UtahAmerican Energy,

Lila Canyon Project
P. O. Box 910
East Carbon, Utah 84520
Phone: (435) 888-4000
(435) 650-3157
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Utah Division of Oil, Gas & Mining
Utah Coal Program
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, UT 84114-5801

March 1, 2016

Attn: Daron Haddock
Permit Supervisor

Re: Lila Canyon Mine
L16-003 Drainage Revisions Task ID# 5056

Dear Mr. Haddock,

Please find attached revised plates and text to address deficiencies to our recent submittal regarding revisions to the surface drainage at the Lila Canyon Mine's surface facilities. Also attached are revised bonding sheets, the 2015 Topsoil Survey and seed mix for Lila Canyon to help address deficiencies.

If you have any questions, or need any additional information regarding this submittal, please contact me directly at 435-888-4026.

Sincerely,

Karin Madsen
Engineering Tech
UtahAmerican Energy, Inc.

APPLICATION FOR PERMIT PROCESSING

Permit Change X	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐	Permit Number: ACT/007/013
Title of Proposal: L16-003 Drainage Deficiencies Task# 5056						Mine: Lila Canyon
						Permittee: UtahAmerican Energy, Inc.

Description, include reason for application and timing required to implement:

Instructions: *If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to your reclamation*

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

X Attach 1 complete digital copy of the application.

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

Karin Madsen / Engineering Tech / 3-1-16

Signed - Name - Position - Date

Subscribed and sworn to before me this 1st day of March, 2016.

Linda Kerns

Notary Public

My Commission Expires: 3.27.17, 20

Attest: STATE OF Utah

COUNTY OF Carbon

ss

LINDA KERNS
NOTARY PUBLIC • STATE of UTAH
COMMISSION # 663615
COMM. EXP. 03/27/2017

Received by Oil, Gas & Mining

ASSIGNED TRACKING NUMBER

Application for Permit Processing
Detailed Schedule of Changes to the MRP

Title of Proposal: L16-003 Drainage Deficiencies Task# 5056	Permit Number: ACT/007/013
	Mine: Lila Canyon
	Permittee: UtahAmerican Energy, Inc.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☐ REPLACE	☐ REMOVE	Chapter 2 Page 9
☐ ADD	☐ REPLACE	☐ REMOVE	Plate 7-2
☐ ADD	☐ REPLACE	☐ REMOVE	Plate 7-5
☐ ADD	☐ REPLACE	☐ REMOVE	Plate 7-6a
☐ ADD	☐ REPLACE	☐ REMOVE	Plate 7-6b
☐ ADD	☐ REPLACE	☐ REMOVE	Appendix 5-4 Pages 2 and 3
☐ ADD	☐ REPLACE	☐ REMOVE	Appendix 7-4 Pages 14, 21, 23-29, 42, and 53
☐ ADD	☐ REPLACE	☐ REMOVE	Chapter 5 List of Plates, Pages 1, 8, 11, 12, 15, 56-58, and 64.
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

place for redistribution on the topsoil pile. Topsoil material will be removed from those areas of the mine yard where material will be excavated in order to achieve final yard configuration and which have been identified as suitable topsoil for reclamation based on the soil survey. This includes the access road to and around the topsoil pile. This material will be used to construct a berm around the topsoil pile.

The following volumes represent soil resources that may be available for salvage, storage and subsequent redistribution during reclamation. The actual amount salvaged will be reported to DOGM following topsoil removal and stockpiling operations in the Annual Report.

AVAILABLE SOIL RESOURCES

Map Unit	Potential Salvage Depth In.	Potential Acres	Potential Estimated Volume YD3	**Actual Salvage Depth In.**	**Actual Salvaged Acres**	**Actual Salvaged Top Soil YD3**
SBG	48	11.83	76343	**18**	**11.61**	**28100**
VBJ	30	9.62	38801	**18**	**3.40**	**8227**
XBS	12	12.09	19505	**12**	**8.81**	**14207**
DSH	40	1.56	8389	**18**	**1.16**	**2809**
RBL	8	9.34	10046	**8**	**2.17**	**2340**
RBT	6	3.79	3057	**6**	**0.56**	**450**
TOTAL(2)		48.23	156141		**27.95**	**56133**
Bank to Loose Cubic Yards *1.18 (Amount topsoil pile is designed to hold.)						(1) **66237**

(1) An additional 800 yd^3 will come from the access road around the topsoil pile. This material will be placed in the berm around the topsoil pile.
(2) The 48.23 acres was taken from a soil survey and does not accurately reflect the operators intention to include 42.6 acres of disturbance within the disturbed area boundary.

The actual topsoil salvage will consist of removing a surface layer up to 18 inches thick over the disturbed area. If shale is encountered within 18 inches only the soil above the shale will be salvaged. (Plate 2-3). This would cover about 34 acres where soil would be salvaged and stored in the topsoil stockpile.

Total volumes of soil stored in the topsoil pile would be

WordPerfect Document Compare Summary

Original document: K:\Lila\2016\L16-003 Drainage and Ditches Deficiencies Task #5056\Original Submittal\Chapter 5 Edits L15-006.wpd
Revised document: K:\Lila\2016\L16-003 Drainage and Ditches Deficiencies Task #5056\Revisions Task# 5056\L16-003 Chapter 5 Edits.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 56 Deletions, 53 Insertions, 0 Moves.

Horse Canyon Extension
Lila Canyon Mine

Chapter 5
Engineering

Volume 4 of 7

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List of Appendixes

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Chapter 5

500. ENGINEERING

510. Introduction

This section presents the engineering portion for the Lila Canyon Extension to the Horse Canyon Mine Reclamation Plan and is based upon previous publications, permit applications for the adjacent Sunnyside and South Lease areas and design which follows basic engineering standards. The objective of this chapter is to provide sufficient engineering design to support the mining and reclamation plan for the Lila Canyon Mine which is part "B" of the Horse Canyon Permit (ACT/007/013) and to satisfy the rules found in R645-301-500. All of the activities associated with the coal mining and reclamation operations are designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plan. The engineering section of the permit application is divided into the introduction, the operation plan, operational design criteria, reclamation plan, and performance standards. All design criteria associated with the operation and reclamation plan have been met.

511. General Requirements.

511.100 The permit application includes a description of the proposed coal mining and reclamation operations with appropriate maps, plans, and cross sections.

511.200 A description of the proposed mining operation and its potential impacts to the environment as well methods and calculations utilized to achieve compliance with design criteria is addressed within this chapter.

511.300 A description of the proposed reclamation plan is included in this chapter.

512. Certification

512.100. Cross Sections and Maps that require certification have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, with assistance from experts in related fields when needed. Cross Sections and Maps will be updated as needed or required by the Division. Listed below are some of the maps and cross sections that have been certified by a qualified registered professional engineer.

512.110. A map showing the extent of known existing mine workings and the approximate year mined has been included and certified by a qualified registered professional engineer and included as Plate 5-1.

512.120. All Surface facilities and operations are shown on the appropriate maps and have been certified by a qualified registered professional engineer.

512.130 Maps showing final surface configuration with cross sections have been included and certified by a qualified registered professional engineer. (See Plate 5-6, 5-7c, and Appendix 5-4)

512.140 Appropriated hydrology drawings and cross sections have been certified by a qualified registered professional engineer. (See Chapter 7)

512.150 Geologic cross sections and maps that are required to be, have been certified by a qualified registered professional engineer. See Chapter 6 and Plate 7-1B.

