56 yd^3/hr (net hourly production) = 370.12 hrs

Data Sources:

Project SC^3

Date 6 March 1995

WORKSHEET NO. 9

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

Topsoil and Riprap Hauling

Characterization of Truck Used (type, size, etc.):

12 Yd. Dump Truck

Description of Truck Use (origin, destination, grade, haul distance, truck capacity, etc.):

4 Mile haul one way

Productivity Calculations:

Cycle time = 6.86 (haul time) + 6.00 (return time) + 2.53 (total loading time) + 2.2 (dump and maneuver time) = 17.59 min

Number of Trucks Required = 17.59 (truck cycle time) ÷ 2.53 (total loading time) = 6

Production Rate = 12 (truck capacity) yd^3 x 6 (# of trucks) ÷ 17.59 (cycle time) min = 4.09 yd^3/min

Hourly Production = 4.09 (production rate) yd^3/min x 50 min/hr (work hour factor) = 204.66 yd^3/hr

Hours Required = 18,474 (volume to be moved) yd^3 ÷ 204.66 (hourly production) yd^3/hr = 90.27 hrs

21,120 ft./ 3,520 FPM = 6.00 Minutes

21,120 ft/ 3,080 FPM = 6.86 Minutes

Data Sources:

Project SC[3]

Date 6 March 1995

WORKSHEET NO. 9A

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

Haul Sub-Base

Characterization of Truck Used (type, size, etc.):

20 Ton Bottom Dumps

Description of Truck Use (origin, destination, grade, haul distance, truck capacity, etc.):

Haul Distance - 25 Miles one way

Productivity Calculations:

Cycle time = 33.33 (haul time) + 30.00 (return time) + 8 (total loading time) + .5 (dump and maneuver time) = 71.83 min

Number of Trucks Required = 71.83 (truck cycle time) ÷ 8 (total loading time) = 9

Production Rate = 15.59 yd^3 (truck capacity) x 9 (# of trucks) ÷ 71.83 min (cycle time) = 1.95 yd^3/min

Hourly Production = 1.95 yd^3/min (production rate) x 50 min/hr (work hour factor) = 97.67 yd^3/hr

Hours Required = 396 yd^3 (volume to be moved) ÷ 97.67 yd^3/hr (hourly production) = 4.05 hrs

Haul 132,000 ft./3,960 ft/mn = 33.33

Return 132,000 ft./ 4,400 ft/mn = 30.00

Data Sources:

Project SC^3

Date 6 March 1995

WORKSHEET NO. 10

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Excavate Culvert

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

Net bucket capacity = 1.36 (heaped bucket capacity) yd^3 x .70 (fill factor) = .95 yd^3

Net Hourly Production = .95 (net bucket capacity) yd^3 x 55 (work hour factor) min/hr ÷ .33min (cycle time) = 158.33 yd^3/hr

Hours Required = 42.82 (volume to be handled) yd^3 ÷ 158.33 (net hourly production) yd^3/hr = 270.49 hrs

Data Sources:

Caterpillar Perfromance Handbood, Edition 21

Project SC^3

Date 6 March 1995

WORKSHEET NO. 10 A

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Excavate Cut Areas

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

Net bucket capacity = 1.36 (heaped bucket capacity) yd^3 x .70 (fill factor) = .95 yd^3

Net Hourly Production = .95 yd^3 (net bucket capacity) x 55 min/hr (work hour factor) ÷ .33 min (cycle time) = 158.33 yd^3/hr

Hours Required = 25,683 yd^3 (volume to be handled) ÷ 158.33 yd^3/hr (net hourly production) = 162.21 hrs

Data Sources:

Caterpillar Performance Handbood, Edition 21

Project SC^3

Date 6 March 1995

WORKSHEET NO. 10 B

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Place Riprap and Filter Blanket

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Pick up material and place

Productivity Calculations:

Net bucket capacity = 1.36 (yd^3) (heaped bucket capacity) x .70 (fill factor) = .95 yd^3

Net Hourly Production = .95 (yd^3) (net bucket capacity) x 45 min/hr (work hour factor) ÷ .33 min (cycle time) = 129.55 yd^3/hr

Hours Required = 9,910 (yd^3) (volume to be handled) ÷ 129.55 (yd^3/hr) (net hourly production) = 76.50 hrs

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC[3]

Date 6 March 1995

WORKSHEET NO. 12

PRODUCTIVITY AND HOURS REQUIRED FOR MOTORGRADER USE--GRADING

Earthmoving Activity:

Grade Sub-Base

Characterization of Grader Used (type, size capacity, etc.):

Caterpillar 14 G

Description of Grader Route (push distance, % grade, blade effective length, operating speed, etc.):

Effective Blade Wdith - 8 ft.

Speed - 2.4 MPH

Productivity Calculations:

Contour Grading:

Hourly Production = $\frac{2.4}{\text{speed}}$ mi/hr x $\frac{8}{\text{eff. blade width}}$ ft x 5280 ft/mi x 1 ac/43,560 ft^2 x

$\frac{.3}{\text{work hour factor}}$ = 0.70 ac/hr

Scarification:

Hourly Production = $\frac{\quad}{\text{work speed}}$ mi/hr x $\frac{\quad}{\text{scarifier width}}$ ft x 5280 ft/mi x 1 ac/43,560 ft^2 x

$\frac{\quad}{\text{work hour factor}}$ = _____ ac/hr

Hours Required = 1.49 ac ÷ 0.70 ac/hr = 2.13 hrs

Data Sources:

Catepillar Performance Handbook, Edition 21

Project Soldier Creek Coal

Date 25 April 1995

WORKSHEET NO. 13

SUMMARY CALCULATION OF EARTHMOVING COSTS

Equipment Type	Owning and Operating Cost ($/hr) Equipment + Accessories		Labor Cost ($/hr)		Total Hrs Req'd		Total Cost ($)
DN9 Dozer (3)	((54,010 $17,610/Machine/Mo.^{3}	) +	32.50	] x	179.93 (3)	=	71,553
D4C Dozer	((70.00	) +	32.50	] x	14.96	=	1,529
966 E Loader	((46	) +	32.50	] x	35.56	=	2,791
915 LHD	((40	) +	32.50	] x	370.12	=	26,834
12 Yd Truck 6	((32.50	) +	22.15	] x	90.27	=	29,600
20 Ton Truck	((32.00	) +	22.40	] x	4.05	=	2,711
215 D Escavator	((14,813 $5,120 Mo. x 2.89 Mo.)	) +	32.50	] x	509.20	=	31,362
14G Motorgrader	((4,200	) +	32.50	] x	2.13	=	169
	((	) +		] x		=	
	((	) +		] x		=	
	((	) +		] x		=	
	((	) +		] x		=	

Total Cost = 166,549

Equipment and Accessory Identification:

Data Sources:

Wheeler Machinery Rental Rates
W.W. Clyde, Equipment and Labor Rental Sheet

Project SC[3]

Date 6 March 1995

WORKSHEET NO. 14

REVEGETATION COSTS

Name and Description of Area to be Revegetated:

Description of Revegetation Activities:

Reseeding:

21.82 acres x ($ _____ per acre + $ 1,692 per acre) = $ 36,919

(# of acres to be reseeded) ($/acre for seedbed preparation) ($/acre for seeding, fertilizing, and mulching) (costs for reseeding)

Planting Trees and Shrubs:

21.82 acres x $ 300 per acre = $ 6,546

(# of acres for planting) ($/acre for planting trees and shrubs) (costs for planting)

Other Revegetation Activity for this Area (e.g., Soil Sampling):

(Describe and provide cost estimate with documentation; use additional sheets if necessary.)

15 Trees/AC X $20/Tree = $300/AC

TOTAL REVEGETATION COST FOR THIS AREA = $ 43,465

Data Sources:

Means Building Construction Cost Data, Edition 53

Project SC^3

Date March 6, 1995

WORKSHEET NO. 15

OTHER RECLAMATION ACTIVITY COSTS

Descriptions of Reclamation Activity:

Seal Portals
Seal Shaft - 6" Slab on Grade
Silt Fence Installation - 63,700 ft.
Remove Pavement - 4"
Remove Signs/Delineators - 6 Signs, 44 Posts

Assumptions:

Seal Portal - Cost per Block = $.91 3 Men to complete work in 3 days, 8 Hours/Day
Seal Shaft - Pump Truck = $17.10/Cu.Yd., Concrete $75.00/Cu.Yd. = $92.10
Silt Fence Installed - $.34/ft., 2 Laborers @ $17.80/Ea. 800 ft./ Hr. Installation
Remove pavement - $6.60/sq. yd.
Remove signs/delineators - $15.65/sign, $8.95/Delineators

Cost Estimate Calculations:

Remove Signs/Delineators - $15.65 x 6 + $8.95 x 44 = $488
Seal Portals - 2,510 sq./ft. x $9.08/50 ft. = $22,800
Seal Shafts - 3.8 cu.yd. x $92.10/cu.yd = 350
Silt Fence Installation - 63,700 ft. x $.34/ft. + $\frac{63,700}{800 \text{ pr.hr.}}$ x $17.80 x 2 = $24,493
Remove Pavement - 1,560 sq. yd. x $6.60 = $10,296

TOTAL = $_____

Other Documentation or Notes:
(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

Data Sources:

Means Construction Cost Data 1995, Edition 53

Project SC^3

Date 6 March 1995

WORKSHEET NO. 15

OTHER RECLAMATION ACTIVITY COSTS

Descriptions of Reclamation Activity:

Asphalt Reconstructed County Road

Assumptions:

10,692 Cu. Ft. x 145 lb./cu.ft. = 1,550,340 lbs. ÷ 2000 lb/ton = 775.17 Ton

Cost Estimate Calculations:

775.17 Tons x $34.50/Ton = $26,743

TOTAL = $ 85,170

Other Documentation or Notes:
(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

Data Sources:

Means Building Construction Cost Data, Edition 53

Project: Soldier Creek Coal

Date: 25 April 1995

WORKSHEET NO. 16

RECLAMATION BOND SUMMARY SHEET

1.	Total Facility and Structure Removal Costs	$ 953,376
2.	Total Earthmoving Costs	166,549
3.	Total Revegetation Costs	43,465
4.	Total Other Reclamation Activities Costs	85,170
5.	Subtotal: Total Direct Costs	1,249,560
6.	Mobilization and Demobilization (at 5 % of Item 5) (1% to 5% of Item 5)	62,478
7.	Contingencies (at 7 % of Item 5) (see Table 4)	87,469
8.	Engineering Redesign Fee (at 6 % of Item 5) (see Graph 1)	74,973
9.	Contractor Profit and Overhead (at 8.8 % of Item 5) (see Graph 2)	109,961
10.	Reclamation Management Fee (at 4.4 % of Item 5) (see Graph 3)	54,981
11.	GRAND TOTAL BOND AMOUNT (Sum of Items 5 through 10)	$ 1,639,422
12.	Excalation @ 2.01/Yr. for 2 years	65,905
		1,705,327

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CHAPTER 5 ENGINEERING

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LIST OF TABLES

Chapter 5

ENGINEERING {R614-301-500}

5.10 Introduction

This chapter presents designs, maps, plans and cross-sections of the facilities and structures required to minimize the potential impacts of the Soldier Canyon Mine operations. This permit was written using R614-301-500 regulations, therefore the format does not follow the order of the R645-301-500 regulations. Although, references to a refuse disposal site and preparation plant may be made in the text, appendices, reports, plates, drawings or maps of this chapter and M&RP, these facilities will not be constructed. Many references have been removed, however removal of all references was not possible such as on Drawings 1.21-1, 3.7-1, 3.7-3, 3.8-1, 3.10-1, 3.10-2, 3.10-3, 3.10-4, 4.11-1, 5.26-2,6-22-7, 7.21-1 and 7-21-2A, etc.

5.11 General Requirements

The methods, calculations, maps, plans and cross-sections attendant to the operations of the Central Mine Facilities and the subsequent reclamation operations are presented in the following sections. These designs are required to comply with the design in R614-301-500 regulations.

5.12 Certification

SCCC provides, in this permit application, certified cross-sections and maps of surface facilities, hydrologic structures, geologic resources, plans and engineering designs , impoundments, and roads .

5.12.25 Primary Roads

I, J.T. Paluso, being a professional engineer licensed in the State of Utah, License Number UT-4028, due hereby certify that the design and construction or

reconstruction of primary roads as described in the plan meet the requirements of R645-301-534.200 and R645-301-742.420.

5.13 Compliance with MSHA Regulations and MSHA Approvals

Soldier Creek Coal Company will comply with the requirements of both DOGM and MSHA regarding these facilities.

5.14 Inspections

All engineering inspections, except those described under R614-301-514.330, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

Sediment pond and sewage lagoon inspections will be performed quarterly by a qualified person for appearance of structural weakness and other hazardous conditions. These structures will also be inspected at least yearly, until removal or release of the performance bond, by a professional engineer and a certified inspection provided to the Division. These inspections will meet the requirements of R645-301-514.300.

A copy of each inspection report will be retained at the Soldier Canyon Mine site.

5.15 Reporting and Emergency Procedures

At any time a slide occurs which may have a potential adverse effect on public, property, health safety or the environment, Soldier Creek Coal Company (SC3) will promptly contact the Division and inform the Division of the problem and of any remedial measures planned. Similarly, if the inspections of the sediment ponds, and sewage lagoon disclose a potential hazard, SC3 will promptly notify the Division of the problem and of any remedial measures planned to alleviate the problem.

In the event of a temporary cessation of the Soldier Canyon Mine operation, SC3 will notify the Division as soon as possible and will effectively support and maintain all surface access openings to underground operations, and secure surface facilities in areas in which there are no current operations, but operations are to be resumed under an approve permit.

Before temporary cessation of coal mining and reclamation operations for a period of 30 days or more, or as soon as it is known that a temporary cessation will extend beyond 30 days, Soldier Creek Coal Company will submit to the Division a notice of intention to cease or abandon operations. This notice of the Division will be as required by R614-301-515-321.

5.20 Operations

This section presents the operations plan for the Soldier Canyon Mine operations.

5.21 General

This section presents a description of the plan for operation of the central mine facilities and topsoil site . The general layout of the various facilities for the Soldier Canyon Mine operations are presented on Exhibits 5.21-1 and 5.21-2 Maps, cross-sections, and calculations for the specific facilities are presented to support the narrative description.

The Applicant will not conduct mining activities outside the approved permit area, and any mining activity conducted within the permit area will not affect areas outside the permit area boundary.

5.21.11 Previously Mined and Presently Mined Areas

Exhibits 5.22-1 and 5.22-2 show the location and extent of past and present underground mining operations.

5.21.12 Existing Surface and Subsurface Facilities and Features

The location of all buildings in and within 1000 feet of the permit area; the location of surface and subsurface man-made features within, passing through, or passing over the permit area; each public road located in or within 100 feet of the permit area; and the location and size of the sewage lagoon, and topsoil storage site are shown on Exhibits 1.12-1, 5.21-1 and 5.21-2. REI's power line is shown on Exhibits 5.21-1 and 5.25.1

5.21.13 Landowners and Right-of-Entry and Public Interest Maps

Exhibits 1.12-1, 1.12-2, 5.21-1, and 5.21-2 show the owners of record of those lands both surface and subsurface, included in or contiguous to the permit area; the boundaries of land within the proposed permit area upon which the applicant has the legal right to enter and begin coal mining and reclamation operations; and the measures to be used to ensure that the interests of the public and landowners are protected as required under R614-103-
234 when conducting coal mining and reclamation activities, within 100 feet of the right-of-way line or relocating a public road.

5.21.14 Mine Maps and Permit Area Maps

Exhibits 5.21-3, 5.21-4 through 5.21-8 and 5.25-1 show the boundaries of all areas proposed to be affected over the estimated total life of the coalmining and reclamation operations, sequence and timing of the mining of subareas for which additional permits will be sought, the coal mining and reclamation operations to be conducted, the lands to be affected throughout the operation and any change in a facility or feature to be caused by the Soldier Canyon Mine operations. Also, the underground workings and location and extent of areas where subsidence is planned and where measures will be taken to prevent, control or minimize subsidence-related damage.

5.21.15 Land Surface Configuration Maps

Topographic maps used by the Applicant clearly indicate surface contours to adequately represent the existing land surface configuration within the permit area.

5.21.16 Maps and Cross-sections of the Features and Proposed Features

Maps produced by the Applicant will show the facilities, disturbed area, disturbed area boundary, explosive storage and point source discharges for their specific requirement are included within this application.

5.21.17 Transportation Facilities Maps

This application describes each road and conveyor system to be constructed and used by the Applicant as required by R614-301-527.

5.21.20 Signs and Markers

Signs and markers will be posted, maintained, and removed by the operator; will be a uniform design that can be easily seen and read; be made of durable material; and conform to local laws and regulations; and be maintained during all activities to which they pertain.

These signs shall include a mine and permit identification sign, perimeter markers, buffer zone, and topsoil markers.

5.22 Coal Recovery

Conservation of Coal Resources

The Bureau of Land Management (BLM) and the Utah Division of State Lands & Forestry govern the conservation and royalty payments of the coal located within Applicant's proposed permit boundary. Mining plans for all seams must be approved by the BLM (43 CFR 3480 et al) and the Utah Division of Oil, Gas & Mining (Regulatory Authority) before mining can occur within the new area. This

prior approval ensures the diligent development and extraction of all minable coal.

Three coal seams within the LOM area, the Sunnyside, the Rock Canyon, and the Gilson, will be mined (Exhibits 5.21-4, -5 and -6). The underground operations have been planned to yield the maximum recovery of the coal reserves using the safety of mine personnel, accepted economic mining practices, and the protection of the environment as criteria. In addition, product quality, as it pertains to present and future customer needs, was also used as a secondary criterion in planning. The plans anticipate increasing current production rates so that longwall mining can be introduced to supplement the current room and pillar operations. Adherence to these guidelines will improve mining conditions in each seam and aid in the maximum, safe recovery of the individual coal horizons. In the event that future mining technology (not yet developed) is more efficient than present technology and is compatible with the Applicant's mining operation, then these new technologies will be applied to the extraction of Soldier Canyon coal.

Although maximum recovery is an important design criteria, other factors must also be considered to ensure the protection of personnel and the environment. Coal reserves will not be recovered in the following areas:

1. Areas where the coal is less than 5 ft thick will not be mined as mining in that height is not feasible under current economic conditions.
2. Coal will only partially be mined in the immediate vicinity of shafts, portals, or any connections between seams. This will prevent subsidence and protect structures in those areas.
3. Solid coal barriers will be left intact to protect the main entries from mined out panels.
4. Solid coal barriers will be left between certain panels for roof and floor protection and to provide seal areas in the event of a fire or gas accumulation.

5. Solid coal barriers of required size will be left along the property boundaries as required by the General Safety Orders of Utah and or BLM.

6. To minimize the chances of exposure to dangerous quantities of harmful gases or flooding of the working sections, solid coal barriers of sufficient size will generally be left around old workings.

7. In most cases, main, barrier, bleeder, and longwall panel pillars will not be recovered because of the extreme hazards associated with such recoveries.

