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CHAPTER 5

ENGINEERING

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.

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, 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 are shown on Exhibits 1.12-1, 5.21-1, 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, 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, 5.25-1 and Plate 1 show the boundaries of all areas proposed to be affected over the estimated total life of the coal mining 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

Table 5.22-1

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

	Continuous Miners				
Year	Unit A	Unit B	Unit C	Longwall	Total
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

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 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

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	4-5
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 Entry spans (ft.)	18	18	18	18
Gate Pillars-Rock Canyon seam				
Pillar Spacing center-to-center (ft.)	N/A	56 by 120	56 by 140	N/A
Recommended Entry spans (ft.)	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

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.

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 sued 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.

Mining equipment abandoned underground due to unsafe recovery conditions has been drained of lubricants and other potentially hazardous fluids to the extent possible. The location of the equipment is illustrated on Exhibit 5.22-1.

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

<u>Surface Features and Facilities Subject to Subsidence, Slides and Other Damage</u>

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.

(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.

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.

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 15×10^{-3}. This criteria is satisfied for Pine Creek as the maximum calculated strain is 11.2×10^{-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 and Table 5.25-7. 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.

TABLE 5.25.7

1997 - 2000 SUBSIDENCE MONITORING SUMMARY

STATIONS 113 (113-SS), 921 (92-1SS) 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

5.25.16 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.

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

Since no underground mining activity has occurred or will occur beneath or in the immediate area of the previously proposed site, no subsidence is anticipated at the site.

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.

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 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.

Refuse Disposal Site. Previous submittals have included sections on a refuse disposal site. These references have been omitted from this chapter 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 either at the Skyline or SUFCo disposal areas.

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.

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 D& D Equipment and Supply Distributors of Helper, Utah. D&D 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 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.

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

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.

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 operated by Coal Service Company. The Applicant performs no additional processing or preparation on the coal before shipment. However, Coal Service does maintain 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. 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 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.

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.

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

5.36 Coal Mines Wastes

Refuse disposed of for 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.

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.

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 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.

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.

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

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+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
	+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

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+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
	+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

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
	+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
	+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

LOCATION	LINE	READING	ADJUSTMENT	AREA	THICKNESS	VOLUME
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.

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.

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

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.

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 if 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 2.00. 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.

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, 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, 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.

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.
Stoker Bin	Steel	1000 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.
1500 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.

DESCRIPTION	MATERIAL	SIZE
Portals (3)	Concrete	228 cu.yd.
Portals (5)	Concrete	370 cu.yd.
Refuse Bin	Mixture	6,667 cu.ft.
Prep. Plant	Mixture	187,500 cu.ft.
Thickener	Mixture	9,620 cu.ft.
Silos (2)	Concrete	300,000 cu.ft.
Transfer Bldg.	Mixture	12,500 cu.ft.
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.
ROM Conveyor	Mixture	19,000 cu.ft.
Reclaim Conv.	Mixture	11,250 cu.ft.
Spec. Coal Conv.	Mixture	4,500 cu.ft.
Refuse Conv.	Mixture	810 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.

ACTIVITY	QUANTITY
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.
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 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.

5.60 Performance Standards

All mining and reclamation operations at the Soldier Canyon Mine will be conducted in accordance with these R614 Rules and this permit.