512.200 Plans and Engineering Designs which may include: Excess spoil piles, durable rock fills, coal mine waste, impoundments, primary roads and variances from approximate original contour. These Plans and Designs have been certified by a qualified registered professional engineer if appropriate.

512.210 Lila Canyon Mine is an underground operation, therefore it is anticipated that no excess Spoil will be produced. This section does not apply.

512.220 The professional engineer experienced in the design of earth and rock fills has certified that the durable rock fill design will ensure the stability of the fill and that the fill meets design requirements.

512.230 The professional engineer experienced in the design of coal mine waste piles has certified the design of the coal mine waste disposal facility. (See Appendix 5-7)

512.240 Prudent engineering practices was used in the design and construction of impoundments in the permit area. The impoundment designs have been certified by a qualified registered professional engineer. (See Plate 7-6)

512.250 The professional engineer has certified the design and construction or reconstruction of primary roads as meeting the appropriate design criteria.

512.260 The operator is not requesting a variance from the approximate original contours (AOC).

513. Compliance With MSHA Regulations and MSHA Approvals.

513.100 Neither Coal processing waste dams or embankments are anticipated during the term of this permit. Therefore, this section is not applicable.

513.200 Planned impoundments and sedimentation ponds do not meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a). Therefore, this section is not applicable.

513.300 Underground development waste transported to the surface, coal processing waste and excess spoil will not be disposed of underground. However, material such as overcast material, rock falls, and slope material, not transported to the surface, may be disposed of underground according to the appropriate MSHA regulations.

513.400 Refuse piles meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215 and all appropriate R645 regulations. (See Appendix 5-7)

513.500 Shafts, drifts, adits, tunnels, exploratory holes, entryways or other opening to the surface from the underground will be capped, sealed, backfilled or otherwise properly managed consistent with MSHA, 30 CFR 75.1711.

513.600 Surface water discharges into the underground mine workings is not anticipated or planned, Therefore, this section is not applicable.

513.700 Surface mining within 500 feet to an active underground mine is not planned nor anticipated. Therefore, this section does not apply.

513.800 Coal mine waste fires plans will be submitted to MSHA and the Division for their approval prior to extinguishing any coal mine waste fires. (See Appendix 5-3)

514. Inspections

All engineering inspections, except the quarterly inspections of impoundments not subject to MSHA, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

514.100 Lila Canyon is an underground operation and it is not anticipated that any spoil will be produced. Therefore, this section does not apply.

514.200 Refuse Piles. A professional engineer or specialist experienced in the construction of similar earth and waste structures will inspect the refuse pile during construction.

514.210 Regular inspections by the engineer or specialist will also be conducted during placement and compaction of coal mine waste materials. If it has been determined that a danger of harm exists to the public health and safety or the environment, more frequent inspections will be conducted. Inspections will continue until the refuse pile has been finally graded and revegetated or until a later time as required by the Division.

514.220 The refuse pile inspections will be performed at least quarterly throughout construction and during the following construction periods:

514.221 In addition to quarterly inspections, an inspection will be performed during foundation preparation which includes the removal of all organic material and topsoil;

514.222 Since no under-drain or protective filter systems are planned, this section is not applicable.

514.223 In addition to quarterly inspections, an inspection will be performed during the installation of the final surface drainage systems.

514.224 In addition to quarterly inspections, an inspection will be performed after the final grading and the facility has been revegetated.

514.230 The division will be provided a certified report prepared by, or under the supervision of, the qualified registered professional engineer after each inspection. The report will certify that the refuse pile has been constructed and maintained as designed and in accordance with the approved plan and R645 Rules. This report will include statements stating the appearances of instability, structural weakness, and other hazardous conditions if found. (See Appendix 5-1)

514.240 Since protective filters and under-drain are not required in the current design criteria this section is not applicable.

514.250 Required refuse pile reports will be retained at or near the mine site in an area convenient to the resident agent and the qualified registered professional engineer. Appendix 5-1 is an example of the refuse pile inspection form.

514.300 Impoundments

514.310 A professional engineer or specialist experienced in the construction of impoundments will inspect impoundments.

514.311 During construction inspections will be made on a regular basis and upon completion of the pond the inspections will be performed at least yearly. Inspections will continue yearly until the pond is removed or the performance bond is released.

514.312 After each inspection the qualified registered professional engineer will promptly provide to the Division, a certified report. This report will state that the impoundment has or has not been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules. The report will include a discussion of any appearances of instability, structural weakness or other hazardous conditions. All so included in the report will be the depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation and any other aspects of the structure affecting stability.

514.313 Required impoundment inspection reports will be retained at or near the mine site in an area convenient to the resident agent and the qualified registered professional engineer. Appendix 5-2 is an example of the impoundment inspection form.

514.320 Since the pond contained in the Lila Canyon Project is less than 20 feet high and stores less than 20 acre-feet of water it is not subject to MSHA, 30 CFR 77.216. Therefore, this section does not apply.

515. Reporting and Emergency Procedures.

515.100 If a slide occurs, the operator will telephone DOGM to notify them of the situation and recommend remedial measures to be taken to alleviate the problem. Additional remedial measures required by DOGM will be implemented.

515.200 During impoundment inspections any potential hazards noted will be reported to DOGM along with measures to be implemented to eliminate the hazard.

515.300 In the case of temporary cessation of operations the following will apply:

515.310 All provisions of the approved permit will be complied with during temporary cessation or abandonment.

515.311 In case of temporary cessation the operator will 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 approved permit.

515.312 Since Lila Canyon Mine is an underground operation this section does not apply.

515.320 Prior to a temporary cessation of coal mining and reclamation operations which is expected to last longer than 30 days, or when a temporary cessation is extended longer than 30 days, the operator will submit to the Division a notice of intention to cease or abandon operations. The following will be included in the notice of temporary cessation.

515.321 The temporary cessation notice will contain the exact number of surface acres and the horizontal and vertical extent of subsurface strata included in the permit area. In addition a description of the reclamation activities accomplished and activities such as backfilling regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

515.322 Since the Lila Canyon Mine is an underground operation this section does not apply.

516. **Prevention of Slides**: Since the Lila Canyon Mine is an underground operation this section does not apply.

520. Operation Plan.

At first glance it would appear to a non-mining person that the best access to UEI's leases would be from the existing (sealed) Horse Canyon portals using the current Horse Canyon surface disturbance. However, the existing Horse Canyon site is not suitable for a large longwall operation. The old Horse Canyon Mine was not designed to produce 4.5 million tons as will be Lila. Some strategic pillars in the old mains were extracted upon retreat preventing any future access. The number of entries in the old works are not adequate for ventilation purposes. Portions of the old mine are flooded preventing reentry. The distance from the old portals to the current leases would result in unacceptable travel times for crews and supplies. Rehabilitating and maintaining an old mine is extremely hazardous and expensive. As a result of the conditions described above it has been determined that new portals at the Lila Canyon site is the most logical and only feasible access to the permittee's coal leases.