8. Due to the minimal amount of interburden between the Rock Canyon and Gilson seams (< 30 ft a locations) only one seam may be mined in specific areas. This is because of the dangers associated with mining both seams under these conditions.

9. Coal will only partially be recovered in areas below and adjacent to the Soldier Creek drainage channel. This is for protection of surface features and facilities as described in Section 5.25.

Maximum Economic Recovery

Utilization of room and pillar and longwall mining methods will make maximum coal recovery more feasible because the mining operations will be more versatile to meet diverse mining conditions. The mine layout is designed to maximize the number of longwall panels and to minimize waste of coal reserves near the boundaries of the property.

Annual Production

Maximum annual production will not be reached until the year 1998. However, the maximum production rate for the mine will begin in 1994 and continue for approximately nine years (Table 5.22-1). At the end of this period, annual tonnage will decline until the various mine reserves have been depleted. During full production periods, the mine will experience variations in annual tonnage. This is due to the moving of the longwall section more than once during the year.

Life of Mine

The life of the mine is subject to the size and geometry of the reserves, and the rate at which the reserves are mined. The projected life of the mine is shown in Table 5.22-1.

5.23 Mining Methods

Mine Plans and Layout

In 1989 J.F.T. Agapito & Associates, Inc. were contracted to evaluate and design a three-seam longwall layout for the Soldier Canyon Mine. This study consisted of executing the following activities: 1) Site Selection and Inspection of Surface Resources, 2) Instrumentation and Data Analysis, 3) Three-seam Gate Design, 4) Subsidence Evaluation, 5) Develop a Mine Plan Layout for Efficient Three-seam Extraction, 6) Develop a Ventilation Plan for the Proposed Mine Layout, and 7) Presentation of Results/Final Report. This final report, Mine Layout design and Ventilation Analysis for Soldier Creek Coal Company, is presented as Appendix 5-D and now forms the basis for the present mine plan. This proposed mine layout has provided the best compromise solution for stability, resource recovery, ventilation, haulage, production requirements and protection of surface resources. The following parameters were concluded:

Direction of Mining - Based on the cleat/joint measurements and stress measurement in the existing mine an east-west and north-south orientation was selected as the preferred direction of mining. This orientation provides the best compromise for roof and rib stability.

Panel Retreat Sequence - It is proposed that longwall panels be extracted from the top of the seam toward the bottom. This is referred to as "Downdip" panel retreat. While an updip retreat is beneficial for overall roof stability, the

Table 5.22-1

Forecasted Average Annual Coal Production
Soldier Canyon Mine
1991 - 2009
(000's tons)

Year	Continuous Miners			Longwall	Total
	Unit A	Unit B	Unit C		
1991	504	504	192	-	1,200
1992	504	277	419	-	1,200
1993	504	185	-	1,500	2,189
1994	504	234	-	2,320	3,058
1995	504	184	-	2,270	2,958
1996	504	233	-	2,320	3,057
1997	504	171	-	2,320	2,995
1998	504	185	-	2,420	3,109
1999	504	229	-	2,320	3,053
2000	504	237	-	2,320	3,061
2001	504	277	-	2,270	3,051
2002	504	277	-	2,320	3,101
2003	-	277	-	2,320	2,597
2004	-	140	-	2,420	2,560
2005	-	140	-	2,320	2,460
2006	-	277	-	2,320	2,597
2007	-	277	-	2,220	2,497
2008	-	114	-	2,320	2,434
2009	-	-	-	1,245	1,245
Totals	6,048	4,218	611	37,545	48,422

downdip was selected for methane control. This downdip retreat direction will enhance methane movement in an updip direction, away from the longwall face.

Multiple-Seam Workings Position - The proposed mine layout calls for all mains to be directly columnized. Columnization will be most important for mains, submains and bleeders in the Rock Canyon and Gilson seams due to the minimal interburden. Longwall panel gate road development will, however, be offset. Offsetting of gate pillars under the gob of the upper seam will improve the lower seam gate stability.

Longwall Panel Dimensions - The longwall dimensions selected for the mine layout range from 610 to 680 ft. wide and from 3,800 to 5,700 ft. long.

Longwall Panel Gate Road Development - A two-entry, yield pillar system was selected for gate road development. This design was based on an overall evaluation of the depth of cover, cleated nature of the coal seams, thickness of coal seams, roof rock strengths and multiple-seam mining plans.

Recommended Pillar Designs - Utilizing the in-mine stress measurements, as well as an evaluation of roof, coal and floor strength properties, recommended pillar dimensions were designed for different depths. The recommended pillar designs are presented in Table 5.23-1.

Pillar Extraction

Full pillar extraction in room and pillar areas will be performed in accordance with the current approved mining plan. This provides for the recovery of the reserves in those areas by a proven method. Extraction of coal in longwall areas will be performed on panels approximately 680 ft. in width and from 3,800 to 5,700 ft. in length. The panel layout also provides for modifications should future technology develop a safer method of development or extraction.

Bleeder entries will generally be driven around all areas where full extraction, either by longwalls or continuous miners, is to take place.

Table 5.23-1

Recommended Pillar Designs
(Agapito 1991)

	Depth of Cover (Ft.)			
	1500	2000	2250	2500
Main Development				
Pillar spacing center-to-center (ft.)	80 by 80	100 by 100	N/A	120 by 120
Recommended number of entries	6	5	N/A	4 to 5
Barrier Pillars				
Recommended Pillar Widths (ft.)	250	300	N/A	350
Gate Pillars-Sunnyside seam				
Pillar spacing center-to-center (ft.)	N/A	54 by 118	54 by 138	58 by 138
Recommended number of entries	18	18	N/A	18
Gate Pillars-Rock Canyon seam				
Pillar spacing center-to-center (ft.)	N/A	56 by 120	56 by 140	N/A
Recommended number of entries	N/A	18	18	N/A
Gate Pillars-Gilson seam				
Pillar Spacing (East Block) (ft.)	N/A	N/A	53 by 138	N/A
Pillar Spacing (North Block) (ft.)	N/A	N/A	N/A	58 by 138
Pillar Spacing (West Block) (ft.)	N/A	46 by 118	N/A	N/A
Recommended Entry spans (ft.)	N/A	18	18	18

Longwall Mining

The mine layout maximized the number of panels, especially longwall panels. Main entries, submains, and panels have been aligned to minimize the waste of coal reserves near property boundaries and areas of thin coal. Coal will be mined from a longwall face approximately 680 ft. wide by a double ranging drum shear.

Longwall panels will be developed using a 2 entry system. This provides for a yield pillar, and in conjunction with the cribbing of the tailgate entry prior to longwall mining will give adequate roof control to enable safe extraction of the coal.

Multi-Seam Considerations

In order to ensure the maximum recovery of coal from all minable seams and to avoid hazardous mining conditions, the Applicant will adhere to the following guidelines during multiple seam mining operations:

a) Coal will be mined from top to bottom in accordance with standard descending seam extraction practices.

b) Where possible, mining in the upper seam will precede mining in the seam immediately below it by at least one year. This staggering of operations will allow time for the overburden to settle and stabilize before mining begins in the lower seam.

c) The protective barrier pillars for all main and submain slope entries, main haulageways, primary air courses, bleeder entries, and manways in each seam shall be superimposed whenever possible, regardless of vertical separation or rock competency.

Shafts and Interconnection of Rock Slopes

The Sunnyside and Gilson seams will be accessed through rock slopes driven from the Rock Canyon seam. In each case, an adequate number of airways will be driven from the Rock Canyon seam, as well as one beltway. The intake airway will also be used to transport men and supplies. The exact number, size and location will be determined according to mining conditions and MSHA approved roof control and ventilation plans.

Ventilation System

A detailed description of the ventilation system as well as an explanation of the methane and dust control plan is routinely reviewed and approved by MSHA. The ventilation system was designed to provide a dependable, adequate supply of uncontaminated air to all underground work areas. Air volume and velocity are sufficient to dilute, render harmless and carry away flammable, explosive or toxic gases as well as dust, gases generated by explosives, smoke and fumes.

Two exhaust fans provide adequate volumes of fresh air to the work areas. Fan No. 1, powered by a 500 hp (440 V) motor, is capable of moving 450,000 cfm. Fan No. 2, with an 800 hp (4160 V) motor is presently producing 645,000 cfm. Both fans are equipped with auxiliary diesel engines.

Roof Control Plan

Roof control is based on a full bolting plan: conventional supplemental materials and supports are used as needed. The plan was reviewed by MSHA and subsequently approved.

When adverse roof conditions are encountered, spot bolting is used to supplement the conventional roof control plan. In areas where spot bolting is deemed necessary, either resin or conventional roof bolts are installed on four-foot centers. Spot bolting begins in competent roof and continues until competent roof is again encountered. If necessary, wire mesh matting or rib bolts are installed in main headings to maximize the stability of these entries. All conventional bolting materials are chosen, installed, and positioned in accordance with 30 CFR 75.200-7 (a) and (b), 75.200-8, and 75.200-10.

Hydraulic props with ropes, timbers or cribs are used as breaker rows and turn props during pillar extraction. Pillar splitting procedures are in accordance with 30 CFR 75.200-11.

Projected Mine Development

Detailed maps of all three seams showing the development of the mine are presented on Exhibits 5.21-4, -5 and -6. The proposed mine plan expands the resent Soldier Canyon operation from the Rock Canyon seam to include the

Sunnyside and Gilson seams. The present room and pillar methods will be supplemented with a longwall unit.

Mine Water System

Pumps ranging in size from 5 to 400 hp, using pipes 2 in. to 8 in. in diameter control incoming formation water. Water not used for dust suppression in the mine is released to Soldier Creek under authorization of NPDES Permit No. UT-0023680. Waste water is gravity fed into two sewage lagoons located 2 miles form the mine site.

When mine water is encountered, it is channeled by the natural pitch of the seam to the low areas, and from there is pumped into an underground sump. Water in the sump is used either for dust suppression in the mining sections or, after most of the suspended solids have settled out is pumped out of the mine into Soldier Creek under authority of NPDES Permit No. UT-0023680.

Hazardous Wastes

It is not anticipated that acid-forming or toxic waste will be discovered during mining. However, if these conditions are encountered, the Regulatory Authority will be notified and a plan will be developed and submitted to the Agency for approval.

Equipment

The machinery for the mine is equipped, maintained, and operated to ensure maximum safety, productivity, and quality of coal production. All underground equipment is approved by MSHA. Table 5.23-2 lists the major underground and surface equipment to be used. These lists are not exclusive and equipment design and choices may vary during the course of mining.

All pieces of stationary and mobile equipment at the mine are assigned a projected useful service life and depreciated accordingly. If the depreciation life of a particular unit expires and the equipment is still in serviceable condition with acceptable availability and maintenance costs, the service life is extended.

Mine Safety

The Applicant considers attention to health and safety of each miner to be a prime contributor to the continued success of the mining operations. The Applicant complies with all MSHA and State of Utah health and safety laws to protect the well-being of its employees. A number of safety provisions have been incorporated into the proposed mining operations to ensure compliance with those laws.

Safety Training

The mine is equipped with modern emergency facilities and has an organized, functioning safety program. All mine employees are instructed concerning mine safety procedures and meet MSHA first aid and safety training requirements. New employees are required to attend a minimum of 40 hrs. of classroom orientation before starting work in the mine.

Fire Protection

In the event of a surface facility or mine fire, the water storage tank located on the surface and underground water sumps will be used to provide water necessary to control the fire. Water lines from the underground sumps are aligned along conveyor belt lines leading to each working face. Outlets have been installed along the water line for quick and easy access in case of any emergency. Fire hydrants and fire extinguishers are strategically located to ensure the protection of all personnel and the environment.

Water or chemical deluge systems with sprays are located at the belt drives to prevent mine fires. Fire extinguishers in operable condition are provided for all structures and equipment where they may be a potential fire hazard. All underground equipment complies with state and federal regulations and is well maintained.

Additional measures are taken to prevent mine fires. All combustible materials are so stored to minimize the potential for combustion. Suitable fire-fighting equipment is provided and trained personnel are certified to use breathing apparatus in case of a mine fire or rescue. Smoking or the carrying of any type

of open flame device is prohibited in the mine and within 25 ft of the portals. These portal areas are designated fire lanes.

Each mine operation complies with the fire protection requirements outlined in MSHA regulations, 30 CFR Parts 75 and 77. A copy of MSHA's approval of plans for extinguishing potential waste fires will be submitted to the regulatory authority upon request.

Mine waste fires will be handled in a manner similar to the mine fire protection system. The system is one of, first protection, and second suppression. Prevention is primarily a safety and training matter dealt with by an ongoing educational program concerning the need for continuous attention to fire prevention. The engineering design for the mine waste disposal areas reduced potential for spontaneous combustion by continuous compaction and covering of material. Second, the suppression system consists of fire extinguishers or fire hoses available for use should a fire develop. Operators are instructed to separate any smoldering material and compact the adjacent material. The burning material is then extinguished by appropriate methods.

Handling of Explosives

The utilization of continuous mining machines and longwall mining machines normally does not require the use of explosives. Some underground construction activities, however, such as the construction of shafts and overcasts, penetration of faulted areas or rock spars, and breaking of fallrock, may require the use of explosives. Explosives are handled in accordance with state and federal laws and are stored, transported and handled by experienced, approved, and certified personnel in accordance with Article VI, Utah General Safety Order of Utah Coal Mines, Section 48 through 53, 30 CFR 75.1300 and the manufacturer's recommendation.

Dust Control

Coal dust is controlled through good housekeeping, wetting face areas, rock dusting, and ventilation. Large quantities of coal dust are prevented from accumulating on the surface of any type of equipment capable of producing heat

or sparks. All working areas and return entries are rock dusted to prevent dangerous accumulations of coal dust.

A pipeline system is provided for wetting the rib, roof, and floor surfaces for a distance of at least 40 ft from each working place, except where these areas are naturally wet. In dry working places, the face areas are kept wetted back to where rock dust has been applied.

All mining equipment or operational areas that are subject to large concentrations of dust are equipped with water sprays at the source to keep air-borne dust to a minimum.

Within the mine rockdust and continuous water spray at the mine face and transfer points protect the miners from excessive amounts of dust. Haulageways are wetted and/or otherwise treated to assist in dust control.

Adequate ventilation is provided to each working face to quickly remove dust particles during the course of mining. All mine operations comply with MSHA and State of Utah laws to keep respirable dust to a minimum. Dust sampling is done as outlined by MSHA.

Diesel Emissions

Diesel equipment in the mine is used in accordance with all state and federal regulations, including the following:

1) Only diesel equipment approved by the Bureau of Mines or MSHA is used underground.
2) Diesel equipment is used only in well-ventilated areas.

All measurements and sampling are in accordance with federal and state laws.

5.24 Blasting and Explosives

The Applicant will comply with all state and federal laws in the use of explosives during the construction of the surface facilities expansion, and whenever blasting is required for the Soldier Canyon Mine. A certified blaster

will direct all blasting operations with the help of at least one other person. The Applicant will make sure that all contractors working on any project are made aware of the blasting procedures. All blasting records will be kept on file at SCM for the required period of time.

All explosive containers used at the mine are built to meet or exceed the specified requirements set forth by the Mine Safety and Health Administration. The surface storage containers are placed in a position to ensure the protection of the environment and all personnel. Those containers, one for caps and one for powder, are located on the surface on skids and made of 1/4-1/2 inch steel place with wood lining of ½ inch plywood. Two five tumbler locks, adequately protected, are used. Both magazines have two vents measuring approximately 3x3 inches.

The portable container used for the transportation of explosives underground is a small metal utility trailer. The trailer is wood lined with caps and powder kept separate. As required by law, no metal screws or metal parts are exposed.

5.25 Subsidence

5.25.10 Subsidence Control Plan

Surface Features and Facilities Subject to Subsidence, Slides and Other Damage

A survey of the surface area overlaying and adjacent to the proposed mine plan area has been completed. All structures and renewable resource lands, which could conceivably be adversely affected by subsidence or other mining induced surface failure, (e.g. slides, slumps, etc.) have been identified and listed below (also see Exhibit 5.25-1).

- Questar Pipeline Company's 20-inch natural gas pipeline.
- Western Natural Gas, Inc./Resource Enterprises, Inc. (REI) degasification facilities, which include two compressor facilities, one exhauster/blower facility, four vertical boreholes and associated gas and power lines.

- Carbon County's public road 53.
- The Pine Canyon private road.
- Streams - Soldier Creek and Pine Creek
- Most surface areas are utilized for livestock grazing.

Most of the area subject to possible subsidence is currently used for low-intensity summer grazing of domestic livestock (primarily cattle and sheep). Subsidence should have no effect on grazing. No other renewable resources exist in this area. The area does, however, have a limited potential for recreational use, such as hunting. Again, subsidence should have no effect on any recreational use.

Existing structures, within the mine plan area, include the Questar natural gas pipeline and the Western Natural Gas, Inc./REI coal bed degasification facilities. The overall subsidence control plan has been designed to ensure that these facilities continue to operate, uninterrupted, and are in no way jeopardized by mining induced subsidence. (See section 5.25.13 Measures to Prevent Subsidence).

One County road passes through the permit area along Soldier Creek. Also, a single dirt road of restricted local use is located along the base of Pine Canyon. The subsidence control plan has been designed so as to prevent any damage to these roads. Subsidence should not damage the roads; however, if damage does occur, it would be slight and easily repaired.

Streams in the life of mine (LOM) area are described in detail in Sec. 7.24.2, Surface Water Information. The nature of subsidence resulting from the proposed mine plan should not significantly affect any streams.

The subsidence control plan has been designed to prevent damage to the streams. Gentry and Abel (1978) demonstrated that topographic lows (such as are the stream beds) are in fact protected in part by "piling up" of the opposite facing ridge slopes (adjacent topographic highs) during actual subsidence events. Therefore, mining induced surface fracturing should be very limited or nonexistent within the stream bed areas and readily filled.

The maximum potential subsidence boundary, which could extend beyond the present five-year term permit area, is detailed on Figure 5.25-1. This subsidence boundary was projected to the surface utilizing an angle of draw of 22.5 degrees. This projection was extended from all coal lease boundaries where a coal seam of mineable thickness exists. In areas where there are multiple seams of mineable thickness, the lower most seam was used for the subsidence projection. Please note that the maximum potential subsidence boundary was projected independently from the approved mine plan. Therefore, the subsidence projection represents a worst case condition, where full extraction mining would occur up to all existing coal lease boundaries. While a 22.5 degree angle of draw is generally considered a conservative estimate, it was utilized to be consistent with the subsidence evaluation performed by J.F.T. Agapito and Associates, Inc. (contained within the Mine Layout Design and Ventilation Analysis - Appendix 5-D). Since the approved mine plan does not propose full extraction mining up to the coal lease boundaries, a further evaluation at a 35 degree angle of draw was performed. Results indicate that a projection of a 35 degree angle of draw from the proposed full extraction areas will not extend beyond the subsidence buffer zone as detailed. Any future mine plan modifications shall maintain a 35 degree angle of draw projection within the subsidence buffer zone unless one of the following conditions is satisfied.

- The Applicant shall demonstrate to the Division's satisfaction that there is no potential for material damage, environmental harm or damage to human health in the subsided areas.

- The Division shall accept a lesser degree angle of draw, based on detailed analysis and engineering evidence submitted by the Applicant.

In order to permit all areas which could potentially be affected by subsidence, a subsidence buffer zone has been added to the Soldier Canyon Mine Five-Year Term Permit Area (see Figure 5.25-1). This subsidence buffer zone includes approximately 1,473 acres and is included on the U.S.G.S. 7.5 minute quadrangle maps Deadman Canyon and Pine Canyon. A legal description of this additional permit area is as follows:

Township 13 South, Range 11 East, SLB&M:
Section 1: Lots 1,2,5,6 & 7, Section 12: W ½ W ½,
Section 13: NW 1/4 NW 1/4.
Township 13 South, Range 12 East, SLB&M:
Section 3: W ½ W ½, Section 10: NW 1/4 NW 1/4.
Township 12 South, Range 12 East, SLB&M:
Section 28: SW 1/4 SW 1/4, Section 29: S ½ S ½,
Section 30: SE 1/4 SE 1/4, Section 31: E ½ E ½,
SW 1/4 SE 1/4, S ½ SW 1/4, Section 32: NW 1/4 NE 1/4,
Section 33: W ½ W ½, SE 1/4 SW 1/4, S ½ SE 1/4,
Section 34: S ½ SW 1/4, W ½ SW 1/4 SE 1/4.

All surface owners, which will be affected by the incorporation of the subsidence buffer zone, have been contacted. Subsidence buffer zone letters were sent to Carbon County, Bureau of Land Management, Questar Pipeline Company, Mrs. Louise Iriart and Newell Nelson on September 1, 1992. Copies of the signed comments can be found in Illustration 5.25-1.

We are presently working with Questar, BLM and Newell Nelson to resolve potential problems. The pending sale of Soldier Creek has made it impossible to accurately define future mine plans. In the near future, when these plans are completed, these areas of concern will be addressed.

Also, as required, a proposed public notice has been prepared for publishing within the Sun Advocate, the local newspaper. This public notice will fulfill the requirements for a significant permit revision, as well as, for the proposed mining activities within 100 feet of a public road.

Following approval of the subsidence buffer zone, the Applicant shall modify the appropriate maps within the MRP and surface signs within the permit area to comply with the permit revision.

5.25.11 Methods of Coal Removal

Much of the reserve area will be mined using a longwall system, or full extraction room and pillar methods. As explained by Von Schonfeldt, et al., 1980, "subsidence when uniform rarely causes problems to renewable resources such as aquifers, streams and ranch lands." Therefore, as a result of using full extraction methods the surface above the mine will lower uniformly and no significant fracturing should occur. The slight decrease in the elevation at the surface is not expected to adversely affect any existing structures, stream, or roads.

To date, no significant surface effects due to subsidence in any part of the mine permit area or adjacent areas have been observed, although some surface subsidence theoretically is expected to occur as a result of historic and current mining activities. The Applicant's proposed mining plan has been designed using technically sound criteria to prevent significant mining induced impact to surface lands or existing structures. The following paragraph of this section describes how the proposed mining procedures will affect subsidence and the extent of controlled subsidence resulting from mining.

The proposed plan consists of a single mine located in the Rock Canyon seam and accessing coal reserves in the overlying Sunnyside seam and underlying Gilson seam via underground rock slopes. The methods of coal removal will be the same for each horizon worked within the mine. The exact method for any given area of the mine will vary, depending upon surface and subsurface sensitivities, depth of overburden and multiple seam conditions. The two basic methods to be used are longwall and room and pillar mining. A detailed description of methods to be used are given in Section 5.22 and 5.23.

Room and pillar mining will be used to develop main, submain, and panel entries. In addition, this method will be used in areas which are uneconomical for

(Proposed)

Public Notice
Soldier Creek Coal Company
Soldier Canyon Mine
P.O. Box I, Price, Utah 84501

Soldier Creek Coal Company has submitted to the Utah Division of Oil, Gas and Mining an application for a significant revision to the previously approved Mining and Reclamation Plan (ACT/007/018). Pursuant to R645-300-121.100, public notice is hereby given regarding this proposed permit revision.

In order to protect all areas which could potentially be affected by underground coal mining activities, a subsidence buffer zone is proposed for addition to the Soldier Canyon Mine Five-Year Term Permit Area. This subsidence buffer zone includes approximately 1,473 acres and is contained within the U.S.G.S. 7.5 minute quadrangle maps "Deadman Canyon" and "Pine Canyon". A legal description of this additional permit area is as follows:

Township 13 South, Range 11 East, SLB&M:
Section 1: Lots 1, 2, 5, 6 & 7, Section 12: W ½ W ½,
Section 13: NW 1/4 NW 1/4.
Township 13 South, Range 12 East, SLB&M:
Section 3: W ½ W ½, Section 10: NW 1/4 NW 1/4
Township 12 South, Range 12 East, SLB&M:
Section 28: SW 1/4 SW 1/4, Section 29: S ½ S ½
Section 30: SE 1/4 SE 1/4, Section 31: E ½ E ½
SW 1/4 SE 1/4, S ½ SW 1/4, Section 32: NW 1/4 NE 1/4,
Section 33: W ½ W ½, SE 1/4 SW 1/4, S ½ SE 1/4,
Section 34: S ½ SW 1/4, W ½ SW 1/4 SE 1/4.

Furthermore, Utah Highway 53, a public road, passes through the proposed buffer zone. A legal description of the specific surface area containing the public road is as follows:

Township 12 South, Range 12 East, SLB&M:
Section 28: SW 1/4 SW 1/4, Section 33: W ½ NW 1/4.

A copy of the current mine permit and the application for a significant revision is available for public inspection at the Carbon County Clerk's Office, Price, Utah, and the Utah Division of Oil, Gas and Mining. Any comments should be directed to the Utah Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

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longwall mining due to reserve geometry. Also room and pillar mining using limited extraction will be used in areas where high to total extraction methods are inconsistent with our subsidence control plan. Longwall mining will be used to achieve maximum extraction in those areas where it can be economically applied in harmony with the subsidence control plan.

As a result of the Applicant's proposed mining activities, some subsidence is expected to occur above much of the full extraction longwall areas. Exhibit 5.25-1 shows the areas over which maximum subsidence may result from the proposed mining activities.

The Mine Layout Design and Ventilation Analysis prepared by J.F.T. Agapito & Associates, Inc. (Appendix 5-D) also evaluated the potential surface subsidence of the proposed mine plan. Utilizing a modified National Coal Board method, which is based on measurements from western U.S. mines, it was estimated that the maximum total subsidence would be approximately 12 feet for 2 seam full extraction. A subsidence factor of 70 percent and an angle of draw of 22.5 degrees was used for the above evaluation. (The subsidence factor is the ratio of maximum surface subsidence to total mining height and the angle of draw defines the expected limits of surface subsidence beyond the boundaries of full extraction.)

5.25.12 Description of Physical Conditions

The depth of cover, seam thickness and lithology, which affect the likelihood or extent of subsidence and subsidence related damage are shown on the mine progress, interval, isopach and subsidence maps and addressed within this section and in the mine planning section.

5.25.13 Measures to Prevent Subsidence

In areas where mining may cause undesirable surface movement, steps will be taken to control or prevent subsidence. To prevent subsidence, permanent support can be achieved by selectively mining certain areas, leaving support pillars of coal, and/or by not mining specific areas.

The proposed mine plan identifies a zone of no secondary mining (Exhibit 5.25-1). This zone is designed to protect Soldier Creek, the Western Natural Gas, Inc./REI degasification facilities, the public road and a portion of the existing Questar natural gas pipeline. The route of this pipeline leaves the zone of no secondary mining as it turns east into Pine Canyon and continues northeast over the mine plan area. Since fill extraction longwall mining is proposed for this area, alternative methods of pipeline protection must be evaluated. Agapito & Associates (1991), suggest that uncovering the pipeline through this area may adequately protect it from subsidence damage. Also, the Applicant is presently in discussion with Questar Pipeline Company regarding the possible relocation of their gas pipeline around the proposed full extraction areas. Questar's preliminary reroute proposal is presented in Appendix 10 as Illustration 10.5.25-1. In any case, an agreement between Questar Pipeline Company and the Applicant shall be executed, and incorporated into this MRP, prior to the commencement of any full extraction mining beneath the existing pipeline.

Agapito & Associates, 1991 (Appendix 5-D) specifically analyzed the potential mining impact to Pine Creek at the point of minimal overburden (approximately 1370 feet). Their analysis is as follows:

USBM (Babcock and Hooker, 1977) suggest several criteria for full extraction mining under major water bodies. These are:

* The cumulative, calculated tensile strain beneath a body of surface water of major potential size shall nowhere exceed $15x10^{-3}$. This criteria is satisfied for Pine Creek as the maximum calculated strain is $11.2x10^{-3}$, near the intersection of the Pine Creek and the longwall barrier pillars.
* Where more than one seam exists, all may be worked by total extraction provided that there is a minimum overburden thickness equal to 58 times the total thickness of all seams to be extracted. This criteria is also satisfied as the minimum overburden thickness is approximately 1350 feet.
* Where a fault which might connect mine workings with the surface stream having a vertical displacement greater than 10 ft is known to

exist, no seam should totally be extracted within 50 ft of the faults. Currently, there is no known major fault in the reserve.

At the time of mine abandonment, the Applicant proposes some limited backfilling of mine entries. These entries are associated with the existing mine ventilation shaft, and lie directly beneath the Soldier Creek channel. All such entries, which have less than 100 feet of overburden shall be backfilled with available underground development waste. Backfilling of additional entries with 100 to 250 feet of overburden may also be considered, but only if these entries show significant signs of deterioration upon abandonment. It should be noted that the available information on pillar strengths and overburden characteristics indicate that backfilling is not required for long-term stability. The backfilling proposed is considered a precautionary measure only.

5.25.14 Monitoring

Subsidence monitoring will be carried out on an annual basis and will entail direct surveys and visual surveys of the mine permit area. The major concern of the subsidence monitoring will be the renewable resources, perennial streams, perennial springs and gas line within the permit area. The methods to be used for monitoring will be ground surveys of monuments and visual surveys during water monitoring or any other surface activities. Initial subsidence monitoring began in 1987 and will continue throughout the life of mine. Annual reports will be sent to the Regulatory Authority detailing all subsidence monitoring activities. The 1987 through 1991 subsidence monitoring summary sheets are presented as Tables 5.25-2 through 5.25-6 respectively. Subsidence data is also located in the annual reports. Also the monuments which have been monitored through 1990 are shown on Exhibit 5.22-1 & 5.25-1.

Monitoring will entail the establishment of surface control monuments within and adjacent to the permit area. This initial survey will provide the Applicant with a base network which will be expanded each progressive year to obtain subsidence information over the permit area. The expanded network will cover the expected development for each progressive year. Each monument will have horizontal and

vertical control determined during the initial survey. This information will be used as a comparison tool for all future monitoring.

Annual resurveys of the mine permit area will produce vertical control at the same sites as the previous year (i.e. the base network and all expanded networks). Information on each site will continue to be produced annually while the area underlying the site is being actively mined or is still unstable and subsiding. The subsiding areas which show no change for two consecutive years will be considered stable and will be omitted from further annual surveys. The annual subsidence survey was discontinued with the survey performed in the year 2000. No tangible surface change was noted in the surveys performed in the years following the cessation of mining as noted on Table 5.25-7. Additional survey data can be found on Tables 5.25-2 through 5.25-6 and in the annual reports.

If mining within the dropped sites happens to occur, then the sites will, again, be added to the annual surveys. Also, during random years, some of the dropped sites will be monitored as a check on their stability and any showing a significant change will be included in the following year's monitoring.

In addition to the ground surveys, aerial photogrammetric methods will be included in the surveys when the areas become too large to feasibly handle with ground surveys. This method will be added to enhance the ground surveys and to cover larger areas as our mine expands to the boundaries. Visual checks for subsidence will be made during all surface activities, especially during water monitoring activities. These visual surveys will be used to detect surface irregularities, surface cracks, and as a check on the direct surveys or any future aerial surveys. Each year a subsidence monitoring report will be sent to the Regulatory Agency. The report will include; dates of surveys, methodology used, results obtained, and mitigative action taken to correct subsidence caused effects. This report will also include changes in the monitoring plan that may be made owing to economic conditions or technical advancement in the art of subsidence monitoring.

5.25.16 Mitigation of Damages

While no damage is anticipated as a result of subsidence from the proposed mining operations, should material damage occur in spite of prevention measures, the Applicant will repair the damage and comply with R645-301-525.230. The Applicant will notify the Regulatory Agency of any slide, rock fall or other disturbance that will have an adverse affect on the environment. If the existing gas pipeline is damaged as a result of subsidence, the pipeline will be repaired by the Applicant. If the roads mentioned earlier are damaged by subsidence, the Applicant will restore the roads to their pre-subsidence usefulness.

TABLE 5.25.7

1997 - 2000 SUBSIDENCE MONITORING SUMMARY

STATIONS 113 (113-SS), 921 (92-1 SS) and 931 (93-1SS)

	Point Description		
	113-SS	92-1SS	93-1SS
Original elevation	7755.71	7816.70	7734.21
1997 Elevation	7755.14	7816.41	7732.67
Difference (ft) Original - 1997	-0.57	-0.29	-1.54
1998 Elevation	7755.06	7816.64	7732.41
Difference (ft) 1997 - 1998	-0.08	0.23	-0.26
1999 Elevation	7755.10	7816.42	7732.68
Difference (ft) 1998 - 1999	0.04	-0.22	0.27
2000 Elevation	7755.08	7816.46	7732.47
Difference (ft) 1999 - 2000	-0.02	0.04	-0.21
Difference (ft) Original - 2000	-0.63	-0.24	-1.74
Year Point Established	1980	1992	1993

5.25.20 Subsidence Control

Soldier Creek Coal Company (SC3) will comply with all provisions of the approved subsidence control plan. SC3 will correct any material damage resulting from subsidence to surface lands, to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before subsidence.

Material damage resulting from subsidence caused to any structures or facilities will be corrected by repairing the damage or compensate the owner of such structures or facilities in the full amount of the diminution in value resulting from the subsidence.

The proposed mine plan will not operate under or in close proximity to any urbanized areas or public buildings.

Also, the mine plan is designed so that mining will not result in material damage to perennial streams or impoundments having a storage volume of 20 ac-ft or, which could result in environmental degradation or safety hazards to streams, water bodies and associated structures. Furthermore, the proposed mine plan is compatible with conservation of existing aquifers within the permit area.

5.25.30 Public Notice of Proposed Mining

Each owner of property or resident within the area above an underground mining block and adjacent area that could be theoretically affected by subsidence, even though it may not actually occur, will be notified by mail at least six months prior to mining or within that period if approved by the Division. The notification shall contain:

a. Identification of specific areas in which mining will take place.
b. Dates of underground operations that could cause subsidence and specific structures; and
c. Measure to be taken to prevent or control adverse surface effect.

5.26 Mine Facilities

Central Mine Facilities

Soldier Creek Coal Company's (SC3) new surface facilities expansion and road relocation will provide the needed facilities and space to accommodate an increase in coal production and preparation for up to 3.5 million tons/year.

Surface buildings and structures that presently exist (Table 5.26-1) and those described, immediately following Table 5.26-1, will be used in connection with or to facilitate the underground coal mining activities at the Soldier Canyon Mine (SCM), located 12 miles north of Wellington, Utah. The existing and proposed facilities are shown on Exhibit 5.21-1. Construction on all proposed facilities shown in this section (5.26) will begin by September 15, 1996, and will be completed within a two year construction time frame. Any facilities not started by this date will either be deleted from the permit or the permit will be changed to show a new construction starting date.

As depicted on Exhibit 5.21-1, the surface facilities do encroach upon the county road and Soldier Creek. In order to minimize the impact on the water quality, degradation of stream channel and facilitate the road relocation, the applicant installed approximately 885 feet of culvert. The stream culvert was installed following DOGM's approval of two previously submitted permit amendments (Illustration 10.2.2-1 and 10.2.2-2). The road relocation has been approved by the BLM and Carbon County. Approval to relocate the county road was granted by the Division on July 19, 1991.

All of the facilities presently constructed and to be constructed will be designed for the LOM. The Applicant plans to use all facilities for the normal operation of SCM and will repair or replace the facilities with items of similar performance standards throughout the LOM. The facilities expansion structures will be constructed and meet the performance standards to provide adequate compliance so that no significant harm to the environment, public health or safety will result from the use of the structures.

Measures have been taken by SC3 to ensure the protection of the landowner and public. The BLM (landowner) reviewed the road relocation project and has issued the Applicant the necessary right-of-way permit (Illustration 10.2.1-1). Carbon County has also reviewed the road relocation project and has given their approval (Illustrations 10.2.1-2 and 10.2.1-3).

The facilities and yard expansion will be fenced for security purposes and access to the facilities will be controlled by roadside gates (Exhibit 5.21-1). The fence will be a type A galvanized wire fence, will stand 7 ft. high and supported by 8.5 ft. galvanized steel posts spaced 9 to 10 ft. apart. Fence construction is in accordance with BLM's Land Management Handbook and has barbed wire suspended from the top.

The construction of the surface facilities expansion will allow the Applicant the ability to continue their operation of SCM and improve the coal handling facilities. The initial construction drawings and plans are shown on Exhibits 5.21-1 and Exhibit 7.32-1. During the construction of the facilities, modifications to the drawings and plans may occur, but all modifications will be shown on the final as-built drawings sent to DOGM. Any modification that could alter or effect the design of the runoff controls or the stream culvert will be sent to the state prior to construction of the facilities.

Designs of the surface facilities expansions at SCM is based on present coal handling problems, ventilation requirements and long-term needs for both at SCM. The following facilities will be constructed during 1992/1993, except for the Portals that were started in October 1989 and completed in August 1991.

1. Three Portals into the Rock Canyon seam will provide additional intake air capacity and will allow SCM to change their underground conveyor facilities.

2. Fourth North #1 belt will connect the underground conveyor system to the surface facilities. This belt has been designed to carry coal from the mine at 3600 tons per hour. The belt will be covered for the total length that it is exposed on the surface.

3. An Ash Analyzer, used in monitoring coal quality, will be located along the coal conveyor belt at the coal bins.

4. The Truck Bin Conveyor Belt will convey and discharge coal to the truck bins. The transfer point from the belt to the truck bins will be enclosed and equipped with water sprays.

5. Two 600 ton Truck Bins will accept the coal from the truck bin belt and discharge the coal into coal haulage trucks. The bins will be equipped with sensors that will automatically open and close the dump gates of the bins.

6. The 300 ton Truck Bin will accept the refuse from the refuse conveyor belt and discharge the refuse into refuse haulage trucks.

7. Power Poles will be repositioned and several new poles added to provide electrical power to the facilities.

8. Substation 46 KV will be constructed to supplement the present power source needed to operate the new facilities.

9. A culvert has to be placed into the natural channel of Soldier Creek to allow for the construction of the facilities and to protect this water resource. The culvert was designed for the 100-year, 24-hour storm event.