Mine Facilities List
Lila Canyon Mine

A list of ~~final~~new structures and facilities follows:

Buildings

1) Office/Bathhouse
2) ~~Shop/Warehouse~~Shop Warehouse
3) Security Shack

Utilities

4) Mine Substation
5) Surface Power Lines
6) ~~6)~~ Water Treatment Plant
7) Potable Water Tank
8) Process Water tank
9) ~~9)~~ Sewer Tank
10) Drain Field

Mine Facilities

11) Ventilation Fan
12) 60-inch Conveyor from tunnels to Coal Stockpile

13) (ROM) Underground Belt from Stockpile to Crusher
14) 48-inch Conveyor from Crusher to Loadout Bin
15) Drop from Loadout Bin to Truck Loadout
16) Reclaim Tunnel, Escape Tunnel, Fan and Fan House
17) ROM Storage Pile, Coal Stacking Tube, 30 ton Rock Dust Silo
18) Crusher Screen Plant
19) Truck Scale and Loadout
20) Coal Loadout Storage Bin
21) Guardrails
22) Underground Pipes
23) Chain Link Fence

<u>Support Facilities</u>

24) Non-Coal Waste Area
25) Equipment & Supplies Storage Area
26) Topsoil Pile
27) Refuse Pile
28) Sediment Pond
29) Slope Access Road / Portal Access Road
30) Rock Slopes
31) Mine Facilities Road / Truck Loadout Road
32) Office/Bathhouse/Warehouse Asphalt Parking Area
33) Mine Parking
34) Fuel Tanks
35) Powder and Cap Magazines
36) Culvert locations are shown on Plate 7-2.

A description of new structures and facilities:

<u>Office/Bathouse</u>

The office and bathhouse building is shown on Plate 5-2. This building will jointly house all support personnel such as accounting, administration, engineering, and safety and will provide a comfortable office environment for all employees. Bathhouse and toilet facilities will be found for all employees at this location. The bathhouse will proved for a location for underground miners to change from clean street clothes to clothing suitable for underground use. The area will proved showers for employees for use after their scheduled work shifts so they can cleanup prior to returning home. Both the bathhouse and office buildings will be of prefab construction and will rest on a concrete pad. The pad dimensions will be approximately 150' by 100' by 12". The facility will be designed to accommodate up to 200 employees working rotating shifts.

Shop Warehouse

The shop warehouse building is shown on plate 5-2. Parts and supplies consumed during the mining process will be stored in the warehouse to be issued as needed. The shop area will be used to perform minor equipment repairs and overhauls. The shop warehouse will be a prefab modular type building approximately 100' by 150' and will rest on a 4" concrete pad.

Security Shack

The Security Shack shown of Plate 5-2, when used will provide security to the mine site. The security shack will be used primarily at times when the mine is not in production. Security may be provided to protect the public from hazards associated with a mine site and to protect company property from unauthorized use. The security shack will be approximately 10' by 20' by 8'` and will be of prefab construction and will rest on a 4" concrete slab.

Mine Substation

The mine substation will be located as shown on Plate 5-2 will proved power to surface and underground areas of the mine property. The substation will comprise of approximately four transformers setting on a concrete pad approximately 20' by 20' by 12" and fully fenced. The total area of the substation is approximately 40' by 40'. Power will be fed into the transformers at 46 KVA and will be transformed down to usage voltages for both the surface and underground facilities. It is anticipated that voltages of 110, 220, 440 will be used on the surface and 12,470 volts will be utilized underground. The mine substation will be constructed in a way to fulfill all appropriate MSHA regulations.

Underground Power Lines

Within the disturbed area both surface and underground power lines will be utilized. Underground lines will be run where feasible. As builds will be provided. Underground Power Lines will be left in place upon reclamation.

Water Treatment Plant

The water treatment plant is located on the north-east side of the surface facility area. The plant will rest on a 15' by 15' slab. Process water will flow through the treatment plant at which time it will be treated and made suitable for potable water uses. The potable water will be stored in the potable water tank until it is used. The location of the water treatment plant can be found on Plate 5-2.

Potable Water Tank

Water treated by the water treatment plant and intended to be used as potable water will be stored in this 15' diameter by 20' high tank. The tank will set on a 15' by 15' concrete pad designed for adequate support of the tank. The location of the potable water tank can be found on Plate 5-2.

Process Water Tank

Process water, water to be used for mine use or to be treated for potable use, will be stored in this tank. The 15' diameter by 20' high process water tank will rest on a 15' by 15' concrete pad. Process water tank will be filled by using mine discharge water or may be hauled in from off site. The location of the process water tank can be found on Plate 5-2.

Sewer Tank

The sewer tank has been designed to facilitate 200 employees working on rotating shifts. The sewer tank will be located under the south end of the office and bathhouse parking area. The location of the sewer tank can be found on Plate 5-2. The design for the Sewer Tank can be found in Appendix 5-4.

Drain Field

The drain field has been designed to facilitate 200 employees working on rotating shifts The drain field will be located at a lower elevation and south of the sewer tank. The location of the drain field can be found on Plate 5-2. The design for the drain field can be found in Appendix 5-4.

Ventilation Fan

~~The v~~Ventilation fans will be located on #0 Portal and on the Northern Breakouts. The ventilation fan will be accessed and installed from inside the mine. The need for surface access is not anticipated at this time. A concrete pad will be poured as a permanent support for the north fan. The highwall and approximately 40 feet of slope above the north breakout ledge will be chain-linked and shot-creted for stability. Prior to installing the chainlink fence, all trees will be cut off, and the vegetation material will be removed off the area and properly disposed. The location of the portal and fan is shown on Plate 5-2.

60-inch Conveyor from tunnels to Coal Stockpile(Main Conveyor)

The Run of Mine underground belt will provide for a means for coal to be conveyed from the working faces to the run of mine coal storage pile on the surface. The belt will provide capacity to convey to the surface, all coal mined in the underground workings. Preliminary design suggests that the conveyor that extends from the bottom of the rock slopes to the stacking tube at the coal storage area, shown on Plates 5-2 and 5-8, will have the following specifications: 60" wide, speed approximately 700 fpm with a length of approximately 810 feet long. Since the ground beneath the conveyor will not be disturbed due to the steepness and remoteness of the area, this conveyor will be completely contained within a tube type structure.

(ROM) Underground Belt from Stockpile to Crusher/ Screen

The Reclaim conveyor will provide for a means for coal to be conveyed from the coal stockpile to the crusher. The belt will provide capacity to convey to the screen and crusher at a suitable rate for crushing and screening. Preliminary design suggests that the reclaim conveyor, shown on Plates 5-2 and 5-8, will have the following specifications: 60" wide, speed approximately 700 fpm with a length of approximately 670 feet long. The portions of the conveyor running on the surface will be covered.

60-inch Conveyor from Crusher to Loadout Bin

The Loadout conveyor will provide for a means for coal to be conveyed from the crusher to the loadout bin. The belt will provide capacity to convey to the loadout at the same rate as the Reclaim conveyor. Preliminary design suggests that the Loadout conveyor, shown on Plates 5-2 and 5-8, will have the following specifications: 60" wide, speed approximately 500 fpm with a length of approximately 230 feet long. The portions of the conveyor running on the surface will be covered.

Drop from Loadout Bin to Truck Loadout

Coal will be dropped from the loadout bin to the trucks being loaded. The drop rate will provide capacity to the trucks at a rate suitable for truck loading.

Reclaim Tunnel, Escape Tunnel, Fans

Design for the escape and reclaim tunnels is not complete. Standard practice is to construct the tunnels from either concrete or corrugated metal. The reclaim tunnel is approximately 350' long with a 14' diameter. The escape tunnel will be approximately 300' long with a diameter of 4'. Appropriate safety and environmental concerns will be addressed upon detailed design. The preliminary layout is shown on Plates 5-2 and 5-8.

ROM Storage Pile

The run of mine storage pile receives coal directly from the underground works and provides storage for the coal until it is crushed and loaded into trucks for transportation to a unit train loadout. The coal from the underground run of mine belt will be dropped into a stacking tube located in the center of the run of mine storage pile. This tube will help reduce any fugitive dust. The stacking tube will be approximately 80' high and will allow for approximately 200,000 tons of open storage in the run of mine storage pile. A 30 ton rock dust bin will be located in this area. The run of mine storage pile is shown on Plates 5-2 and 5-8.