10. County Road will be relocated eastward to facilitate SCM's expansion. The new road will be built using current and prudent engineering practices. The road will be a county road and maintained by the County.

11. Access Roads into the expansion will provide an access to the mine portal area and haulage facilities. These access roads will be classified as primary roads and constructed to meet all prudent regulations.

12. A Concrete Protection Pad has been placed over the gas line to permit haulage of men and material over the gas line and into the portal area.

13. Drainage controls will be placed within the expansion to provide runoff control for the surface facilities, yard expansion, and undisturbed drainage. Additionally, several operational drainage controls may be upgraded to provide the necessary facilities to handle the design event.

14. Fences and Gates were placed along the county road and across the culvert in the stream to limit any unauthorized access to the surface facilities expansion. Also, the fence enclosing the present storage yard will be removed and relocated to accommodate the new facilities.

15. Other miscellaneous items may be added to the design to improve the overall operation of the facilities, but all such items will be listed and shown on the as-built drawing that will be submitted to DOGM.

Topsoil Storage Site

The Topsoil storage site was constructed to handle the storage needs of the mine. The site is located approximately 2.5 miles southwest of the mine and is located within 100 feet of a public road (Exhibit 5.21-2).

The storage site is 4.5 acres, of which only 2.3 acres is presently being used for the storage of topsoil, substitute topsoil and landscape boulders/riprap.

Refuse Disposal Site

Previous submittals have included sections on a refuse disposal site. These references have been omitted from this document since this site is no longer proposed for the Soldier Creek Mining operation. The operational history has shown little need for such a site. Disposal, if any should occur, will be at a permitted disposal site.

5.26.20 Utility Installations and Support Facilities

5.26.21 Utility Installations

Questar Pipeline

A Questar Pipeline Company gas line passes through the property in a northeasterly direction. The pipeline was constructed in 1962-1963 and is presently in use (Exhibit 1.12-1).

Methane Recovery Facilities

Resource Enterprises, Inc.'s (REI) methane collection facility offices and storage yard are located within the mine permit boundary. These facilities include gas collection and pump systems, office, bathhouse and storage yard (Exhibit 5.21-1). REI's methane gas recovery operation exploits the coalbed gas resource by working in unison with the underground mining operation. This operation holds permits and approval from the Mine Safety and Health Administration and the BLM. The produced gas is sold to Questar Pipeline Company and injected into their pipeline which passes through the Applicant's permit area.

Power Supply

Utah Power provides electrical power for the entire mining operation. Presently, two substations distribute power to the underground equipment and surface facilities with a third substation, planned for construction during the facilities expansion (Exhibit 5.21-1). The existing substations and the planned substation, are and will be 46 KV. The electrical system complies with all federal, state and local requirements. The transmission lines were constructed by Utah Power & Light and Electrical Contractors and have raptor-resistant towers to minimize the potential for adverse impacts to wildlife (Figure 5.26-3).

Disturbance caused by company own transmission lines is very minimal. Transmission poles are spaced approximately every 200' - 400'. Disturbance at each site is usually limited to a 2' diameter area. Using Soil Conservation Service formulas:

$$Q = \frac{(P - 0.S)^2}{P + 0.8S}$$

$$S = \frac{1000}{CN} - 10$$

S = Watershed storage factor (inches)

P = Rainfall depth (inches) = 1.90" 10 year-24 hour event

CN = Runoff curve number (dimensionless) = 75

Q = Direct runoff volume (inches) = .333" calculated

The total runoff from each site is .65 gallons. This runoff is very minimal and due to vegetative cover and low flow velocities, erosion is not a problem. If erosion should become a problem, sediment control structures such as straw bales and silt fences could be used. Refer to Figure 5.32-1 for sediment control structures.

Diesel generators provide emergency power to the ventilation fans in the event of a power failure.

Communications

A telephone system tied into the U.S. West Communication's system provides direct communication between the portal area in Soldier Canyon and the central facilities area. A sufficient number of hook-ups have been installed to provide easy access in case of an emergency.

In addition, an independent, private system is functioning. This system includes hook-ups in the mine to provide communication with the portal and central facilities areas. It was designed for easy and rapid access to maximize safety and complies with all current MSHA requirements.

The Applicant's coal mining and reclamation activities will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by gas, electric and telephone lines which pass over, under or through the permit area, unless otherwise approved by the owner of those facilities and the Division.

5.26.22 Support Facilities

All support facilities incident to the operation of Soldier Canyon Mine will operate in accordance with a permit issued for the mine. Support facilities will be located, maintained, and used in a manner that prevents or controls erosion and siltation, water pollution, and damage to public or private property; and to the extent possible using the best technology currently available minimizes additional damage to fish, wildlife and related environmental values; and minimizes additional contributions of suspended solids to stream flow or runoff outside the permit area. Any such contributions will not be in excess of limitations of Utah or Federal law through adequate design and operation of appropriate water pollution control facilities.

Culinary Water

The Applicant purchases all culinary water from authorized distributors. The distributor purchases culinary water from Price City and Wellington City public water loadouts. The holding tank at the mine site has a capacity of 60,000 gal.

Sanitary Wastewater

Soldier Canyon Mine uses a total containment lagoon system constructed in the fall of 1982 to treat wastewater. The system includes a metal septic tank, a sewer line and 2 self-contained lagoons having a surface area of 0.14 ac each (Exhibit 5.26-2).

The septic tank located at the mine site is coated according to Underwriters Laboratories, Inc. specifications UL 70 and is used to collect all solids before releasing the water into the 4 in. line. The water is then transported to the lagoons, approximately 11,655 linear feet southwest of the main facility area, by the 4 in. gravity flow line. Along the line there are several cleanouts to ensure proper functioning. The water exits the pipeline and empties into the containment lagoons which consist of two clay-lined cells with a designed capacity of over 3,200 gal. of wastewater per day. Each cell is lined with clay to limit seepage to 0.125 in. per day. The embankment slopes are 3:1 and are riprapped.

A contract hauler transports sludge from the septic tank to the Wellington wastewater treatment plant for disposal or to the sewage lagoons. The hauler is qualified to dispose of sludge.

The wastewater system was designed by Horrocks and Carollo Engineers with all plans and designs approved by the Utah Division of Health. The location of the lagoon and the pipeline system are shown on Exhibit 5.26-2. The lagoon is surrounded by Type A galvanized wire fencing to keep out deer and other large mammals. Sludge remaining after evaporation will be disposed of on-site or may be used for soil reclamation. Dikes and the area around the lagoons have been successfully revegetated.

Mobile Screening Unit

The Applicant will at times use a mobile screening unit to screen run-of-mine coal at the mine site. The screening unit is proposed to be used occasionally, until the new surface facilities can be constructed. The screener will be placed adjacent to the existing ground storage stockpile and coal will be supplied for screening via a front-end loader. The screened coal will be stockpiled, and the coarser material will be placed back on to the original stockpile and transported to Banning for processing. Exhibit 5.21-1a shows the approximate location of the screener and associated screened coal stockpiles.

5.26.3 Water Pollution Control

Industrial Wastewater

Any ground water which is encountered is collected in sumps and pumped into Soldier Creek in accordance with 614-301-731 and 614-301-751 and the National Pollutant Discharge Elimination System (NPDES), Permit No. UT-0023680 (Table 5.26.2). In accordance with R614-301-731.222.2 the Applicant will notify the Regulatory Authority within five days of receipt of analytical results that indicate noncompliance with permit conditions. At least every three months monitoring data will be submitted to the Division.

Wastewater produced from mine equipment washdown or facilities cleanup very widely in volume and concentration of wastes. These wastes are treated in grease

and sediment traps at the sources and either recycled or discharged to the sediment pond.

5.26.4 Air Pollution Control

Coal mining and reclamation activities will be conducted in accordance with R614-301-420 and the Air Quality Approval Order issued by the Utah Division of Air Quality (Appendix 4-D).

5.27 Transportation Facilities-Road Classification

Central Mine

There is one main road leading to Soldier Canyon Mine, Soldier Creek Road. This 30 ft. wide public road, maintained by Carbon County, is paved to the mine site. Beyond the mine the road is graveled for several miles, branching in Sec. 32 T12S, R12E with one branch going northeast through Nine Mile Canyon and the other to the northwest. Other portions of the permit area may be reached by sporadically maintained trails and jeep trails. Mine staff infrequently use (4 time per year) ranch roads to access water monitoring locations (Exhibit 7.21-1).

The No. 1 exhaust fan, two ventilation slopes, water tank, and access road are located directly northwest of the main mine buildings (Exhibit 5.21-1). These facilities were constructed in 1975-76 as part of a major improvement and rehabilitation project of the existing mine. Specific details of the area are shown in Figure 5.27-1.

Table 5.26-2

NPDES Effluent Limitations
(Permit No. UT 0023680)

During the period beginning immediately (July 1, 1991) and lasting through March 31, 1996, the permittee is authorized to discharge from Outfalls 001, 002, 003 and 004. During the permit period, discharge from Outfalls 005, 006 and 007 is only authorized upon completion of a final construction inspection by Utah Bureau of Water Pollution Control and authorized by the Bureau to place the facilities in operation. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Monthly Average	7-Day Average	Daily Maximum	Sample Type a/	Frequency
Flow, M^3/day, gpd	N/A	N/A	N/A	2/month	Measured b/
Total Suspended Solids, mg/L	25	35	70	2/month	Grab
Iron (Total), mg/L	N/A	N/A	2.0	1/month	Grab
Total Dissolved Solids, mg/L c/	N/A	N/A	1,200	2/month	Grab
Oil and Grease, mg/L	N/A	N/A	10	1/month	Grab

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken for compliance with the monitoring requirements specified above shall be taken at the discharge points prior to mixing with the water in Soldier Creek.

a/ See Definitions, Part I.A.

b/ For the intermittent discharges, the duration of the discharge shall be reported.

c/ In addition to the concentration limitation, the total amount of Total Dissolved Solids (TDS) discharged from all outfalls is limited to five tons (10,000 pounds) per day.

Design and construction of the No. 1 exhaust fan and associated road preceded the regulations pertaining to surface effects of underground coal mining (i.e., Utah Code Annotated U.C.A. 40-10-1 et seq). The access road, as constructed, does not fully comply with these regulations (specifically R614-301-527.100 and R614-301-534 Primary Roads) However, the Applicant believes for the following reasons, that the existing road meets or exceeds the performance standards intended by complying with R614-301-527.100 and R614-301-534.

1. All runoff from the road is conveyed directly to the central facilities sedimentation pond. This sedimentation pond provides the best available runoff treatment to prevent additional contributions of suspended solids to the natural drainage.

2. Adequate drainage and erosion controls have been constructed and maintained by the Applicant.

3. The horizontal and vertical alignment of the road has provided acceptable access while minimizing the area disturbed. Alternative alignments were very limited due to the extreme rugged terrain of the area.

4. Road cuts and embankments constructed in 1975-76 have demonstrated adequate stability.

5. Final reclamation for the site has been addressed and approved.

The surface expansion will involve the relocation of the county road and the establishment of two primary roads. The county road will be constructed according to the County and BLM specifications. As shown by the County and BLM approvals, the road satisfies their requirements. Although the County will operate and maintain the new road, the Applicant will maintain reclamation liability for the area throughout the bond liability period.

The two primary roads will be constructed and maintained according to the regulations. The primary road leading into the yard will split in order to access the haulage facilities. The other primary road will access the new portals. Exhibit 5.21-1 and Figure 7.32-1 show the new location of the roads and

typical design. As-built drawings and certification of the primary roads will be submitted upon completion of construction of the new operations.

Sewage Lagoons

Accessing the sewage lagoon is an ancillary road, approximately 1,000 ft. in length extending from the Soldier Creek Road to the sewage lagoon (Exhibit 5.26-1). Mine staff infrequently use this (4 times per year) to inspect the lagoon and diversion structures.

Topsoil Storage Site

Accessing the topsoil storage site is a ancillary road, approximately 100 ft. in length extending from the Soldier Creek Road to the storage site (Exhibit 6.1-1). The road will only be used when material is to be stockpiled and for monitoring diversion structures and vegetation. The designs, specifications, and plans for this road are presented or discussed in Section 5.34 of this application.

5.27.2 Transportation Facilities

The present coal haulage conveyor used in carrying coal from the underground workings to the surface facilities is a 42 in. wide conveyor belt. The conveyor extends beyond the portal to the coal loadout bin. The belt conveyor, constructed in 1976, has a rated capacity of 1,000 tons/hr.

On the surface, the coal is conveyed to and stored in a 600 ton surge bin with automatic truck loading equipment capable of loading 250 tons/hr. Constructed during June and July 1977, the 600 ton capacity loadout bin provides sufficient storage to accommodate production fluctuations.

The coal is then trucked (42 ton/load) by a contract hauler down the canyon 19.3 miles to the Banning Siding Loadout facility. The Applicant performs no additional processing or preparation on the coal before shipment. The operator maintains a crusher at the train loadout facility which reduces the product to 2x0 in.

5.28 Handling and Disposal of Coal, Overburden, Excess Spoil and Coal Mine Waste

During the construction of the facilities and further development of the new portals, excavated and underground development material will be generated. The Applicant will temporarily store this material on site (Exhibit 5.21-1a) until the material can be utilized in the construction of pads and roads for the facilities. During the backfilling of the culvert extension, underground development material was placed at least 8 feet up from the bottom of the culvert to minimize any chance of saturation. The material was analyzed (Illustration 10.2.6-1) and approved by the Division for use as backfill. This will be used for backfilling of the highwalls during reclamation. All underground development materials used in backfilling and grading operations during construction of the new facilities will be accounted for in the reclamation plan and will be placed at the bottom of the highwalls and covered with at least 4 feet of nontoxic and noncombustible material.

The temporary stockpiling of underground development waste and/or excess spoil will be placed as shown on Exhibit 5.21-1a. Presently, the only anticipated underground development waste will be generated during the grading of the portal roadways. Therefore, a maximum of 1000 yd^3 of underground development waste and/or excess spoil will be stored on the operations pad.

Sampling of all future coal mine waste and excess spoil will be, by a composite sample and, analyzed according to Table 6 of the "Utah Guidelines for Management of Topsoil and Overburden". Lab results will be submitted to DOGM with the annual report. In the event that acid and toxic forming materials are identified, the Division will be notified and additional sampling of the material will be performed to define the extent of the problem material.

The sampling program and runoff control, developed by the Applicant, will minimize the potential for any adverse impact to the environment as required by R614-301-731.300.

Overburden material that will be used for pad and other construction at the mine site were sampled for possible toxic contaminants. Representative samples of the overburden and underburden were taken from a previously completed portal exploration cut. Initial samples were taken on 5/8/89 with subsequent resampling completed on 9/30/89. Respective analysis sheets are presented as Illustration 10.2.6-2. (Note: the second analysis was requested by DOGM due to unusually low values originally determined for neutralization are acid potential. Additional detail on % sulfur and % calcium carbonate were also requested).

Based on the 9/30/89 sample analysis, the following values have been determined.

Parameter	Overburden	Underburden
Total Sulfur as S,%	0.03	0.10
Calcium Carbonate as $CaCO_3$,%	20.3	18.8
Acid Potential*	0.94	3.12
Neutralization Potential*	203.00	188.00
Acid Base Potential*	202.06	184.88

*Reported as Tons $CaCO_3$/1000 Tons Material

5.29 Management of Mine Openings

During operation of the Soldier Canyon Mine, access to all mine openings are controlled by the operator during working and nonworking hours. For security reasons, the central mine facilities, except for the parking lot, are fenced and access controlled by gates.

Any mine entry that is temporarily inactive, but has a future useful life, will be protected by barricades or other covering devices, fenced, and posted with signs to prevent access into the entry and to identify the hazardous nature of the opening. These devices will be periodically inspected and maintained in good condition by the Applicant.

Permanent sealing of underground openings is discussed in Section 5.51 of this application.

5.30 Operational Design and Plans

5.31 General

The design for the Soldier Canyon Mine facilities and associated sediment control structures are presented in this section.

5.32 Sediment Control

The design of sediment control structures is presented in Chapter 7 of this application. The designs are intended to minimize the disturbance to the hydrologic balance by distributing the smallest practical area and through contemporaneous reclamation. These activities will result in a reduction of the runoff and sediment rate and volume expected from the site area.

5.33 Impoundments

Central Mine

The only impoundment at the mine site is the temporary sediment pond used for the purpose of sediment control during the life of mine and reclamation operations. The pond was initially designed by Vaughn Hansen Associates in July 1979 and subsequently modified by EarthFax Engineering, Inc. in March 1991. The design of the pond is presented in Chapter 7 of this application. A geotechnical investigation performed on July 14, 1986 of the sediment pond embankment, based on site specific soils information, has shown that adequate safety factors can be maintained. The EarthFax report indicates that the sediment pond has a minimum safety factor for the inslope and outslope of 2.60 and 1.79 respectively. At the same time random compaction tests averaged 95 percent of the maximum dry density as determined by ASTM D-1557. This information is also presented in Appendix 7.

During the pond construction all vegetative and organic materials were removed and the foundation prepared to resist failure. Slope protection is provided against erosion by the existing stand of vegetation.

5.34 Roads

General

The primary roads associated with the Soldier Canyon Mine will be located, in so far as practical, on the most stable available surfaces. The roads will be surfaced with rock, crushed gravel, asphalt or other material approved by the Division as being sufficiently durable for the anticipated volume of traffic and weight and speed of vehicles using the road. They will be routinely maintained. It will also include revegetation, brush removal, and minor reconstruction of road segments as necessary. Culverts will be installed that are designed, installed, and maintained to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the roads. All roads will meet the requirement of R645-301-534.200 and R645-301-742.420.

Central Mine

The surface expansion of the central mine facilities will produce two primary roads. The primary road leading into the yard will split in order to access the haulage facilities. The other primary road will access the new portal area. Exhibit 5.21-1 and Figure 5.34-1 show the location of the roads and typical design. For the interim, until the facilities are constructed, the primary roads will not fit the typical design. During construction activities, it would not be practical to asphalt and install the permanent LOM road surface and half-round diversion ditches. Therefore, the Applicant proposes, for the interim, that a graveled road surface and earthen ditches be constructed.

Drainage from the roads will be collected in road side ditches and conveyed under the roads via drainage culverts. These ditches and culverts are sized to handle the 10 year 6 hour precipitation event. The designs for these structures are discussed in Chapter 7 of this application. To minimize erosion and sediment from the road outslope, the outslopes of the road will be vegetated.

The area not designated as a primary road will be the pad area. The pad areas will be used for mine related storage and activities. Due to the storage of mine

related material, the travel paths in these areas will be ever changing in response to the amount of material at the site.

The county road was realigned for approximately 1235 ft. (Exhibit 5.21-1) to accommodate the surface facilities expansion. The road design was performed by Creamer & Noble Engineering. The Applicant designed its runoff control and treatment facility, to control and treat all runoff from the realigned portion of the county road. The design and layout of these structures are discussed in Chapter 7 of this application. Also shown with this information, is a typical design of the county road.