Crusher

The enclosed crusher will crush coal from the 8" minus down to a 2" minus size, at the rate of approximately 1000 tons per hour. The coal will be first screened then the oversized will be crushed. Crushed coal will be stored temporarily in a 500 ton storage bin located above the truck loadout. The crusher and screen locations are shown in Plates 5-2 and 5-8.

Truck Scale and Loadout

Coal will be reclaimed from the coal storage bin, weighed and then loaded into coal haul trucks for transportation to the various unit train loadouts. A small loadout shack will be constructed to provide cover and protection for the various equipment and controls need for the coal loading process. The truck scale and loadout are shown on Plates 5-2 and 5-8.

Coal Storage Bin

The coal storage bin is part of the truck loadout and is shown of Plate 5-2. The coal storage bin is where crushed coal is stored waiting to be loaded into coal haul trucks. The bin provides for surge capacity and allows for better control of crushing time. The coal storage bin provides for a enclosed dry location for temporary crushed coal storage. Coal is delivered from the crusher to the coal storage bin by use of a 60" covered surface conveyor running at a speed of approximately 700 FPM. The preliminary layout is shown on Plates 5-2 and 5-8.

Coal Stacking Tube.

The final design for the coal stacking tube is not yet complete. Preliminary design indicates that the stacking tube will be approximately 15' Diameter and approximately 80 feet high. Standard practice is to construct the tube of either concrete or steel. The preliminary layout is shown on Plates 5-2 and 5-8.

Culverts

A complete list and design for the culverts can be found in Appendix 7-4, Tables ~~9 and~~6 through 10~~,~~; and are shown on Plate 7-2. A summary of the culverts follows:

Culvert	Length	Size
DC-1	60'	18"
DC-2	60'	18"
DC-3	~~65'~~70'	18"
DC-4	27~~0~~4'	24"
DC-5	250'	24"
DC-6	107'	24"
DC-7	155'	24"
DC-8	16~~7~~8'	24"
DC-9	186'	24"
DC-10	60'	24"
DC-11	35'	24"
DC-12a	14~~0~~1'	30"
DC-12b	7~~9~~6'	~~24~~30"
DC-12c	35~~7~~4'	~~24~~30"
DC-12d	9'	30"
DC-13~~- 45'~~	60'	~~24~~18"
DC-14	25'	~~24~~18"
S~~P~~p2-1	165'	~~24~~18"
UC-1	480'	60"

Guard Rails

Approximately 1,520 feet of Guard rails will be installed on the mine access road according to the detailed engineering plan being prepared. Appropriate MSHA and UDOT requirements will be taken into consideration.

Underground Pipes

Locations of the underground pipes have yet to be determined. Once detailed engineering design is completed the underground pipes will be added to Plate 5-2 or other appropriate Plates. Under ground pipes will be left in place upon reclamation.

Chain Link Fence

Approximately 1,500' of a six foot high chain link fence will be constructed as shown on Plate 5-2. The fence will be constructed to protect the public, and proved security along the section of county road that runs adjacent to the property.

Non-Coal Waste Area

An area for non-coal waste has been identified on Plate 5-2. Non-coal waste such as papers, timbers, cans, and miscellaneous scrap that is brought to the surface will be disposed of in a metal bin or "dumpster" located in the non-coal waste area identified on Plate 5-2. Metal will be separated from other forms of trash for salvage. Material not salvageable will be transported to the East Carbon Development Corporation (ECDC) dump or other approved disposal site for permanent disposal. Once a dumpster has reached capacity, the full dumpster will be replaced with an empty dumpster, and then the full dumpster will be hauled by a contract hauler to the specified disposal site.

Equipment & Supplies Storage Area

The equipment and supply storage area is approximately 350' by 400'. This storage area will be used to store mine supplies and equipment from the time of delivery until they are needed underground. Supplies such as timbers, bolts, plates, rock-dust, pipes, resin, screens, concrete blocks, steel, cables, and numerous other materials may be stored in this area. Equipment both new and used will be stored in this area. Many various longwall pieces such as shields, pan-lines, shears, chains, head and or tail drives, transformers, belt drives, pumps and numerous other material will be stored in this storage area. This secure area provides for a good storage area for diesel, gasoline, hydraulic, and roadway chemicals. All oil tanks will have appropriately designed berms or retaining walls. The equipment and supplies storage area is shown on Plate 5-2. Any explosives will be stored here according to appropriate MSHA regulations.

Topsoil Pile

The topsoil pile has been located on the south west end of the surface facilities. The pile has been designed to contain adequate topsoil for redistribution according to the reclamation plan found in Chapter 5. The proposed location provides for good protection from wind contamination as well as protection from mine related activities. The location of the topsoil pile is shown on Plate 5-2.

Mine Development Waste Pile

A temporary mine development waste area has been designed to provide a location for the storage of underground development waste that is brought to the surface. Any underground development waste, other than rock slope material, will be placed in the temporary pile then blended back into the coal stream for sale. The rock slope material will be used as fill as per Appendix 5-7. The capacity of the temporary pile will only be a few hundred tons. The area for the rock slope material is shown on Plate 5-2.

Sediment Pond

The sediment pond has been design to provide for adequate sediment protection for the project area. All water running off the disturbed area will be routed into the sediment pond for treatment. The sediment pond has been designed according to the appropriate R645 regulations and the designs can be found in Appendix 7-4 and Plate 7-6. Because the sediment pond does not fit into the requirement of 30 CFR 77.216(a) an MSHA number for the proposed pond is not required. The sediment pond is located on the south-west end of the property and shown on Plate 5-2.

Slope Access / Portal Access Road

The slope access road splits off the facility access road near the north-east corner of the equipment and supply storage area, and follows an alignment that takes into consideration grade and direct access. The slope access road will be used to provide access to the rock slopes which in-turn proved access to the underground workings. The slope access road will be used as access for all men, material and equipment need in the mine. Since the slope access road provides for frequent access for men, equipment and materials for a period of six months or longer the slope access road is classified as a primary road and will be paved. The slope access road will be designed, constructed, and maintained according to appropriate R645 regulations. The slope access road is shown on Plate 5-2.

Rock Slopes

Access to the underground workings of the Lila Canyon Mine will be provide by two rock slopes driven from the top of the Mancos shale up-dip to the intersection of the coal seam. One portal will proved for access for men, equipment and material to the mine. The second access slope will contain the run of mine belt line from the underground workings of the mine to the run of mine stock pile. There is a possibility that only one larger slope will be driven and then divided. to provide for two separate entries. The two 1,227 foot long slopes will slope up at approximately 12%, from a starting elevation of approximately 6150'. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation. The length of the slopes were minimized by taking advantage of the coal seam dip which is approximately 12% to the east. The rock material removed from the slopes will be used as fill material for the surface facilities. The rock slope material / underground development waste will contain mostly shale, sandstone and mudstone. Traces of coal may be found but the amount will be insignificant. There are no known coal seams or significant rider seams found below the Sunnyside Seam in the Lila Canyon Portal Area. The rock slope locations are shown on Plate 5-2.

Mine Facilities Road / Truck Loadout Road

The mine facility road shown on Plate 5-2 begins at the edge of County Road 164 and allows for access to the various surface facilities. The road has been located in the most practical location taking into consideration grade, stability, and alignment. Employees will use this road to access the office &

bathhouse facilities. Coal haul trucks will use this road to access the scales and truck loadout. All supplies will be hauled on a short portion of this road from the supply storage area to the slope access road. The road will be paved during construction of the facilities and before coal ming operations begin in order to to minimize dust and provide good surface for heavy truck traffic as well as facility access. The facility access road will be approximately 24' wide to provide for two lane traffic and will have the appropriate drainage controls to insure long term life and low maintenance. The has been constructed and will be maintained according to the appropriate R645-534 and R645-527 regulations.

Office/Bathhouse/Visitor Parking Area

Parking will be as shown on Plate 5-2. Parking facilities for office, mine, and warehouse employees will be provided jointly as shown. This area will also provide parking for all vendors, and visitors. The surface of the 220' by 350' area will be paved. The parking area is located and designed to allow for convenient and safe parking of personal vehicles. The sewer tank and drain field will be located on the north end of this parking area.

Mine Parking

A mine parking area will be provided as shown on Plate 5-2. The mine parking area is where all mine and mine related mobile equipment will be parked when on the surface. This is the location where the underground work crews will be loaded into man trips for transportation to the various work areas. The mine parking area will be paved. The mine parking area will be approximately 70' by 220'.

Fuel Tanks

Fuel tanks will be located in the Equipment & Supplies Storage Area and be installed as discussed under Equipment & Supplies Storage Area. A 1,500 gallon diesel tank, 500 gallon hydraulic tank and a 500 gallon gasoline tank will be needed.

Powder and Cap Magazines

Powder and cap magazines will be mobile temporary, and supplied by the explosive distributer. Upon reclamation the powder and cap magazines will be returned to the distributer.

As per the approved Air Quality Order all roads will be paved and the pad areas used by mobile equipment will be treated with water or dust suppressant, open stockpiles will be watered as conditions warrant.

521. Included in this section are maps, cross sections, narratives, descriptions and calculations used to satisfy the relevant requirements. This section describes and identifies the lands subject to coal mining and reclamation operations covering the estimated life of the project.

521.100 This application includes the cross sections, maps and plans needed to present the relevant information required by the Division. This information includes the following:

521.110. Plate 5-1 Shows area previously mined and approximate dates of mining.

521.111 Plate 5-1 of part ‘B” and 2-2 of part “A” shows the location and extent of known workings of inactive, or abandoned underground mines. The surface portals or mine openings to the surface are shown. Plates 5-1 and 2-2 of part “A” have been prepared and certified by or under the direction of a registered professional engineer.

Doelling lists several coal mines and mining activity in within or adjacent to the permit area. Doelling lists the Calkins prospect, the Lila Canyon prospect, and the Prentiss prospect. In addition Doellng lists several coal mines Prentiss, Utah Blue Diamond, Blue Diamond and Heiner Mines. The research has shown that the Prentiss, Utah Blue Diamond, Blue Diamond and Heiner Mines were engulfed by the Book Cliffs mine. The Lila Canyon prospect refers to the old Lila Canyon mine fan portals used to ventilate the Geneva (Horse Canyon mine. The Calkins prospect is believed to have been engulfed by the Geneva mine.

An outcrop fire has been detected in an area north of the exiting permit area “A”. The fire is off the permit area and located in an area that has been sealed from the old horse canyon works.

The outcrop fire is not anticipated to cause any problems with mining at the Lila Canyon Mine.

521.112 No surface mined areas are found within the permit area. Therefore, this section does not apply.

521.120 Three existing structures, a 48" and a 60" CMP culvert located near the new proposed sediment pond, and the Little Park Road can be found at the Lila Canyon Mine. The existing culverts are shown on plate 5-1A and the road on Plate 5-1. Existing Horse Canyon facilities are discussed in part “A” of this plan.

521.121 There are no buildings within 1000 feet of the proposed permit area for the Lila Canyon Mine, Part “B”.

521.122 There are no subsurface man-made features, other than the culverts discussed in 521.200, within, passing through, or passing over the proposed permit area for Part “B”.

521.123 Plate 4-1, as well as others, shows the existing county road 126 which is located partly within 100 feet of the proposed permit area. In Addition, the Little Park road is located above the surface facilities within the permit area. The Little Park road is also shown on plate 4-1

521.124 There are no known existing areas of spoil, waste, coal development waste, or non-coal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities within part “B” of the proposed permit area. This section is not Applicable.

521.125 There are no existing sedimentation ponds, permanent water impoundment, coal processing waste banks or coal processing waste dams near or within the permit area.

521.130 Landowner and right of entry maps are included in the permit application. These maps and cross sections show the following:

521.131 Plate 4-1 shows the surface ownership and Plate 5-4 shows the coal ownership of land included in or contiguous to the permit area.

521.132 The applicant has the legal right to enter and begin coal mining and reclamation operations on all areas shown within the permit area. The permit area is shown on Plates 5-3 and 5-4 as well as others.

521.133 Coal mining or reclamation operations are planned within 100 feet of a public road. There are no plans to relocate public roads.

521.133.1 Emery County has given permission to conduct coal mining or reclamation operations within 100 feet of the county road. (See Appendix 1-4)

521.133.2 The current permit does not propose any relocation of public roads. Therefore, this section is not applicable.

521.140 Mine maps and permit area maps and or cross-sections will clearly indicate the following:

521.141 Plate 5-1 shows the permit boundary and Plate 5-2 shows the disturbed area boundary. Additional subareas that might require additional permits are addressed in Section 112.800 and 4-1B.

521.142 The underground workings are shown on Plate 5-5.

521.143 The proposed disposal site for placing the slope rock is shown on Plate 5-2 as well as other appropriate plates.

521.150 Plates 6-2, 6-3, and 6-4, show surface contours that represent the existing land surface configuration of the proposed permit area.

521.151 The Plates show the surface contours for all areas to be disturbed as well as over the total permit area. The Plates showing the surface contours has been prepared by or under the supervision of a registered engineer.

521.152 No previously mined areas are included within Part "B". Therefore this section does not apply.

521.160 The maps, plates, and cross sections associated with this chapter clearly show:

521.161 Proposed buildings, utility corridors, and facilities are shown on Plate 5-2 as well as others.

521.162 Area of land affected according to the sequence of mining and reclamation is shown on the appropriate plates.

521.163 Land for which a performance bond will be posted is shown on the appropriate plate. Plate 5-2 as well as others show the area for which the performance bond will be posted. All disturbed areas within the permit boundary has been bonded.

521.164 Coal storage and loading areas are shown on Plate 5-2 and certified as required. Additional information can be found in Appendix 5-4.

521.165 Topsoil, and waste piles are shown on Plate 5-2 as well as others.

521.166 The waste disposal areas are shown for non-coal waste and underground mine waste on Plate 5-2.

521.167 No explosives are expected to be stored on site. However, if explosives are stored they will be stored as discussed in Section 520. on Plate 5-2.

521.168 Since Lila Canyon mine is an underground operation this paragraph is not applicable.

521.169 The refuse pile is shown on Plate 5-2 and discussed in Appendix 5-7.

521.170 Transportation facility maps describing roads, and conveyor maintained within the permit is shown with descriptions of roads, embankments, culverts, and drainage structures are presented in section 520 and are shown on Plates 5-2, and 7-2.

521.180 Support facilities are described in section 520 and are shown on Plate 5-2. Plate 5-2 is the official disturbed area boundary map.

521.190 Other relevant information required by the Division will be addressed.

521.200 Signs and markers will:

521.210 Signs and markers will be posted maintained, and removed by the person who conducts the coal mining and reclamation operations.