The county will maintain and operate their road, but the Applicant will assume the relocation and reclamation costs during reclamation of the Soldier Canyon Mine. Upon reclamation, the county road will be relocated to its approximate pre-alignment location as shown on Exhibit 5.53-1.

Sewage Lagoons

The ancillary road extending from the county road to the sewage lagoon is an earthen road with two 18" drainage culverts. This road is a remnant of the old county road, once used for travel, up Soldier Canyon. Due to the infrequent use of this road, very little maintenance is performed. The road site ditches and culverts are inspected and maintained as necessary.

Topsoil Storage Site

Access to the topsoil storage site is by an ancillary road extending from the county road. This access road is constructed as shown on Figure 5.34-2 with two 18" drainage culverts. The design of these culverts is discussed in Chapter 7. To minimize erosion along the road outslopes, riprap was placed on the outslopes. As required by the regulations, culverts will be inspected to ensure that they are functioning as per design.

5.35 Spoil

No significant excess spoil will be developed by the underground mine. The only anticipated spoil will be from the materials collected in the sediment pond and during construction of the facilities. This limited volume of material will be removed from the pond and construction site, and transported to a refuse disposal area (see Section 5.36).

Therefore, no other plans have been developed to handle other significant volumes of spoil materials.

5.36 Coal Mines Wastes

Previous submittals have included sections on a refuse disposal site. These references have been omitted from this document since this site is no longer proposed for the Soldier Creek Mining operation. The operational history has shown little need for such a site. Disposal, if any should occur, will be at a permitted disposal site. Refuse disposed of in the facility will be placed in a controlled manner, as discussed in Section 5.28.

5.37 Regraded Slopes

5.37.10 Geotechnical Analysis

Analyses were performed to determine the stability of cut slopes associated with the Soldier Canyon Mine. The results of these analyses are contained in Appendix 7-E, Part A-3 Slope stability Analysis.

5.37.20 through 5.37.25 Regrading of Fills

At this time, it is Soldier Creek's intention that all fill areas will be regraded to achieve approximate original contour or to achieve a reclaimed surface which blends into the natural contours of the surrounding areas. The contours representing the proposed reclaimed surface are shown on Map 760a.

5.40 Reclamation Plan

5.41 General

5.41.10 through 5.41.40 Permanent Closure of all Facilities

When Soldier Creek Coal Company permanently ceases operation of its Soldier Canyon Mine it will be totally reclaimed in accordance with the R614 Rules and this permit. All underground openings will be sealed and backfilled. All surface equipment, facilities, and structures will be removed, except as described in Section 5.52 below. The proposed postmining land use, and performance standards of the State Program will be achieved through reclamation efforts as described below.

5.42 Narratives, Maps, and Plans

5.42.10 Timetable

A timetable of the final reclamation activities is shown in Table 5.42-1.

5.42.20 through 5.42.32 Final Surface Configuration

Contours representing the final reclaimed surface are shown on Map 760a. Soldier Creek Road will be relocated to its approximate original location and will remain to achieve postmining land use. The main channel of Soldier Creek and the west tributary to Soldier Creek will be reconstructed and will remain after final reclamation. Three culverts will remain to protect the environment after final

reclamation. These culverts are described in Section 7.60. All other equipment, structures, and facilities will be removed and reclaimed.

In order to determine the feasibility of achieving the reclaimed surface shown on Map 760 a mass-balance calculations were done. These calculations show that there is more fill material available than is required to achieve the final reclaimed surface. But there is not so much excess material that disposal of the excess material is a problem. The excess cut material (20,602 cy)will be spread over the entire mine site adding approximately 6 inches to the final reclamation surface. The additional six inches will not change the contours on Exhibit 542a, this exhibit was re-certified in 2004.

The following procedure was used to calculate the cut and fill material balance for reclamation purposes:

A map showing the projected reclaimed contours was placed over a map showing the disturbed contours. Wherever the contour lines of these two maps intersected points were marked and the differences in the two intersecting contour lines were calculated. If the intersecting contour lines showed that the existing surface had to be cut to achieve the reclamation surface then the difference at the point of intersection was given a positive value to indicate that material would be available. If the contours indicated that the existing surface would have to be raised to meet the reclamation surface then the difference at that intersection point was given a negative value to indicate that fill material would be needed. Cut and fill contours were then drawn for the disturbed areas. The contour lines were drawn on a two foot contour interval except in one area where less detail was needed and a ten foot contour interval was used. The areas between contour lines were then measured using a planimeter. Each area was measured two to four times and the average of the measurements was used. The conversion factor for the planimeter which was used is 1.5254 times the planimeter reading to get the area in square inches. Since maps having a scale of 1 inch equals 50 feet were used the areas in square inches were then multiplied by 2,500 to get the measured area in square feet. The thickness of cut or fill was determined by using the average values of the two thickness contours bounding an area. For example, to

determine the thickness of the area measured between the 2 foot and 4 foot contour lines, the average of 3 was calculated. This thickness multiplied by the measured area results in the volume of cut or fill for the area. If an area was bounded by a contour line on the lower limit but not on the upper limit then the thickness was determined by adding one fourth of the contour interval to the value of the bounding contour. For example, if an area was measured within a 10 foot contour line but there was no 12 foot contour line, the thickness assigned to the area bounded by the 10 foot contour was 10.5 feet. This assumption is based on the fact that the area within the 10 foot contour line is greater than 10 feet in thickness but the maximum thickness within this area is less than 12 feet. Areas outside a 0 thickness contour line, or between a 0 cut thickness contour and a 0 fill thickness contour, were assumed to be approximately balanced regarding cut and fill volumes. In these areas there may be an actual net cut or fill amount, but since the differences in the existing surface and the reclamation surface are too small to contour the actual net amounts will be very small with reference to the total volumes involved. As will be discussed below there is excess fill material available so if there is a small deficiency in fill material in these "balanced areas" there is ample fill material available. If these "balanced areas" contain slightly more material than is needed, the additional volume available will not significantly impact the disposition of the excess fill material available from the rest of the project.

TABLE 5.42-1

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
Excavate Culvert	+0	31.45	-29.35	8,008	+1	8,008
	+2	25.14	-21.90	12,356	+3	37,067
	+4	21.90	-19.02	10,983	+5	54,914
	+6	19.02	-15.95	11,707	+7	81,952
	+8	15.95	-13.11	10,830	+9	97,473
	+10	13.11	-4.81	31,652	+11	348,173
	+12	4.81	-3.85	3,661	+13	47,592
	+14	3.85	-2.91	3,585	+15	53,770
	+16	2.91	-2.15	2,898	+17	49,270
	+18	2.15	-1.15	3,814	+19	72,457
	+20	1.15	-0.58	2,174	+21	45,648
	+22	0.58	-0.05	2,021	+23	46,487
	+24	0.05	-	191	+24.5	4,672
	+2	1.11	-0.50	2,326	+3	6,979
	+4	0.50	-0.33	3,241	+5	16,207
	+6	0.33	-0.07	992	+7	6,941
	+8	0.07	-0.01	229	+9	2,059
	+10	0.01	-	38	+10.5	418
	+12	3.10	-1.29	6,902	+13	89,732
	+14	1.29	-0.84	1,716	+15	25,741
	+16	0.84	-0.55	1,106	+17	18,801
	+18	0.55	-0.24	1,182	+19	22,462
	+20	0.24	-0.05	725	+21	15,216
	+22	0.05	-	191	+22.5	4,290
Parking Area	+0	6.05	-3.47	9,839	+5	49,194
	+10	3.47	-1.34	8,123	+15	121,841

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+20	1.34	-	5,110	+22.5	114,977
No.1 Fan	+0	12.28	-9.00	12,508	+1	12,508
	+2	9.00	-1.61	28,182	+3	84,545
	+4	1.61	-0.97	2,441	+5	12,203
	+6	0.97	-0.52	1,716	+7	12,013
	+8	0.52	-	1,983	+8.5	16,856
	+4	0.59	-0.43	610	+5	3,051
	+6	0.43	-0.35	305	+7	2,136
	+8	0.35	-0.31	152	+9	1,373
	+10	0.31	-0.26	191	+11	2,097
	+12	0.26	-0.23	114	+13	1,487
	+14	0.23	-0.15	305	+15	4,276
	+16	0.15	-0.10	191	+17	3,241
	+18	0.10	-0.02	305	+19	5,797
	+20	0.02	-	76	+20.5	1,564
Central Facilities	+0	9.14	-5.00	15,788	+1	15,788
	+2	4.93	-3.60	5,072	+3	15,216
	+4	3.60	-2.82	2,975	+5	14,873
	+6	2.82	-1.94	3,356	+7	23,491
	+8	1.94	-0.89	4,004	+9	36,038
	+10	0.89	-	3,394	+11	37,334
	+12	0.07	-	267	+12.5	3,337
	-0	14.42	-7.98	24,559	-1	-24,559
	-2	7.98	-6.29	6,445	-3	-19,334
	-4	6.29	-4.62	6,369	-5	-31,843
	-6	4.62	-1.73	11,021	-7	-77,147
	-8	1.73	-0.33	5,339	-9	-48,050
	-10	0.33	-	1,258	-10.5	-13,214

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+0	0.07	-0.03	153	+1	153
	+2	0.03	-	114	+2.5	286
	+0	0.50	-0.05	1,716	+1	1,716
	+2	0.05	-0.01	153	+3	458
	+4	0.01	-	38	+4.5	172
	+0	1.72	-0.91	3,089	+1	3,089
	+2	0.91	-0.56	1,335	+3	4,004
	+4	0.56	-0.23	1,258	+5	6,292
	+6	0.23	-0.07	610	+7	4,271
	+8	0.07	-	267	+8.5	2,269
New Portal Area	-0	16.67	-11.37	20,212	-1	-20,212
	-2	1.44	-1.00	1,678	-3	-5,034
	-4	1.00	-0.46	2,059	-5	-10,296
	-6	0.46	-0.20	992	-7	-6,941
	-8	0.20	-0.09	419	-9	-3,775
	-10	0.09	-	343	-10.5	-3,604
	-2	0.85	-0.29	2,136	-5	-12,813
	-10	0.29	-0.14	572	-11	-6,292
	-12	0.14	-	534	-12.5	-6,674
	-2	9.08	-7.08	7,627	-3	-22,881
	-4	7.08	-5.10	7,551	-5	-37,754
	-6	5.10	-3.38	6,559	-7	-45,915
	-8	3.38	-1.91	5,606	-9	-50,453
	-10	0.12	-	458	-11	-5,034
	-10	1.79	-0.98	3,089	-11	-33,978
	-12	0.98	-0.46	1,983	-13	-25,779
	-14	0.46	-0.18	1,068	-15	-16,017
	-16	0.18	-	686	-16.5	-11,326

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+0	0.70	-0.16	2,059	+1	2,059
	+2	0.16	-0.07	343	+3	1,030
	+4	0.07	-0.01	229	+5	1,144
	+6	0.01	-	38	+6.5	248
New Facilities	+0	0.70	-0.16	2,059	+1	2,059
	+2	0.16	-0.07	343	+3	1,030
	+4	0.07	-0.01	229	+5	1,144
	+6	0.01	-	38	+6.5	248
	-0	4.37	-3.32	4,004	-1	-4,004
	-2	3.32	-2.35	3,699	-3	-11,097
	-4	2.35	-1.53	3,127	-5	-15,635
	-6	1.53	-1.01	1,983	-7	-13,881
	-8	1.01	-0.47	2,059	-9	-18,531
	-10	0.47	-	1,792	-10.5	-18,816
	-0	22.14	-19.27	10,945	-1	-10,945
	-2	19.27	-16.78	9,496	-3	-28,487
	-4	16.78	-14.64	8,161	-5	-40,804
	-6	14.64	-11.18	13,195	-7	-92,363
	-8	11.18	-9.00	8,313	-9	-74,821
	-10	9.00	-6.91	7,970	-11	-87,672
	-12	6.91	-3.00	14,911	-13	-193,840
	-14	3.00	-1.28	6,559	-15	-98,388
	-16	1.28	-0.30	3,737	-17	-63,533
	-18	0.30	-	1,144	-18.5	-21,165
No.2 Fan Area	+0	8.48	-2.72	21,966	+1	21,966
	+2	2.72	-1.50	4,652	+3	13,957
	+4	1.50	-	5,720	+4.5	25,741
	+0	0.50	-0.10	1,525	+1	1,525

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+2	0.10	-0.02	305	+3	915
	+4	0.02	-	76	+4.5	343
	-0	0.70	-0.55	572	-1	-572
	-2	0.55	-0.31	915	-3	-2,746
	-4	0.31	-	1,182	-4.5	-5,320
Balanced Areas	0	21.85	-	83,325	0	0
	0	1.71	-	6,521	0	0
	0	12.62	-	48,126	0	0
Subtotal Cut Areas				277,850	Cut Volume	1,847,684
Subtotal Fill Areas				222,027	Fill Volume	1,341,545
Subtotal Balanced Areas				137,972	-	-
Total Area				637,849	Net Volume	506,139

In addition to cut material being used to fill the areas necessary to achieve the reclaimed surface, material will be required to backfill shafts and portals on the property. It was assumed that the material backfilled into the portals will stand at the angle of repose inby the fill. It was also assumed that the shafts will require 10 percent more material than calculated because some of the material will flow into the entries at the bottoms of the shafts. These additional amounts of fill are listed as "Internal Embankments". Table 5.42-2 shows the volume of fill material required to backfill the shafts and portals. Although the proposed 20 foot diameter ventilation shaft is included in the mass balance calculations the costs associated with reclaiming it are not included in this application. The reasons for this are: it is almost certain that the shaft will be constructed and allowance must be made for providing material to backfill

it; the cost of reclaiming the new shaft and fan installation will be included in the permit amendment to obtain approval for construction of this facility.

TABLE 5.42-2

PORTALS	NUMBER	WIDTH	HEIGHT	VOLUME OF FILL REQUIRED
	3	20 Feet	16 Feet	15,360
	3	24 Feet	14 Feet	14,112
	2	20 Feet	8 Feet	2,560
SHAFTS	NUMBER	DIAMETER	DEPTH	VOLUME OF FILL REQUIRED
	1	16 Feet	105 Feet	21,112
	1	20 Feet	300 Feet	94,248
Volume Required				147,392
Additional Internal Embankments (30° Angle of Repose)				39,276
Total Volume Required				186,668

Part of the cut/fill volumes determined by the contouring method above consisted of the volume of the large Soldier Creek bypass culvert. The volume of the culvert was measured because it was shown below surface on the disturbed surface contour map and it was removed on the reclaimed surface contour map. The volume of the culvert must be subtracted from the measured volume of material available. The area of the culvert is 239 square feet and it is 893 feet long which results in a volume of 213,427 cubic feet.

The net material available after the disturbed surface has been graded to match the reclamation contours and the culvert volume is subtracted is 292,712 cubic feet. To backfill the portals and shafts requires 186,668 cubic feet which leaves 106,044 cubic feet or 3,928 cubic yards of material. Additionally there are 6,764 cubic yards of topsoil and substitute topsoil located in the topsoil storage area which will also be used to achieve reclaimed contours. This makes the total amount of material which is available but not needed to achieve the

reclaimed surface 10,692 cubic yards. The reclamation channel design requires that 6,699 cubic yards of riprap and 3,211 cubic yards of filter gravel be used. This material will replace fill material. This brings the total excess cut material to 20,602 cubic yards. The excess cut material (20,602 cy)will be spread over the entire mine site adding approximately 6 inches to the final reclamation surface. The additional six inches will not require a change to the contours on Exhibit 542a, this exhibit was re-certified in 2004.

Topsoil is available from several sources. The topsoil storage site contains 2,970 cubic yards of topsoil and 3,794 cubic yards of substitute topsoil. A small topsoil storage pile near the sediment pond contains 310 cubic yards of topsoil. The material under the parking area contains an estimated 3,920 cubic yards of substitute topsoil. The total amount of topsoil and substitute topsoil available is around 10,994 cubic yards or 296,838 cubic feet. The total central mine disturbed area is approximately 14.6 acres. Of this about 10.3 acres are pre-SMCRA. The balance of 4.3 acres, or 187,308 square feet, is post-SMCRA disturbance. Of this 187,308 square feet 32,400 square feet will be paved for the replacement of County Road 53 and 21,400 square feet will be riprapped for reclamation of Soldier Creek. This leaves 133,508 square feet of post-SMCRA area. If 1 foot of topsoil or substitute topsoil is placed on the post-SMCRA area, 133,508 cubic feet of growing media will be required. This leaves 163,330 cubic feet of growing media to place over the pre-SMCRA disturbed area which is around 448,668 square feet in size. The sediment pond is 48,126 square feet in area and 10,595 square feet of stream channel will be riprapped leaving 389,947 square feet to be covered with growing media. The available growing media will provide a cover of just over 5 inches over the pre-SMCRA disturbed area.

While the areas which are assumed to be approximately cut/fill balanced do not contribute to the amount of cut or fill material involved, these areas will be graded to achieve a surface which matches the reclamation contours. The volume of grading associated with each of these areas was determined by measuring the approximate cut area and multiplying the area by the estimated average contour elevation difference. Reclamation cost calculations include grading costs for the amount of material to be graded and topsoil spreading and seeding costs for

the area of each of these locations. The area and grading volume for each area is shown on Map 5.42a.

It is planned that the sediment pond will remain intact during final reclamation to treat disturbed area runoff. The material which was used to construct the sediment pond will be used to totally reclaim the sediment pond area. There is approximately 4500 cubic yards of topsoil and substitute topsoil in the sediment pond embankment. This material will provide a 2.5 foot cover of growing media for reclamation of the sediment pond area. The fact that the sediment pond will be reclaimed some time after the rest of the mine is reclaimed does not affect the final mass-balance calculations or the reclamation cost calculations since the ultimate contoured surface will be achieved regardless of the timing of specific phases of reclamation.

During final backfilling and grading, any fill material, which has been or will be determined to be unsuitable, will be placed at the lowest level against highwalls. Suitable fill material will then be placed over the unsuitable material. The application of topsoil will be as described in Chapter 2. Otherwise, fill material will be backfilled and graded in the most efficient and effective manner at the time of reclamation in order to achieve reclamation performance standards. The locations of where fill materials are available and where backfilling is required along with the volumes associated with each are shown on Map 5.42a. This map shows where and how much material will be excavated and where and how much material will be backfilled.

Reclamation Timetable

As indicated above, to ensure a good revegetation effort, the reclamation schedule needs to be planned to allow regrading, redistribution of topsoil, and seed bed preparation to be completed to allow seeding in the fall of the year, just prior to the first snows. This schedule is presented in Table 3.41-1 and 5.42-1 of this application.

Following the revegetation efforts, the sediment control structures; consisting of diversions, containment berms, and sediment pond; will remain in place until

the revegetated sites have been adequately protected. It is anticipated that the sediment pond will remain in place until at least two years after the last augmented seeding of the reclaimed surface.

5.42.40 Bond Release

Before seeking bond release Soldier Creek will provide a description of the structures, which will remain in place. These structures will be maintained, during the reclamation monitoring period, and will be renovated if necessary. Insurance will be provided that all temporary structures will be removed and reclaimed.