521.220 Signs and markers will be of uniform design that can be easily seen and read and be made of durable material and conform to local laws and regulations.

521.230 Signs and marker will be maintained during all activities to which they pertain.

521.240 Mine and Permit Identification Signs.

521.241 Mine and permit identification signs will be displayed at each point of access from public roads to areas of surface operations and facilities on permit areas.

521.242 Since Lila Canyon Mine is an underground operation, this section is not applicable.

521.243 Mine and permit identification signs where required, will show the name, business address, and telephone number of the permittee and the identification number of the permanent program permit authorizing coal mining and reclamation operations.

521.244 Mine and permit identification signs will be retained and maintained until after the release of all bonds for the permit area.

521.250 Perimeter Markers

521.251 The perimeter of all areas affected by surface operations or facilities before beginning mining activities will be clearly marked with perimeter markers.

521.252 Since Lila Canyon Mine is an underground operation this section is not applicable.

521.260 Buffer Zone Markers

521.261 Signs will be erected to mark buffer zones as required and will be clearly marked to prevent disturbance by surface operations and facilities.

521.262 Since Lila Canyon Mine is an underground operation this section is not applicable.

521.270 Topsoil Markers. Markers will be erected to mark where topsoil or other vegetation-supporting material is physically segregated and stockpiled.

522. Coal Recovery

Additional Details can be found in the R2P2 on file at the BLM Office.

Effective barrier and pillar designs are essential for safe and productive underground mining. Barrier pillars will be sized according to accepted engineering practices. One or more of the following methods may be used to properly size barrier pillars: Dunn's Rule, the Old English Barrier Pillar Law, Pennsylvania Mine Inspector's Formula, Ash and Eaton Impoundment Formula, Pressure Arch Method, British Coal Rule of Thumb, North American Method, Holland Rule of Thumb, or Holland Convergent Method.

Regardless of the methods or care taken to properly size barrier pillars the true effectiveness on any design can only be determined by conducting full-scale in-mine performance evaluations. Mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

Barrier pillars will be utilized to isolate the abandoned Horse Canyon Mine from the new Lila Canyon Mine. Barrier pillars will also be used to simplify ventilation, to provide independent escape routes and to possibly retain large quantities of mine water. Barrier pillars will be employed along the outcrop in order to maintain ventilation courses.

A barrier pillar where no second mining will be allowed within the barrier will be used to protect the escarpments. The width of the escarpment barrier will be determined by implementing a 21.5^{o} angle of draw project downward from the surface to the coal seam. Development mining or first mining will be allowed within the escarpment barrier.

For longwall mining applications the abutment loading is of prime importance. Initial longwall pillars will be designed using the ALPS method. Again mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

Mine pillars will be sized taking into consideration the coal strength, depth of cover, width and height of pillars using one or more of the following methodologies: Obert-Duvall, Holand-Graddy, Holland, Salamon-Munro, or Bieniawski. Again mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

523. Mining Methods:

Mining will begin in Section 15, T16S, R14E, in the Sunnyside seam. Development of the Sunnyside seam will be in a down dip direction toward the east. The seam will be accessed by two 1,200 foot slopes driven up at 12% from the base of the cliffs.

Production during the first year is estimated to be 200,000 tons, the second through the fifth year production should be between 1,000,000 and 1,500,000 using continuous mining methods. If and when tonnage demand increases to justify longwall mining, production could peak as high as 4,500,000 tons a year and continue at that level for the life of the mine.

Mine production will begin with the slope construction. Once the coal is encountered development will continue using continuous miners and various haulage types. Battery, cable, or continuous haulage may be used in conjunction with continuous miners in development. Continuous miners will account for all the production during the first two to five years. Mining will consist of driving mains, developing room and pillar panels and gate entries for future longwall mining.

The majority of the second mining will be performed using longwall equipment. However, in isolated areas room and pillar type of mining may be used in areas not suitable for longwall mining. Longwall panels are sited approximately parallel lengthwise to the strike with a slight up dip orientation to provide drainage for the development faces. This practice will be applied to the continuous miner panels wherever possible. (See plate 5-5)

Roof control and ventilation plans will be submitted to MSHA and approved prior to any underground mining activities.

An air quality permit from the State Division of Air Quality has been obtained and will be modified as needed.

Ventilation of the mine will be by an exhaust and or blowing type system. It has been estimated that 900,000 cfm will be required at full production. Intake air will be supplied by slopes and entries from the surface.

A water supply system will be installed. Potable water from an approved source will be hauled by truck and stored in a mine site storage tank located near the man and coal slope portals. Alternative sources for potable water are being considered. A treatment plant may be indicated. Process water will be hauled from the Price River or other approved source by truck and stored in another mine site storage tank. It is anticipated that once the old two entry development panel is encountered that adequate process water may be obtained from the old works. This process water will provide for dust control, water to the mine and fire suppression. Mine water will be used with the process water. See Appendix 7-3 (PHC) for water usage calculations.

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

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

Underground mining equipment to be used at Lila Canyon is typical of most room-and-pillar and longwall mine. A list of major equipment which may be used underground is listed below additional equipment not on the list may be used as needed.

Continuous Miners
Roof Bolters
Battery Shuttle Cars
Electric Shuttle Cars
Diesel Ram Cars
Feeder Breakers
Continuous Haulage Units
Battery Scoops
Diesel Scoops
Diesel Service Vehicles
Diesel Material Haulers
Diesel
Belts and Terminal Groups
Battery and Diesel Man Trips
Longwall Shields
Longwall Pan-lines
Longwall Shears
Longwall Stage-loaders
Longwall Pumps
Various Water Pumps
Various Transformers and Switches
Rock Drills
Loaders

523.100 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine, therefore this section is not applicable.

523.200 No Surface Coal Mining and Reclamation Activities are proposed with 500 feet of an underground mine, therefore this section is not applicable.

523.210 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine, therefore this section is not applicable.

523.220 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine, therefore this section is not applicable.

524. Blasting and Explosives: Surface blasting activities incident to underground coal mining is planned for the Lila Canyon mine during construction of the access slopes only.

524.100 Steps have been taken to achieve compliance with the blaster certification program and is described in this permit application.

524.110 Surface blasting involving 5 lbs of explosives or more will be conducted under the direction of a certified blaster.

524.120 Blasting certificates will be carried by the blasters or will be on file at the permit area during blasting operations.

524.130 The blaster and at least one other person will be present at the firing of a blast.

524.140 Persons responsible for blasting operations at a blasting site will be familiar with the blasting plan, if required, and site-specific performance standards and give on-the-job training to persons who are not certified and who are assigned to the blasting crew or assist in the use of explosives.

524.200 Since the planned blasting does not meet the requirements of 524.211 or 524.212 a blast design is not included in the permit application. If in the future blasting falls under section 524.200 then a plan will be submitted to Division for approval.

524.210 Since the planned blasting does not meet the requirements of 524.211 or 524.212 anticipated blast designs are not required.

524.300 Since planned blasting requires more than 5 lbs of explosives the preblasting survey is addressed where applicable in this permit application.

524.310 There are no dwellings or other structures located within one-half mile of the permit area owned by anyone but the operator. The operator will prepare the preblast survey if required. Notification procedures implied in this section are not applicable.

524.320 Since the operator is the only owner of structures and no dwelling exist within one-half mile of any part of the permit area this section is not applicable.

524.330 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.340 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.350 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.400 The blast schedule is as follows:

524.410 Since there are no residents within one-half mile of the projected blasting site this section does not apply.

524.420 All surface blasting will be conducted between sunrise and sunset unless nighttime blasting is approved by the Division.

524.430 Since there are no residents within one-half mile of the projected blasting site this section does not apply.

524.440 Since there are no residents within one-half mile of the projected blasting site a flexible blasting schedule is allowable. Surface blasting may take place anytime during daylight hours, unless approved differently by the Division.

524.450 Because of the remote location of the Lila Canyon Mine, over six miles from the nearest locality (Columbia), this section does not apply.

524.460 Since the town of Columbia is the nearest locality, and is over six miles distance from the permit area, this section does not apply.

524.500 The blasting signs, warnings and access control is described below.

524.510 Blasting signs will meet the specifications of R645-301-521.200. The following will apply.

524.511 Signs reading "Blasting Area" will be conspicuously place at the point where any road provides access to the blasting area.

524.512 The signs posted at all entrances to the permit area from public, roads, or highways will be placed in a conspicuous location and will state "Warning! Explosives in Use" and will clearly list and describe the meaning of the audible blast warning and all clear signals that are in use.

524.520 Audible warning and all-clear signals of different character or pattern will be given. Each person within the permit area will be trained in the meaning of the signals.

524.530 Access within the blasting area will be controlled until an authorized until the operator has reasonably determined the following:

524.531 No unusual hazards, such as imminent slides or undetonated charges, exist; and

524.532 Access to and travel within the blasting area can be safely resumed.

524.600 Adverse blasting effects are described as follows:

524.610 Blasting will be conducted to prevent injury to persons, damage to public or private property outside the permit area, adverse impacts on any underground mine, and change in the course, channel, or availably of surface or ground water outside the permit area.

524.620 Airblast Limits

524.621 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.622 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.630 Monitoring: Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.640 Ground Vibration: Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance form the permit area, this section does not apply.

524.650 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.660 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.670 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.680 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.690 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, sections 524.620 through 524.632 and 524.640 through 524.680 do not apply.

524.700 Records of blasting operations will be maintained at the mine site for at least three years and will be available for inspection by the Division or the public. Blasting records will contain the following information.

524.710 Blasting records will include.

524.711 The name of the operator will be on the blasting record.

524.712 The location, date, and time of the blast will be recorded on the blasting record.

524.713 The name, signature, and certification number of the blaster will be recorded on the blasting record.

524.720 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.730 Weather conditions will be recorded on the blasting record.

524.740 A record of the blast will include the following:

524.741 The type of material blasted will be recorded on the blasting record.

524.742 Sketches of the blast pattern including number of holes, spacing, burden, decks, and delay pattern will be recorded on the blasting record.

524.743 The diameter and depth of holes will be recorded on the blasting record.

524.744 The type of explosives used will be recorded on the blasting record.

524.745 The total weight of the explosives used per hole will be recorded on the blasting record.

524.746 The maximum weight of explosives detonated in an eight-millisecond period will be recorded on the blasting record.

524.747 Information on the initiation system will be recorded on the blasting record.

524.748 The type and length of the stemming will be recorded on the blasting record.

524.749 Mats or other protections used will be recorded on the blasting record.

524.750 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area a record of seismographic and airblast information is not required.

524.760 Since a blasting schedule is not required this section does not apply.

524.800 The operator will comply with the various appropriate State and Federal laws and regulations in the use of explosives.

525. Subsidence: The permittee will comply with the appropriate R645-301-525 requirements.

525.100 Subsidence Control Plan

525.110 Plate 5-3 shows the location of State appropriated water and 5-3 (Confidential) shows the eagle nests that potentially could be diminished or interrupted by subsidence.

525.120 SUBSIDENCE POTENTIAL (See also Section 5.4 of Part "A")

A review of renewable resources in and adjacent to the permit area found resources consisting of ground water, grazing, timber, and recharge areas. Subsidence from underground coal mines has been believed to affect overlying forest and grazing resource lands in the following ways:

- Formation of surface fissures which intercept near surface soil moisture thus draining the water away from the root zone with deleterious effects.
- Alterations in ground slope and destabilization of critical slopes and cliffs.
- Modification of surface hydrology due to the general downward migration of surface water through vertical fractures.
- Modification of groundwater hydrology including connection of previously separated aquifers, reduction in flows of seeps and springs which rely upon tight aquitards for their flow, and changes in recharge mechanisms.
- Emissions of methane originating from the coal seam through open fissures to the surface or at least the base of the surficial soil which has been known to have deleterious effects on woody plants.

Because these renewable resources exist with and adjacent to the permit area, a subsidence control plan is required. This plan is presented in Section 525.400.

A great deal of baseline data is available from many mining settings to develop subsidence damage criteria for surface structures (Bhattacharya et al. 1984). The formation of cracks and fissures are the general effects of subsidence and can have minor deleterious effects on groundwater resources without any fissuring to the surface. In the arid areas of Utah, impacts to and modification of the groundwater regime can be disruption of flow from natural seeps and springs which rely on the permeability contrast of interbedded sandstones and shale for their flows. These water resources are generally near surface occurrences and are essentially surface waters and subject to the same limiting damage criteria as surface water bodies. Subsidence damage to surface water bodies has been studied by a number of workers including Dunrud (1976), Wardell and Partners (1976), and U.S. Bureau of Mines (1977).

The results of the Wardell and Partners studies of subsidence effects in a number of countries indicates that the limiting strain for the onset of minor impacts to surface waters is approximately 5 x 10^{-3}. The SME Mining Engineering Handbook also suggests a limiting extension strain value of 5 x 10^{-3} for pasture, woodland, range or wildlife food and cover.

Table 10.6.19 in the Mining Engineers Handbook suggests that the minimum safe cover required for total extraction of the coal resources under surface waters is approximately 60 times the seam thickness for coal beds at least 6 feet thick or approximately 450 feet. In their review of the foregoing, Singh and Bhattacharya (1984) recommended that the same limiting safe strain values and cover thickness ratios be used for protecting groundwater resources and recharge areas over coal mines. Where extension strain is greater than this limiting value, it is likely that surface fissures and cracks may develop. As the strain value decreases below the limiting value, the potential for surface damage decreases.

Figure 1 in Appendix 7-3 shows a typical subsidence profile. As shown in Figure 1, the zones are: a caved zone that occurs in the 6 to 10 times the thickness of the coal seam, a fractured zone which occurs 10 to 30 times the thickness of the coal seam, and deformation zone which occurs 30 to 60 times the thickness of the coal seam, and finally, a soil zone which occurs on the ground surface. The cover thickness of 1,000 to over 2,000 feet, over most of the mine area is also much greater than the limiting thickness of 630 feet recommended by International Engineers Inc. (1979) (10.5' x 60).

The Lila Canyon mine will be a longwall operation. As projected, 15 longwall panels at various depths will be mined. The longwall panels are laid out with the gate roads running along the strike roughly north-south, which will result in the longwall shear cutting up and down the dip. The depth of cover over the longwall panels approaches but never gets less than 500 feet toward the southwest and increases to over 2500 feet in the northeast. Only three of the 13 planned longwall panels are under less than 1,000 feet of cover. The remaining 10 panels are under 1,000 plus feet of cover. Maximum subsidence is expected to be approximately 9.5 feet in the areas approaching 500 feet of cover and less than 3' in the deeper cover areas. Extension strain varies from 12.4 x10^{-}3 in the 500 foot cover areas to .9 x 10^{-}3 in the 2,500 foot cover areas. Extension strain values of 5.0 x 10^{-}3 and above occurs in areas of approximately 1000' of cover and less.