5.42.50 Sedimentation Ponds

The sedimentation pond at the Soldier Canyon Mine will remain in place until such time as effluent limitations and vegetative requirements have been met. The sedimentation pond will then be removed and reclaimed. As described above and in Section 7.60, the material used to construct the sedimentation pond will be used to reclaim it to the final contours as shown on Map 760a. The reclaimed sedimentation pond area will then be monitored and maintained for an additional 10 year period.

5.42.60 through 5.42.63 Roads

As part of the 1991 facilities expansion at the Soldier Canyon Mine, a portion of the County Road was relocated. Upon final reclamation, the road will be reconstructed in its approximate original location. Culverts, necessary to maintain the integrity of the road, will be permanently installed and will be maintained during the reclamation monitoring period. All other roads in the permit area will be removed and reclaimed. Culverts and bridges associated with the reclaimed roads will be removed. Access to the reclaimed roads will be prevented by the use of large boulders or other type of acceptable barriers.

5.42.70 through 5.42.71 Mine Openings

When no longer needed for mining operations, all entry ways or other openings to the surface from the underground mine will be sealed and backfilled. The permanent closures will be constructed to prevent access to the mine workings by people, livestock, and wildlife. Also, they will keep any potential surface drainage from entering the sealed entries.

Because of the geology of the coal seam, the entries will slope away from the portal pad; therefore, there should be no gravity discharge of water from the underground mine. Furthermore, there are low concentrations of acid producing and no iron producing elements found in any of the coal seams to be mined. The Applicant does not anticipate any discharge from the permanently abandoned mine portals. The analysis of the overburden and underburden indicates an absence of any acid or toxic material.

The abandonment procedures for the portal and shaft openings are in accordance with MSHA procedures (30 CFR 75.1771) and are as follows:

* Slope or drift openings required to be sealed under 75.1711 shall be sealed with solid, substantial, incombustible material, such as concrete blocks, bricks or tile, or shall be completely filled with incombustible material for a distance of at least 25 feet into such openings.
* Shaft openings required to be sealed under 75.1711 shall be effective capped or filled. Filling shall be for the entire depth of the shaft and, for the first 50 feet from the bottom of the coalbed, the fill shall consist of incombustible material. Caps consisting of a 6-inch thick concrete cap or other equivalent means may be used for sealing. Caps shall be equipped with a vent pipe at least 2 inches in diameter extending for a distance of at least 15 feet above the surface of the shaft.

This procedure for permanent closure of portal entries is shown on Figure 5.42.1. Exposed coal outcrops will be covered with a minimum of 4 ft. of non-combustible earth material to protect against spontaneous combustion. The Applicant will submit detailed design drawings and specifications for sealing the shafts to the Regulatory Authority and MSHA for approval prior to permanent closure of the openings.

5.42.72 through 5.42.74 Disposal of Spoil and Waste

Excess spoil and coal mine waste will be placed in the lowest level of the final fill under cover of unsuitable fill material. This will be done in such a way as to ensure that reclamation performance standards are achieved.

Noncoal mine wastes, will be stored to prevent fires, contamination or other hazards. These wastes will be temporarily disposed of in a metal trash bin until permanently disposed of in an offsite state-approved solid waste disposal facility. During final reclamation, no noncoal mine wastes will be disposed of onsite. All such wastes will be removed from the mine site and disposed of in a state-approved solid waste disposal facility.

5.42.80 Estimate of Reclamation Costs

Reclamation of the Soldier Canyon mine consists of demolition of the existing facilities, site preparation-seeding, and rebuilding the portion of County Road 53 which was relocated.

Table 5.42-3 lists each structure to be demolished as part of reclamation at the Soldier Creek Mine. Refer to the Soldier Canyon reclamation bond for demolition costs.

TABLE 5.42-3

DESCRIPTION	MATERIAL	SIZE
Office	Mixture	132,000 cu.ft.
Warehouse	Mixture	15,950 cu.ft.
Old Shop	Mixture	192,000 cu.ft.
New Shop	Mixture	45,936 cu.ft.
Training Rm.	Mixture	17,748 cu.ft.
Amb. Garage	Mixture	11,600 cu.ft.
Bath House	Mixture	96,000 cu.ft.
Storage Shed	Mixture	32,400 cu.ft.
Security Shack	Wood	512 cu.ft.
Control Bldg.	Mixture	1430 cu.ft.
8,000 Gal. Tank	Steel Concrete	1,070 cu.ft. 50 cu.yd.
4,000 Gal. Tank	Steel Concrete	535 cu.ft. 34 cu.yd.
1,000 Gal. Tank	Steel	134 cu.ft.
1,500 Gal. Tank	Steel Concrete	201 cu.ft. 3 cu.yd.
60,000 Gal. Tank	Steel	8,022 cu.ft.
Loadout Bin (2)	Mixture	30,000 cu.ft.
Septic Tank	Steel	9,000 cu.ft.
Fan No.1	Mixture	15,400 cu.ft.
Fan No.2	Mixture	15,300 cu.ft.
Crib Wall	Concrete	120 cu.yd.
Sewage Pipe	4" Steel	10,600 ft.
Substation 1	Concrete	18 cu.yd.
Substation 2	Concrete	30 cu.yd.
Belt Conveyor	Mixture	57,000 cu.ft.
Portals (3)	Concrete	228 cu.yd.

DESCRIPTION	MATERIAL	SIZE
Portals (5)	Concrete	370 cu.yd.
Culvert Ends	Concrete	2,000 cu.ft.
Culvert	Steel	53,580 cu.ft.
Ditch	Concrete	1,170 cu.ft.
Small Culverts	Steel	4,700 cu.ft.
Parking Lot	Asphalt	1865 sq.yd.
Office Park.	Asphalt	716 sq.yd.
Old Yard Road	Asphalt	2,881 sq.yd.
New Yard Road	Asphalt	2,055 sq.yd.
Relocated Road and New Portal Road	Asphalt	4,453 sq.yd.
Fencing	Chain Link	2,000 ft.
Powerline	Wire	2,500 ft.

The topsoil storage site contains 2,970 cubic yards of topsoil, 3,794 cubic yards of substitute topsoil, and 1,337 cubic yards of rock for riprap. The costs in the bond include the cost of hauling these materials from the storage site to the mine site to be used in reclamation. Also 8,573 cubic yards of additional riprap and filter gravel will be hauled in from an outside source. These hauling costs are also included. The storage site contains 590 cubic yards of topsoil to be used to reclaim the storage site. The costs listed in the bond include the cost of redistributing this topsoil on the storage site.

TABLE 5.42-4

ACTIVITY	QUANTITY
Central Mine Facility	
Excavate Culvert	42,827 cu.yd.
Seal Portals	2,510 sq.ft.
Seal Shaft	3.8 cu.yd.
Grade Balanced Areas	14,022 cu.yd.
Excavate Cut Areas	25,683 cu.yd.
Backfill Shaft	860 cu.yd.
Backfill Portals	2,215 cu.yd.
Backfill Fill Areas	47,179 cu.yd.
Grade to Reclaim Contour	23,397 cu.yd.
Scarify Subgrade	631,706 sq.ft.
Haul Topsoil From Storage Site to Central Facility	2,970 cu.yd. Topsoil 3,794 cu.yd. Sub. 1,337 cu.yd. Rock
Spread Topsoil	15,500 cu.yd.
Seed Mine Site	631,706 sq.ft.
Plant Seedlings	14.5 acres
Mulch	14.5 acres
Silt Fence	Phase 1 - 54,925 ft. Phase 2 - 8,775 ft.
Lay Rock Riprap and Filter Gravel	9,910 cu.yd.
Haul in Additional Riprap and Filter Gravel	8,573 cu.yd.
Install Culverts	185 ft.
Seed Mix	14.5 acres
Topsoil Storage Site and Sewage Lagoons	
Fill Sewage Lagoons	6,222 cu.yd.

ACTIVITY	QUANTITY
Spread Topsoil - Topsoil Storage Site	590 cu.yd.
Spread Topsoil Sewage Lagoons	890 cu.yd.
Seed Topsoil Storage Site	201,505 sq.ft.
Seed Sewage Lagoons	87,120 sq.ft.
Plant Seedlings	6.6 acre
Mulching	6.6 acre
Seed Mix	6.6 acre
Scarify Sewage Lagoons & Topsoil Storage Site	288,625
Fence Removal	2,875 ft.
Reconstruct County Road 53	
Sub base	3,600 sq.yd.
Grade subgrade	3,600 sq.yd.
Asphalt 4"	3,600 sq.yd.

5.50 through 5.51 Sealing of Underground Openings

When any underground opening is no longer needed and is to be abandoned, it will be sealed as described in Section 5.42.70 above.

5.52 through 5.52.20 Permanent Features

At this time it is not anticipated that there will be any constructed depressions or permanent impoundments as part of the final reclamation.

5.53 through 5.53-24 Backfilling and Grading

Backfilling and grading will be done so as to create a reclaimed surface which will achieve approximate original contour and will allow the reclaimed surface to blend with the surrounding surfaces. Highwall and depressions will be eliminated as shown on Map 760a. The postmining slope of the reclaimed areas will not exceed the angle of repose as determined by the slope of similar material in place surrounding the reclaimed area.

Postmining contours as shown on Map 760a were designed giving consideration to stream channel design and runoff control. This will minimize erosion and water pollution.

Spoil will be used to backfill areas where fill is required as shown on Map 5.42a, and will be placed at the lowest level possible and will be covered with material, which will provide a growing media for reclamation vegetation.

When backfilling and grading have been completed, the entire area will be scarified to provide a " roughened" surface on which topsoil will be placed. This will prevent slippage of the topsoil. It is not anticipated that terraces will be used in final reclamation.

Exposed coal seams, acid and toxic forming materials, and combustible materials will be covered with nontoxic and noncombustible materials to prevent combustion or other impact on reclamation. The use of cut-and-fill terraces is not anticipated in the reclamation of the Soldier Canyon Mine.

5.53.60 through 5.53.65.3 Approximate Original Contour

Much of the disturbance at the Soldier Canyon Mine is pre-SMCRA and information is not available concerning the original contour of these disturbed areas. All areas which have been disturbed post-SMCRA will be reclaimed to the approximate original contour. Pre-SMCRA areas will be returned to the best estimate of approximate original contour and will be contoured to blend in with undisturbed topography adjacent to the disturbed areas. The proposed reclaimed surface of

A. Definitions (Continued)

c. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

d. Continuous collection of sample, with sample collection rate proportional to flow rate.

5. A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.

6. An "instantaneous" measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.

7. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

8. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

9. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. "Director" means Director of the United States Environmental Protection Agency's Water Management Division.

11. "EPA" means the United States Environmental Protection Agency.

12. "Active mining area" means the areas on and beneath land used or disturbed in activity related to the extraction, removal, or recovery of coal from its natural deposits. This term excludes coal preparation plants, coal preparation plant associated areas and post-mining areas.

A. Definitions (Continued)

13. "Reclamation area" means the surface area of a coal mine which has been returned to required contour and on which revegetation (specifically, seeding or planting) work has commenced.

14. Mine drainage means any drainage, and any water pumped or syphoned, from an active mining area or a post mining area.

15. Alkaline mine drainage means mine drainage which before any treatment has a pH equal to or greater than 6.0 and total iron concentration less than 10 mg/L.

16. Post mining areas means : 1) a reclamation area or 2) the underground workings of an underground coal mine after extraction removal or recovery of coal from its natural deposit has ceased and prior to bond release.

17. The term "10-year, 24-hour precipitation event" shall mean the maximum 24-hour precipitation event with a probable recurrence interval of once in 10 years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S.," May 1961, and subsequent amendments or equivalent regional or rainfall probability information developed therefrom.

18. The term "coal preparation plant" means a facility where coal is crushed, screened, sized, cleaned, dried, or otherwise prepared and loaded for transit to a consuming facility.

19. The term "coal preparation plant associated areas" means the coal preparation plant yards, immediate access roads, coal refuse piles, and coal storage piles and facilities.

20. The term "settleable solids" is that matter measured by the volumetric method specified below:

    The following procedure and method detection limit is used to determine settleable solids:

    Fill an Imhoff cone to the one-liter mark with a thoroughly mixed sample. Allow to settle undisturbed for 45 minutes. Gently stir along the inside surface of the cone with a stirring rod. Allow to settle undisturbed for 15 minutes longer. Record the volume of settled material in the cone as milliliters per liter. Where a separation of settleable and floating material occurs, do not include the floating material in the reading. Notwithstanding any provision of 40 CFR Part 136, the method detection limit for measuring settleable solids under this procedure shall be 0.4 ml/L.

B. Description of Discharge Points

The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under an NPDES permit is a violation of the Clean Water Act and could subject the person(s) responsible for such discharge to penalties under Section 309 of the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from first learning of an unauthorized discharge could subject such person to criminal penalties as provided under the Clean Water Act.

Outfall Serial Number(s)	Description of Discharge Point(s)
001	Outfall from mine water discharge. There has been no discharge from this outfall for several years.
002	Outfall from the facility's existing sedimentation pond. The facility has never discharged from this outfall.
003	Outfall from mine water discharge.
004	Outfall for additional mine water discharge.
005	Outfall from proposed sedimentation pond for topsoil storage area.
006	Outfall from proposed sedimentation pond for waste rock storage area.
007	Outfall from proposed sedimentaion pond for storage yard.

C. Specific Limitations and Monitoring Requirements

1. During the period beginning immediately and lasting through the life of this permit, the permittee is authorized to discharge from Outfalls 001, 002, 003 and 004. During the permit period, discharge from Outfalls 005, 006, and 007 is only authorized upon completion of a final construction inspection by the Utah Bureau of Water Pollution Control and authorization by the Bureau to place the facilities in operation. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Monthly Average	7-Day Average	Daily Maximum	Sample Type a/	Frequency
Flow, M^3/day, gpd	N/A	N/A	N/A	2/month	Measured b/
Total Suspended Solids, mg/L	25	35	70	2/month	Grab
Iron (Total), mg/L	N/A	N/A	2.0	1/month	Grab
Total Dissolved Solids, mg/L c/	N/A	N/A	1,200	2/month	Grab
Oil and Grease, mg/L	N/A	N/A	10	1/month	Grab

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge of sanitary wastes.

Samples taken for compliance with the monitoring requirements specified above shall be taken at the discharge points prior to mixing with the water in Soldier Creek.

a/ See Definitions, Part I.A.

b/ For the intermittent discharges, the duration of the discharge shall be reported.

c/ In addition to the concentration limitation, the total amount of Total Dissolved Solids (TDS) discharged from all outfalls is limited to five tons (10,000 pounds) per day.

C. Specific Limitations and Self-Monitoring Requirements (Continued)

2. Any overflow, increase in volume of a discharge or discharge from a bypass system caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) at Outfall 002 shall comply with the following limitation instead of the Total Suspended Solids limitations contained in Part I.C.1.:

Effluent Characteristic	Effluent Limitation
Settleable Solids	0.5 mg/L maximum not to be exceeded a/

Settleable Solid shall be monitored weekly by a grab sample during periods of precipitation.

a/ See Definitions, Part I.A.20. for procedures and method detection limit for measurement of settleable solids.

3. Any overflow, increase in volume of a discharge or discharge from a bypass system caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the following limitations instead of the otherwise applicable limitations:

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units. However, as stated under Part I.C.2., all effluent samples collected at Outfall(s) 002, 005, 006 and 007 during storm water discharge events shall be analyzed for settleable solids and the parameters identified under Part I.C.1.

4. The alternate limitations provided in Parts I.C.2. and I.C.3. shall apply only if:

a. The treatment facility is designed, constructed operated, and maintained to contain at a minimum the volume of water which would drain into the treatment facility during the 10-year, 24-hour, precipitation event (or snowmelt of equivalent volume);

b. The treatment facility is designed, constructed, operated, and maintained to consistently achieve the effluent limitations set forth in Part I.C.1. during periods of no precipitation (or snowmelt).

5. The operator shall have the burden of proof that the preceding conditions have been met in order to qualify for the alternate limitations in Parts I.C.2. and I.C.3. The alternate limitations in Parts I.C.2. and I.C.3. shall not apply to treatment systems that treat underground mine water only.

C. Specific Limitations and Self-Monitoring Requirements

6. Schedule of Compliance

a. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

(1) If the permittee has not previously submitted Area Map(s) described in Part IV, P., such Area Map(s) shall be submitted within 30 days of the effective date of this permit.

(2) Revised Area Map(s) as described in Part IV, P., must be submitted 60 days prior to commencement of the discharge.

b. No later than fourteen (14) calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part I shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Sludge samples shall be collected at a location representative of the quality of sludge immediately prior to use-disposal practice.

B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. See Part I.C. for any applicable sludge monitoring procedures.

C. Penalties for Tampering. The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both.

D. Reporting of Monitoring Results. Effluent monitoring results obtained during the previous month shall be reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported. Until further notice, sludge monitoring results may be reported in the testing laboratory's normal format (there is no EPA standard form at this time), but should be on letter size pages. Whole effluent toxicity (biomonitoring) results must be reported on the most recent version of EPA Region VIII's Guidance For Whole Effluent Reporting. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the Signatory Requirements (see Part IV), and submitted to the Director, Water Management Division and the State water pollution control agency at the following addresses:

original to: United States Environmental Protection Agency
Region VIII
Denver Place
999 18th Street, Suite 500
Denver, Colorado 80202-2405

Attention: Water Management Division
Compliance Branch (8WM-C)

copy to: Utah Department of Health
Bureau of Water Pollution Control
P.O. Box 16690
Salt Lake City, Utah 84116-0690

E. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

G. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or name(s) of the individual(s) who performed the sampling or measurements;

3. The date(s) and time(s) analyses were performed;

4. The time(s) analyses were initiated;

5. The initials or name(s) of individual(s) who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and,

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

H. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this NPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting.

1. The permittee shall report any noncompliance which may seriously endanger health or the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the EPA, Region VIII, Emergency Response Branch at (303) 293-1788 and the State of Utah at (801) 538-6333.

2. The following occurrences of noncompliance shall be reported by telephone to the EPA, Region VIII, Compliance Branch at (303) 293-1589 and the State of Utah at (801) 538-6146 by the first workday (8:00 a.m. - 4:30 p.m. Mountain Time) following the day the permittee became aware of the circumstances:

   a. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G., Bypass of Treatment Facilities.);

   b. Any upset which exceeds any effluent limitation in the permit (See Part III.H., Upset Conditions.); or,

   c. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit to be reported within 24 hours.

3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and,

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

4. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Compliance Branch, Water Management Division, Denver, Colorado, by phone, (303) 293-1589.

5. Reports shall be submitted to the addresses in Part II.D., Reporting of Monitoring Results.

J. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D. are submitted. The reports shall contain the information listed in Part II.I.2.

K. Inspection and Entry. The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Director advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

B. Penalties for Violations of Permit Conditions. The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307, or 308 of the Act is subject to a fine of not less than $5,000, nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both. Except as provided in permit conditions on Part III.G., Bypass of Treatment Facilities and Part III.H., Upset Conditions, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

F. Removed Substances. Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be buried or disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard. Sludge/digester supernatant and filter backwash shall not be directly blended with or enter either the final plant discharge and/or waters of the United States.

G. Bypass of Treatment Facilities:

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. and 3. of this section.

2. Notice:

a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 60 days before the date of the bypass.

b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I., Twenty-four Hour Reporting.

3. Prohibition of bypass.

a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

(1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(3) The permittee submitted notices as required under paragraph 2. of this section.

b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of paragraph 2. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limitations).

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the permittee can identify the cause(s) of the upset;

   b. The permitted facility was at the time being properly operated;

   c. The permittee submitted notice of the upset as required under Part II.I., Twenty-four Hour Notice of Noncompliance Reporting; and,

   d. The permittee complied with any remedial measures required under Part III.D., Duty to Mitigate.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

I. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

J. Changes in Discharge of Toxic Substances. Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. One hundred micrograms per liter (100 ug/L);

   b. Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,

   d. The level established by the Director in accordance with 40 CFR 122.44(f).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. Five hundred micrograms per liter (500 ug/L);

   b. One milligram per liter (1 mg/L) for antimony:

   c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,

   d. The level established by the Director in accordance with 40 CFR 122.44(f).

IV. GENERAL REQUIREMENTS

A. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as determined in 40 CFR 122.29(b);

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under Part IV.A.1.; or,

3. There are any planned substantial changes to the existing sewage sludge facilities, the manner of its operation, or to current sewage sludge management practices of storage and disposal. The permittee shall give the Director notice of any planned changes at least 30 days prior to their implementation.

B. Anticipated Noncompliance. The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:

   a. For a corporation: by a responsible corporate officer;

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;

   c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and,

   b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to authorization. If an authorization under paragraph IV.G.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.G.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for

G. Signatory Requirements (Continued)

gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports. The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both.

I. Availability of Reports. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Director. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

K. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

M. Transfers (Continued)

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2. above.

N. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

O. Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

2. Wasteload Allocation: A wasteload allocation is developed and approved by the State and/or EPA for incorporation in this permit.

3. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted which calls for different effluent limitations than contained in this permit.

P. Other Requirements

1. Area Maps (Active Mining Operations)

a. Facilities which have already identified the location of each discharge need not submit an area map.

b. The permittee shall submit revised Area Map(s) to show any changes, corrections, or other modifications or adjustments of the location of the point source discharges. The purpose of this requirement is to assure that the Regional Administrator and the State of Utah are kept fully advised as to the current location of such discharges.

c. The revised Area Map(s) shall be submitted in the form specified below and shall be made from USGS topographical maps (7.5 or 15-minute series) or other appropriate sources as approved by the Regional Administrator or his designee. Each revised Area Map shall be 8 1/2 inches by 11 inches and shall be in black and white suitable to produce readable copies by rapid printing methods (Xerox, Dennison, Offset printing, etc.) or as approved by the Regional Administrator or his designee. Where additional 8 1/2 inch by 11 inch maps are required to show the area of operation, they shall be numbered and a key shall be shown on the first map. The first map section shall have the company name, mine/job name, address, and NPDES number clearly printed thereon. Also, one line of latitude and one line of longitude shall be marked on each map section. The Area Map(s) shall delineate the following, using the graphics as indicated:

(1) Existing Area of Operation (Solid Outline)

(2) Existing point source (Solid Triangle)

(3) The projected area of operation for the next five years (Dashed Outline)

(4) Project point source for the next five years (Opened Triangle)

(5) The monitoring reports must indicate the active-inactive status of all discharge points which are listed on the current area maps. These discharge points shall be assigned numbers 001, 002, 003, 004, etc.

(6) **The permittee shall provide notification to the U.S. Environmental Protection Agency and the Utah Department of Health at the addresses in Part II.D. of this permit within 15 days of the date(s). Outfalls 005, 006, and 007 are placed in operation.**

P. Other Requirements (Continued)

2. Monitoring of a discharge may be terminated if either:

(a) Sufficient data has been accumulated to show to the satisfaction of the Regional Administrator or his designee that the untreated discharge from an area where active mining has ceased will meet the limitations herein; or,

(b) The discharge emanates from an area on which the State of Utah has released the grading bond or has taken other similar action.

RESPONSE TO COMMENTS
Soldier Creek Coal Co.
UT-0023680

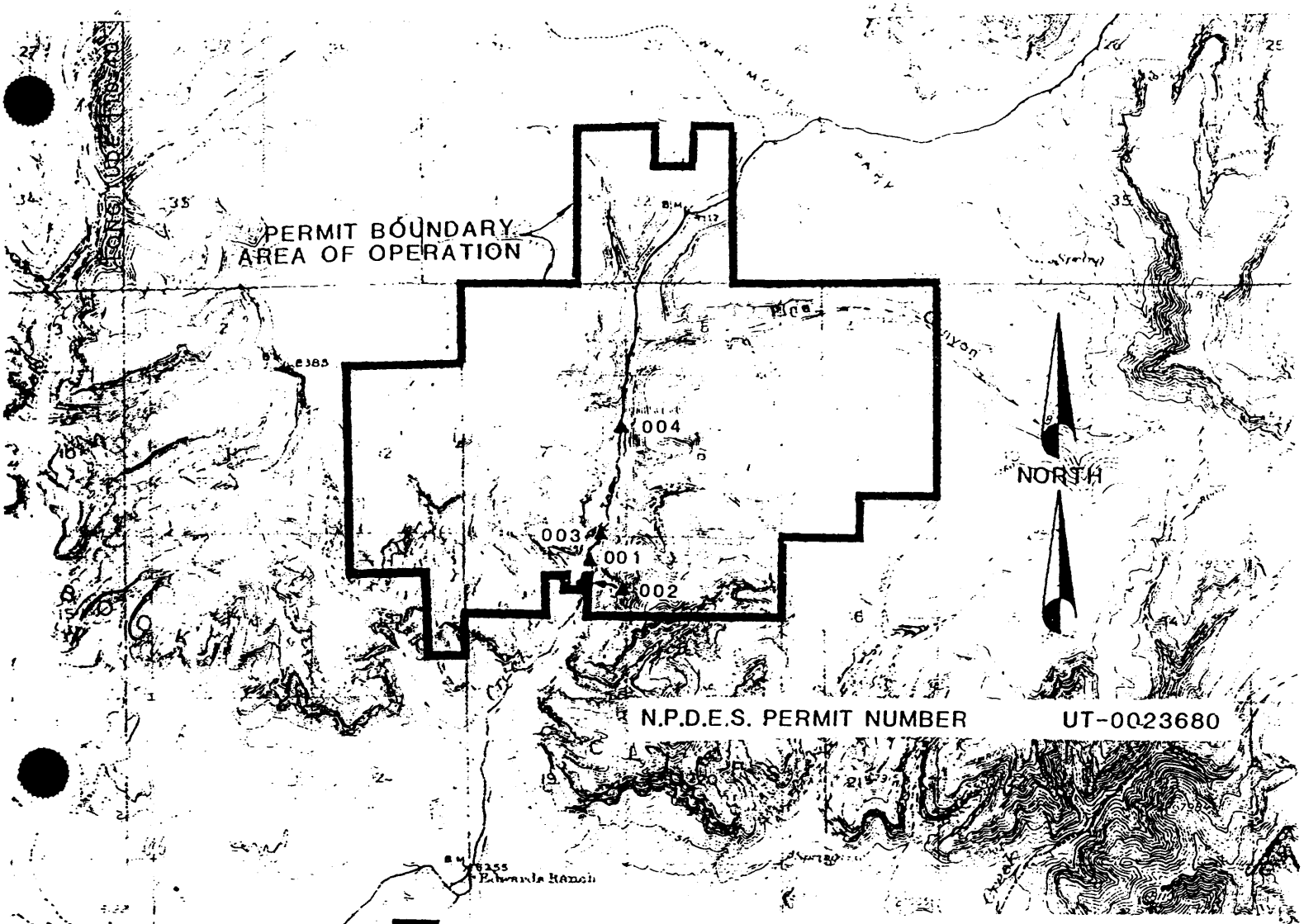
Summary of Comments Received

Soldier Creek Coal Company, through a letter from Johnny Pappas, Environmental Coordinator, requested a higher TDS limitation (tons/day) with the justification of exceeding the proposed limitation twice, in March and April 1991.

Response to Comments

The permit will be issued as is, with an effective date of July 1, 1991. If conditions at the facility change such that the characteristics of the discharge are different, then a request for modification can be made to the State of Utah. There is not enough information available to make that determination at this time.

Robert B. Brobst
Joel Webster
USEPA
May 30, 1991



POINT SOURCES

001-EXISTING MINE WATER DISCHARGE POINT

002-EXISTING SEDIMENT POND DISCHARGE POINT

003-EXISTING MINE WATER DISCHARGE POINT

004-EXISTING MINE WATER DISCHARGE POINT

005-REQUESTED SEDIMENT POND DISCHARGE POINT

006-REQUESTED SEDIMENT POND DISCHARGE POINT

007-REQUESTED SEDIMENT POND DISCHARGE POINT

USGS 15 MINUTE SERIES (TOPOGRAPHIC)

REVISIONS		
NO.	DATE	BY
	10/30/90	J.P.
3		

Soldier Creek Coal Company

P.O. BOX I PRICE, UTAH 84501

SOLDIER CANYON MINE

SCALE: 1:62,500

TITLE: N.P.D.E.S. DISCHARGE POINTS

DRAWING NO.

Direct Costs		
Subtotal Demolition	450,351	
Subtotal Earthmoving	869,884	
Subtotal Revegetation	217,731	
Direct Costs	1,537,966	
Indirect Costs		
Mob/Demob	153,797	10.00%
Contingency	76,898	5.00%
Engineering Redesign	38,449	2.50%
Main Office Expense	104,582	6.80%
Project Management Fees	38,449	2.50%
Indirect Costs	412,175	26.80%
Total Costs	1,950,140	
Escalation Factor		0.0289
Number of Years		2
Escalation	112,718	
Reclamation Cost Escalated	2,062,858	
Bond Amount (rounded to nearest $1,000)	2,063,000	

Material	Means Reference Number	Cost	Unit
Mixture of Types, Large	02220 100 0100	0.26	/CF
Steel, Large	02220 100 0012	0.25	/CF
City Service	City Service Price	4.00	/CY
Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY
12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY
On Site Disposal	02220 375 5550	6.30	/CY
16 Ton Truck	01590 200 5300	408.01	/Day
Truck Driver		38.10	/Hr
Loading & Trucking	02225 730 3000	38.50	/CY
Over 8 CY Truck	02225 730 5100	0.53	/CY
Mechanical Equipment Heavy	15055 300 3600	715.00	/Ton
Pavement removal, 4" to 6" thick	02220 875 1750	6.40	/SY
Chain Link , posts & fabric, 8' to 10' high	02220 875 0700	2.56	/LF
Cat D9R, U-Blade, ROPS, Rental Rate	Blue Book	17,060.00	/Month
Cat D9R, U-Blade, ROPS, Operating Rate	Blue Book	64.80	/Hr
Cat 966G Loader, 5 CY, Rental Rate	Blue Book	6,815.00	/Month
Cat 966G Loader, 5 CY, Operating Rate	Blue Book	28.05	/Hr
12 - 18 C.Y. Truck, Rental Rate	Blue Book	3,580.00	/Month
12 - 18 C.Y. Truck, Operating Rate	Blue Book	25.05	/Hr
Cat 14H Motergrader, Rental Rate	Blue Book	7,880.00	/Month
Cat 14H Motergrader, Operating Rate	Blue Book	28.20	/Hr
Cat 325, 3 1/2 CY., Rental Rate	Blue Book	10,860.00	/Month
Cat 325, 3 1/2 CY., Operating Rate	Blue Book	38.05	/Hr
Cat 325, 2 CY.	02315 400 0260	1.73	/CY
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Rental Rate	Blue Book	880.00	/Month
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Operating Rate	Blue Book	3.85	/Hr
Foreman		53.65	/Hr
Heavy Equipment Operator		47.15	/Hr
Floor slab with 30" pans	03110 420 3760	5.70	/SF
Geneva Rock Concrete	Geneva Rock	75.00	/CY
Pump, concrete truck mounted	01590 100 2120	13.55	/Hr
Prime and seal	02720 200 0800	3.67	/Gal
Prepared and rolled	02720 215 0100	0.80	/SY
Asphalt 4" thick	02740 300 0200	7.30	/SY
Roadside delineators, Remove and Reset	02220 875 0100	18.80	/EA
915 LHD, Rental Rate	Blue Book	15,924.00	/Month
915 LHD, Operating Rate	Blue Book	41.90	/HR
Bedding Crushed or screened bank run	02300 130 0050	27.50	/CY
Machine Placed for Slope Protection	02370 300 0100	33.50	/CY
Silt Fence	02370 550 1000	0.97	/LF
Chicken Wire	02820 500 0010	6.55	/LF
Bare root seedling, 6" to 10", heavy soil	02910 035 0711	1.21	/EA
Hydro Spreader (equip. & labor)B-81	Reveg	19.95	/MSF
Seed Mix No. 1	Maple Leaf	237.13	/Acre
Seed Mix No. 2	Maple Leaf	95.48	/Acre
Concrete Demolition	AML 1	10.06	/CY
Seal Portals	AML 1	5,200.00	/EA
5,000 Gal. Water Truck, Rental Rate	Blue Book	4,895.00	/Month

5,000 Gal. Water Truck, Operating Rate	Blue Book	27.15 /HR
Fencing, barged wire, 3 strand	02200 875 0600	1.36 /FT
36" Culvert installed	02630 100 2660	46.00 /FT
Heavy Equipment Operator		49.35 /HR

Powerline

1/3 the cost of a new line $1,500 plus $705 for labor and equipment divided by 5,280 feet, Personal communication with Means — 0.23 /Ft

Power Poles

1/3 the cost of a new pole $226 plus $51 for labor and equipment. Personal communication with Means. — 164 /Pole

Note:

Resources used were:
R. S. Means Building Construction Cost Data 60 th Edition
Blue Book
Geneva Rock

Ref.	Description	Cost
1	Office	41,164
2	Warehouse	11,004
3	Old Shop	64,560
4	New Shop	16,848
5	Training Room	5,535
6	Ambulance Garage	3,636
7	Bathhouse	33,613
8	Storage Shed	16,374
9	Security Shack	160
10	Stacking Tube	1,327
11	Control Building	446
12	8,000 Gallon Tank	806
13	4,000 Gallon Tank	607
14	1,000 Gallon Tank	50
15	1,500 Gallon Tank	147
16	60,000 Gallon Tank	4,228
17	Loadout Bins (2)	12,412
18	Septic Tank	3,342
19	Fan No. 1	4,803
20	Fan No. 2	4,771
21	Crib Wall	2,883
22	Substation No. 1	1,147
23	Substation No. 2	1,436
24	Belt Conveyor	22,052
25	Portals (3)	21,077
26	Portals (5)	34,888
27	Culverts Ends	1,778
28	Culvert	16,173
29	Ditch	28,106
30	Small Culvert	1,419
31	Asphalt Removal	84,588
32	Fencing	5,120
33	Powerline	575
34	Power Poles	3,280
	Total	450,351

Earthmoving

Ref.	Description	Cost
35	Mine Site Grading	134,783
36	Backfill Portals	8,741
37	Sewage Lagoon	38,340
38	Fuel Storage Area	17,773
39	Topsoil Storage Area	4,714
40	Road Reconstruction	95,711
41	Stream Channel	569,822
	Total	869,884

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
1	Office																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						132000					CF		132000	CF	34,320
	Structure's Vol. Demolished																0.35	46200	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						1711					CY		1711	CY	6,844
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
2	Warehouse																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						15950					CF		15950	CF	4147
	Structure's Vol. Demolished																0.35	5582.5	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						207					CY		207	CY	827
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						251					CY		251	CY	2,525
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													326.3	CY	441
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													326.3	CY	1,008
	Disposal Costs	On Site Disposal	02220 375 6550	6.30	/CY													326.3	CY	2,056
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
3	Old Shop																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.28	/CF						192000					CF		192000	CF	49,920
	Structure's Vol. Demolished																0.35	67200	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						2469					CY		2469	CY	9,956
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.09	/CY						195					CY		195		1,952
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02316 400 1360	1.36	/CY													263.5		342
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													253.5		783
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													263.5		1,597
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
4	New Shop																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						45936					CF		45936	CF	11,943
	Structure's Vol. Demolished																0.35	16077.6	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						595					CY		595	CY	2,382
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.08	/CY						105					CY		105		1,058
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02316 400 1360	1.35	/CY													136.5		184
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													136.5		422
	Disposal Costs	On Site Disposal	02220 378 5550	6.30	/CY													136.5		860
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
6	Training Room																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						17748					CF		17748	CF	4,614
	Structure's Vol. Demolished																0.35	6211.8	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						230					CY		230	CY	920
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	[illegible]																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
6	Ambulance Garage																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						11660					CF		11660	CF	3,032
	Structure's Vol. Demolished																0.35	4081	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						151					CY		151	CY	605
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
7	Bathhouse																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.28	/CF						96000					CF		96000	CF	24,960
	Structure's Vol. Demolished																0.35	33600	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						1244					CY		1244	CY	4,976
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						153					CY		153		1,539
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1360	1.35	/CY													198.9		269
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													198.9		615
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													198.9		1,253
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
6	Storage Shed																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						32400					CF		32400	CF	8,424
	Structure's Vol. Demolished																0.35	11340	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						420					CY		420	CY	1,680
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.08	/CY						261					CY		261		2,626
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02316 400 1350	1.35	/CY													339.3		458
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													339.3		1,048
	Disposal Costs	On Site Disposal	02220 376 6550	6.30	/CY													339.3		2,138
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
9	Security Shack																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						512					CF		512	CF	133
	Structure's Vol. Demolished																0.35	179.2	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						7					CY		7	CY	27
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				160
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				160

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
10	Stacking Tube																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.26	/CF						45					CF		45	CF	11
	Structure's Vol. Demolished																0.35	16		
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel	City Service	City Service Price	4.00	/CY						1					CY		1	CY	2
	Steel's Weight												495			LB/CF				
	Truck's Capacity												11.1			Tons				
	Haulage																			
	Transportation Cost Steel Truck	18 Ton Truck	01590 200 5300	408.01	/Day													0.70	Day	284
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													8	HR	212
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.08	/CY						34					CY		34	CY	342
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1360	1.35	/CY													44.2	CY	60
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													44.2	CY	137
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													44.2	CY	279
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
11	Control Building																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						1430					CF		1430	CF	372
	Structure's Vol. Demolished																0.35	500.5	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						19					CY		19	CY	74
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
12	6,000 Gallon Tank																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						1070					CF		1070	CF	268
	Structure's Vol. Demolished																0.011	11.77		
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel	City Service																		
	Steel's Weight												495			LB/CF				
	Truck's Capacity												2.9			Tons				
	Haulage																			
	Transportation Cost Steel Truck	16 Ton Truck	01590 200 5300	406.01	/Day													0.18	Day	74
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													1.46	HR	56
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						17					CY		17	CY	171
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.36	/CY													22.1	CY	30
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													22.1	CY	68
	Disposal Costs	On Site Disposal	02220 376 5550	6.30	/CY													22.1	CY	139
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

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Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
13	4,000 Gallon Tank																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						535					CF		535	CF	134
	Structure's Vol. Demolished																0.011	6	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												1.5			Tons				
	Haulage																			
	Transportation Cost Steel Truck	18 Ton Truck	01590 200 5300	408.01	/Day													0.09	Day	37
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													0.73	HRS	28
	Disposal Cost Steel																			
																				199
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						17					CY		17	CY	171
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 6 CY (966G)	02316 400 1360	1.36	/CY													22.1	CY	30
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0920	3.06	/CY													22.1	CY	68
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													22.1	CY	139
																				0
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				0

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
14	1,000 Gallon Tank																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						134					CF		134	CF	34
	Structure's Vol. Demolished																0.011	1	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												0.4			Tons				
	Haulage																			
	Transportation Cost Steel Truck	16 Ton Truck	01590 200 5300	408.01	/Hr													0.02	Day	9
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													0.18	HR	7
	Disposal Cost Steel																			
	[illegible]																			[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	[illegible]																			[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
16	1,800 Gallon Tank																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						201					CF		201	CF	50
	Structure's Vol. Demolished																0.011	2	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												0.5			Tons				
	Haulage																			
	Transportation Cost Steel Truck	16 Ton Truck	01590 200 5300	406.01	/Hr													0.03	Day	14
	Transportation Cost Steel Truck Drive	Truck Driver		36.10	/Hr													0.27	Hrs	10
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						3					/CY		3	/CY	30
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.36	/CY													3.9	/CY	5
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													3.9	/CY	12
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													3.9	/CY	25
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
16	90,000 Gallon Tank																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						8022					CF		8022	CF	2,006
	Structure's Vol. Demolished																0.011	88	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												21.8			Tons				
	Haulage																			
	Transportation Cost Steel Truck	18 Ton Truck	01590 200 6300	408.01	/Hr													1.36		557
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													10.92		416
	Disposal Cost Steel																			
																				973
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						52					CY		52	CY	523
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													67.6	CY	91
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													67.6	CY	209
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													67.6	CY	426
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				1423

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
17	Loadout Bins (2)																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						30000					CF		30000	CF	7,500
	Structure's Vol. Demolished																0.011	330	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												81.7			Tons				
	Haulage																			
	Transportation Cost Steel Truck	16 Ton Truck	01590 200 5300	406.01	/Hr													5.10	Day	2,083
	Transportation Cost Steel Truck Drive	Truck Driver		36.10	/Hr													40.84	Hrs	1,566
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						53					CY		53	CY	533
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1360	1.36	/CY													68.9	CY	93
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													68.9	CY	213
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													68.9	CY	434
																				1,273
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				1,273

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
18	Septic Tank																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						9000					CF		9000	CF	2,250
	Structure's Vol. Demolished																0.011	99	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												24.5			Tons				
	Haulage																			
	Transportation Cost Steel Truck	16 Ton Truck	01590 200 5300	408.01	/Hr													1.53	Day	625
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													12.25	HR	467
	Disposal Cost Steel																			
	[illegible]																			[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
19	Fan No. 1																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						15400					CF		15400	CF	4,004
	Structure's Vol. Demolished																0.35	5390	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						200					CY		200	CY	799
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			4,803
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	[illegible]																			4,803

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
20	Fan No. 2																			
	Structure's Demolition Cost	Mixture of Types, Large	02220 100 0100	0.26	/CF						15300					CF		15300	CF	3,978
	Structure's Vol. Demolished																0.35	5355	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						198					CY		198	CY	793
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
21	Crib Wall																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.08	/CY						120					CY		120	CY	1,207
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1360	1.36	/CY													156	CY	211
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													156	CY	482
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													156	CY	983
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
22	Substation No. 1																			
	Structure's Demolition Cost	Mechanical Equipment Heavy	15055 300 3600	715.00	/Ton							1				Ton		1	Ton	715
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						18					CY		18	CY	181
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													23.4	CY	32
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													23.4	CY	72
	Disposal Costs	On Site Disposal	02220 376 5550	6.30	/CY													23.4	CY	147
																				[illegible]
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
23	Substation No. 2																			
	Structure's Demolition Cost	Mechanical Equipment Heavy	15055 300 3600	715.00	/ton							1				Ton		1	Ton	715
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				715
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						30					CY		30	CY	302
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													39	CY	53
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													39	CY	121
	Disposal Costs	On Site Disposal	02220 376 6550	6.30	/CY													39	CY	246
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
24	Belt Conveyor																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						57000					CF		57000	CF	14,250
	Structure's Vol. Demolished																0.011	627	CF	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight												495			LB/CF				
	Truck's Capacity												155.2			Tons				
	Haulage																			
	Transportation Cost Steel Truck	16 Ton Truck	01590 200 5300	406.01	/Hr													9.70	Days	3,957
	Transportation Cost Steel Truck Drive	Truck Driver		38.10	/Hr													77.59	Hrs	2,956
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.06	/CY						37					CY		37	CY	372
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													48.1	CY	65
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													48.1	CY	149
	Disposal Costs	On Site Disposal	02220 378 8650	6.30	/CY													48.1	CY	303
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
25	Portals (3)																			
	Structure's Demolition Cost	Seal Portals	AML 1	5,200.00	/EA						3					EA		3	EA	15,600
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
																				15,600
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Demolition		10.09	CY						226					CY		226	CY	2,294
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1360	1.35	CY													296.4	CY	400
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	CY													296.4	CY	916
	Disposal Costs	On Site Disposal	02220 376 6560	6.30	CY													296.4	CY	1,867
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				17,867

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
26	Portals (5)																			
	Structure's Demolition Cost	Steel Portals	AML 1	5,200.00	/EA						5					EA		5	EA	26,000
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.00	/CY						370					CY		370	CY	3,722
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1360	1.35	/CY													481	CY	649
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													481	CY	1,486
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													481	CY	3,030
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
27	Culverts Ends																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.08	/CY						74					CY		74	CY	744
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													96.2	CY	130
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													96.2	CY	297
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													96.2	CY	606
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Der.

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
28	Culvert																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						53580					CF		53580	CF	13,395
	Structure's Vol. Demolished																0.35	695	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel	City Service	City Service Price	4.00	/CY													695	CY	2,778
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
29	Ditch																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost	Concrete Breakage		10.08	/CY						1170					CY		1170	CY	11,770
	Concrete's Vol. Demolished																1.3			
	Loading Cost	Front-End Loader 5 CY (966G)	02315 400 1350	1.35	/CY													1521	CY	2,053
	Transportation Cost	12 CY Truck, 1/2 Mile Round Trip	02320 200 0320	3.09	/CY													1521	CY	4,700
	Disposal Costs	On Site Disposal	02220 375 5550	6.30	/CY													1521	CY	9,582
																				28,105
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
30	Small Culvert																			
	Structure's Demolition Cost	Steel, Large	02220 100 0012	0.25	/CF						4700					CF		4700	CF	1,175
	Structure's Vol. Demolished																0.35	61	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel	City Service	City Service Price	4.00	/CY													61	CY	244
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			[illegible]
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	[illegible]																			[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
31	Asphalt Removal																			
	Parking Lot																			
	Asphalt Demolition	Pavement removal, 4" to 6" thick	02220 875 1750	6.40	/SY						1865					SY		1865	SY	11,936
								0.5			16785					SF		8392.5	CF	
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						310.8					CY		310.8	CY	1,243
	Office Parking																			
	Asphalt Demolition	Pavement removal, 4" to 6" thick	02220 875 1750	6.40	/SY						716					SY		716	SY	4,582
								0.5			6444					SF		3222	CF	
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						119.3					CY		119.3	CY	477
	Old Road																			
	Asphalt Demolition	Pavement removal, 4" to 6" thick	02220 875 1750	6.40	/SY						2881					SY		2881	SY	18,436
								0.5			25929					SF		12964.5	CF	
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						480.2					CY		480.2	CY	1,921
	New Yard Road																			
	Asphalt Demolition	Pavement removal, 4" to 6" thick	02220 875 1750	6.40	/SY						2055					SY		2055	SY	13,152
								0.5			18495					SF		9247.5	CF	
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						342.5					CY		342.5	CY	1,370
	Relocated Road and New Portal Road																			
	Asphalt Demolition	Pavement removal, 4" to 6" thick	02220 875 1750	6.40	/SY						4453					SY		4453	SY	28,499
								0.5			40077					SF		20038.5	CF	
	Transportation Cost Non-Steel Truck	City Service	City Service Price	4.00	/CY						742.2					CY		742.2	CY	2,969

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
32	Fencing																			
	Structure's Demolition Cost	Chain Link , posts & fabric, 8' to 10' high	02220 875 0700	2.56	/LF						2000					LF		2000	LF	5120
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			5120
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	[illegible]																			[illegible]

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
33	Powerline																			
	Structure's Demolition Cost	Powerline		0.23	/LF						2500					LF		2500	LF	575
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			575
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
																				575

Ref.	Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
34	Power Poles																			
	Structure's Demolition Cost	Power Poles		164.00	/EA						20					EA		20	EA	3280
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non-Steel Truck																			
	Transportation Cost Non-Steel Drive																			
	Disposal Cost Non-Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	[illegible]																			3,280
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	[illegible]																			
	[illegible]																			[illegible]

Ref. 35	Equipment Cost	Hourly Operating Cost	Hourly Equipment Cost	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Mine Site Grading															
Cat D9R, U-Blade, ROPS, Rental Rate	17,060.00	64.80	0.10	49.35	227.26	3	681.78	$/Hr	68433	CY	788.70	CY/Hr	86.8	Hrs	59,156
Excavate Culvert															
Cat 325, 3 1/2 CY., Rental Rate	10,860.00	38.05	0.10	49.35	159.08	1	159.08	$/Hr	42827	CY	301.82	CY/Hr	141.9	Hrs	22,573
Topsoil, Subsoil & Rock															
Cat D9R, U-Blade, ROPS, Rental Rate	17,060.00	64.80	0.10	49.35	227.26	1	227.26	$/Hr	15500	CY	283.12		54.7	Hrs	12,442
Cat 966G Loader, 5 CY, Rental Rate	6,815.00	28.05	0.10	49.35	122.80	1	122.80	$/Hr					22.6	Hrs	2,776
12 - 18 C.Y. Truck, Rental Rate	3,580.00	25.05	0.10	38.10	88.03	11	968.33	$/Hr	8101	CY	358.33		22.6	Hrs	21,892
5,000 Gal. Water Truck, Rental Rate	4,895.00	27.15	0.10	38.10	98.56	1	98.56	$/Hr					70.8	Hrs	6,974
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Rental Rate	880.00	3.85	0.10		9.74	1	9.74	$/Hr					141.5	Hrs	1,378
Foreman				53.65	53.65	1	53.65	$/Hr					141.5	Hrs	7,592
															134,783

Ref. 36	Equipment Cost	Hourly Operating Cost	Hourly Equipment Rate	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Backfill Portals															
915 LHD, Rental Rate	15,924	41.90	0.10	47.15	192.77	1	192.77	$/Hr	2215	CY	88.86	CY/HR	24.9	Hrs	4,805
Seal Shaft															
Floor slab with 30" pans							5.70	/SF	205	SF					1,169
Geneva Rock Concrete							75.00		8	CY					600
Pump, concrete truck mounted	955	13.55	119.38	38.10	171.03	1	171.03	$/Hr					8.0	Hrs	1,368
Backfill Shaft															
Cat 966G Loader, 5 CY, Rental Rate	6,815.00	28.05	0.10	47.15	120.60	1	120.60	$/Hr	860	CY	354.83	CY/HR	2.4	Hrs	292
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Ren	880.00	3.85	0.10		9.74	1	9.74	$/Hr					8.0	Hrs	78
Foreman				53.65	53.65	1	53.65	$/Hr					8.0	Hrs	429
Subtotal															8,741

Ref. 37	Equipment Cost	Hourly Operating Cost	Hourly Equipment Cost	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Sewage Lagoon															
Cat D9R, U-Blade, ROPS, Rental Rate	17,060.00	64.80	0.10	47.15	225.06	3	675.18	$/Hr	6222	CY	184.00	CY/Hr	33.8	Hrs	22,831
Topsoil															
Cat D9R, U-Blade, ROPS, Rental Rate	17,060.00	64.80	0.10	47.15	225.06	1	225.06	$/Hr	890	CY	184.00		4.8	Hrs	1,089
Cat 966G Loader, 5 CY, Rental Rate	6,815.00	28.05	0.10	47.15	120.60	1	120.60	$/Hr					2.5	Hrs	300
12 - 18 C.Y. Truck, Rental Rate	3,580.00	25.05	0.10	38.10	88.03	11	968.33	$/Hr	890	CY	358.33		2.5	Hrs	2,405
5,000 Gal. Water Truck, Rental Rate	4,895.00	27.15	0.10	38.10	98.56	1	98.56	$/Hr					19.3	Hrs	1,905
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Rental Rate	880.00	3.85	0.10		9.74	1	9.74	$/Hr					38.7	Hrs	376
Foremen				53.65	53.65	1	53.65	$/Hr					38.7	Hrs	2,074
Chain Link , posts & fabric, 6' to 10' high									2875	FT			2.56	FT	7,360
															39,040

Ref. 38	Equipment Cost	Hourly Operating Cost	Hourly Equipment Rate	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Fuel Storage Area															
Cat 966G Loader, 5 CY, Rental Rate	6,815.00	28.05	0.10	47.15	120.60	1	120.60	$/Hr					14.8	Hrs	1,784
12 - 18 C.Y. Truck, Rental Rate	3,580.00	25.05	0.10	38.10	88.03	11	968.33	$/Hr	6042	CY	408.50		14.8	Hrs	14,322
5,000 Gal. Water Truck, Rental Rate	4,895.00	27.15	0.10	38.10	98.56	1	98.56	$/Hr					7.4	Hrs	729
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Ren	880.00	3.85	0.10		9.74	1	9.74	$/Hr					14.8	Hrs	144
Foreman				53.65	53.65	1	53.65	$/Hr					14.8	Hrs	794
Subtotal															17,773

Ref. 39	Equipment Cost	Hourly Operating Cost	Hourly Equipment Cost	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Topsoil Storage Area															
Cat D9R, U-Blade, ROPS, Rental Rate	17,060.00	64.80	0.10	47.15	225.06	3	675.18	$/Hr	590	CY	184.00	CY/Hr	3.2	Hrs	2,165
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Rental Rate	880.00	3.85	0.10		9.74	1	9.74	$/Hr					3.2	Hrs	31
Foreman				53.65	53.65	1	53.65	$/Hr					3.2	Hrs	172
Fencing, barged wire, 3 strand									1725	FT			1.36	$/FT	2346
Subtotal															4,714

Ref. 40	Equipment Cost	Hourly Operating Cost	Hourly Equipment Rate	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Road Reconstruction															
Hauling Base Coarse															
12 - 18 C.Y. Truck, Operating Rate	3,580.00	25.05	0.10	38.10	88.03	26	2,288.78	$/Hr	7200	CY	350.05	LCY/Hr	20.6	Hrs	47,077
Spreading Base Coarse															
Cat 14H Motergrader, Rental Rate	7,880.00	28.20	0.10	47.15	127.42	1	127.42	$/Hr	0.74	AC	2.80	AC/Hr	0.26	Hrs	34
Paving															
Prepared and rolled							0.80	$/SY	3600	SY					2,880
Prime and seal							3.67	$/Gal	1803	GAL					6,617
Asphalt 4" thick							7.30	$/SY	3600	SY					26,280
Roadside delineators, Remove and Reset							18.80	$/EA	50	EA					940
Install 36" Culverts							46.00	$/LF	185	LF					8,510
5,000 Gal. Water Truck, Rental Rate	4,895.00	27.15	0.10	38.10	98.56	1	98.55875	$/Hr					20.8	Hrs	2,053
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Rental Rate	880.00	3.85	0.10		9.74	1	9.74	$/Hr					20.8	Hrs	203
Foreman				53.65	53.65	1	53.65	$/Hr					20.8	Hrs	1,118

Ref. 41	Equipment Cost	Hourly Operating Cost	Hourly Equipment Rate	Operator's Hourly Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Costs	Unit	Quantity	Units	Production Rate	Unit	Equip. + Labor Time/Dis.	Unit	Cost
Stream Channel															
Bedding Crushed or screened bank run	02315 130 0050						27.50	/CY	8573	CY					235,758
Machine Placed for Slope Protection	02370 300 0100						33.50	/CY	9910	CY					331,985
Truck Pickup, 3/4 Ton, 4x4 wheel drive, Ren	880.00	3.85	0.10		9.74	1	9.74	$/Hr					32.8	Hrs	319
Foreman				53.65	53.65	1	53.65	$/Hr					32.8	Hrs	1,760

Ref.		Description	Material	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
42		Revegetation																			
		Soil Preparation																			
		Pocking	Cat 325, 2 CY.	02315 400 0260	1.73	/CY					21.92						AC		35,364	CY	61,180
		Subtotal																			61,180
		Silt Fence																			
		Silt Fence	Silt Fence	02370 550 1000	0.97	/LF	15925										FT		15925	FT	15,447
		Chicken Wire	Chicken Wire	02820 500 0010	6.55	/LF	15925										FT		15925	FT	104,309
		Subtotal																			119,756
		Seed Mix No. 1 for Minesite,																			
		Topsoil Area, and Sewer Lagoon																			
		Hydroseeding Equipment and Labor	Hydro Spreader (equip. & labor)B-81	Reveg	19.95	/MSF					21.92						AC		955	MSF	19,049
		Hrydro seeding	Seed Mix No. 1	Maple Leaf	237.13	$/AC													21.92	AC	5,198
		Seed Mix No. 2 for Riparian Area																			
		Hydroseeding Equipment and Labor	Hydro Spreader (equip. & labor)B-81	Reveg	19.95	/MSF					2.4						AC		105	MSF	2,066
		Hrydro seeding	Seed Mix No. 2	Maple Leaf	95.48	$/AC													2.4	AC	229,152
		Transplant Material for Riparian																			
		Narrow Leak Cottonwood			1.00	/EA								100			Plants/AC		240	EA	240
		Coyote Willow			0.92	/EA								175			Plants/AC		420	EA	386
		Wood Rose			0.66	/EA								100			Plants/AC		240	EA	158
		Rocky Mountain Maple			1.00	/EA								50			Plants/AC		120	EA	120
		Snowberry			0.79	/EA								50			Plants/AC		120	EA	95
		Mountain Mahogany			0.92	/EA								50			Plants/AC		120	EA	110
		Squewbush			0.79	/EA								50			Plants/AC		120	EA	95
		Transplant Labor	Bare root seedling, 6" to 10", heavy soil	02910 035 0711	1.21	/EA													1380	EA	1,670
		Subtotal																			29,436
		Revegetation																			7,359
		25% Vegetation Rate																			
		Total																			217,731