A typical longwall panel at the Lila Canyon Mine will have dimensions of approximately 950 feet wide and up to 7,000 feet long and 2,000 feet deep. Using the methods described in the National Coal Board's *Subsidence Engineers' Handbook,* the S/m ratio for this geometry would be 0.38 where "S" is the maximum subsidence and "m" is the seam extraction thickness. For an average seam extraction thickness of 10.5 feet, the total subsidence would be 4.0 feet. However, as described above, the major impacts of this subsidence are due to extension strains and not total vertical subsidence. The prediction of average extension strain is accomplished with the use of the formula:

+E = 0.75 S/h where S=subsidence, and h=depth of cover

NOTE: The .75 factor is only an average. The factor changes with various w/h ratios. Figure 15 found in NCB's Subsidence Engineers Handbook takes into account the w/h ratio.

The solution of this equation for the Lila Canyon Mine configuration discussed above produces a predicted, average extension strain of 1.5 x 10^{-3} which is less than the limiting strain of 5 x 10^{-3} for protecting surface waters, groundwater sources, pasture, woodland, range or wildlife food and cover. Thus, it is unlikely that the gradual compression expected over much of the subsidence area will have any deleterious effects on the overlying renewable surface resources.

The table below shows the expected subsidence amount and expected extension strain for longwall panels at various mining depths. These calculations were done for a flat multiple seam mining. There are adjustments for single seam mining and for dipping seams. However, these adjustments are minor and are not expected to result in significant changes in values.

Maximum Subsidence & Expected Extensive Strain (NCB 1975)

	Feet	Meters
Panel Width =	900	274
Seam Height =	10.5	3

Depth of Cover		Width to Depth (a)	Maximum Subsidence(S)		Factor NCB Fig. 15	Extension Strain (E)
Feet	Meters	Ratio	Feet	Meters	Factor	x 10^{-3}
500	152	0.9	9.5	2.9	.65	12.4
1000	305	0.75	7.9	2.4	.66	5.2
1100	335	0.71	7.5	2.3	.68	4.6
1200	366	0.68	7.1	2.2	.70	4.1
1300	396	0.65	6.8	2.1	.70	3.7
1400	427	0.59	6.2	1.9	.75	3.3
1500	457	0.54	5.7	1.7	.78	3.0
2000	610	0.38	4.0	1.2	.82	1.6
2500	762	0.28	2.9	0.9	.80	0.9

The most favored technique until recently has been the use of the empirical charts developed by the National Coal Board (NCB). The above calculations were obtained using the empirical charts developed by the National Coal Board (NCB). Comparisons, as stated in the SME handbook, of US subsidence data with NCB predictions highlight the following differences between coalfields in the US and UK: Most of the studies in the US are limited to the Eastern US coalfields with a very limited data base applicable to western conditions.

With the exception of Illinois, maximum subsidence factors observed in US coalfields are less than predicted by NCB.

The limit (draw angles in the US coalfields tend to be less then the 35 degree value generally accepted by NCB.

The points of inflection of the subsidence profiles over US coal mines are generally closer to the panel centerline compared to the NCB profile. This effect is dependent not only on the percentage of competent strata in the overburden but also on their locations relative to the ground surface and their thickness.

Surface strains and curvatures observed over US longwall panels have been shown to be significantly higher then NCB predictions, almost four times larger in many cases.

The pace at which subsidence occurs depends on many controls including the type and speed of coal extraction, the width, length and thickness of the coal removed, and the strength and thickness of the overburden. Observations of subsidence by Dunrud over the Geneva and Somerset Mines indicate that subsidence effects on the surface occurred within months after mining was completed, and the maximum subsidence was essentially completed within 2 years of the completion of retreat mining.

Dr. Roy Sidle found in his study of Burnout Creek that subsidence impacts to streams are temporary and self healing.

The Sidle Study is representative of the conditions found in the Lila area because:

• the lithology is very similar between the Book Cliffs and the Wasatch Plateau

• the cover thickness ranges from 600 - 800 feet which falls within the rage expected at Lila, and

•the seam thickness of 8-10 feet is in the same range expect at Lila.

An Executive Summary of his study and published findings follows:

Title : Stream response to subsidence from underground coal mining in central Utah

5. Authors: Sidle-RC Kamil-I Sharma-A Yamashita-S

Short-term geomorphic and hydrologic effects of subsidence induced by longwall mining under Burnout Creek, Utah were evaluated. During the year after longwall mining, 0.3-1.5 m of subsidence was measured near impacted reaches of the mountain stream channel. The major channel changes that occurred in a 700-m reach of Burnout Creek that was subsided from 1992 to 1993 were: extent glides; (2) increases in pool length, numbers and volumes;

(3) increases in median particle diameter of bed sediment in pools; and (4) some constriction in channel geometry. Most of the changes appeared short-lived, with channel recovery approaching pre-mining conditions by 1994. In a 300-m reach of the South Fork drainage that was subsided from 1993 to 1994, only channel constriction was observed, although any impacts on pool morphology may have been confounded by heavy grazing in the riparian reaches during the dry summer of 1994. Similar near-channel sedimentation and loss of pool volume between 1993 and 1994 were noted throughout Burnout Creek and in adjacent, unmined James Creek. Subsidence during the 3-year period had no effect on baseflows or near- channel landslides.

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

The coal seam is approximately 12.5 feet thick with only about 10.5 feet being extracted, and the depth of cover ranges from 0' to approximately 2,500'. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden, and depth of workings, even with full seam extraction, only minimal subsidence, if any, is anticipated.

Some surface expressions of tension cracks, fissures, or sink holes may be experienced but should be insignificant. The chances of subsidence-related damage to any perceived renewable resource is minimal.

All dirt roads above the mine are in areas in excess of 1,000 feet of cover or in areas where mining will not take place. The chance of subsidence negatively effecting these dirt roads is minimal. However, in the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence, the road will remain accessible by regrading and filling in the cracks, fissures or sinkholes.

The unnamed ephemeral channel in the southwest corner of the permit area is located in an area where no mining is planned or over the top of a bleeder system that will not be second mined. The chance of subsidence negatively effecting this ephemeral channel is minimal. However, in the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence the channel will be regraded and the cracks, fissures or sinkholes will be filled in by hand methods due to its inaccessibility.

A small portion of Little Park Wash, which is ephemeral, has less than 1,000 feet of cover in the southwest corner of the permit area. The portion with less than 1,000 feet of cover runs diagonally across one longwall panel and then parallel to the bleeder system in the second longwall panel. In the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence the channel will be regraded and cracks, fissures or sinkholes will be filled in. Since this stream channel is accessible and is traversable by 4 wheel drive, access for repairs would not be a problem. If any subsidence repairs cannot be fixed using hand methods, small earth moving equipment could be used.

DWR and BLM Wildlife Biologists, in consultation with the Division, have determined that any loss of snake dens to subsidence would be random and a minor impact to the population of snakes.

525.130 A survey was conducted within the proposed permit area and adjacent area and it was determined that limited renewable resource lands exist within the area surveyed. Limited areas were found which contribute to the long-range productivity of water supply or fiber products. No structures exist within the permit area in which subsidence, if it occurred, could cause material damage or diminution for reasonably foreseeable use. See Plates 5-5 and 5-3 for areas of potential subsidence. Identification and data for the State appropriated water supplies can be found in chapter 7 section 727.

All State Appropriated water rights within the maximum limit of subsidence that could be affected, are either owned by the Operator or by the BLM. The BLM has been notified of the water rights survey by means of the submittal of the permit application.

According to Mark Page (State Water Rights), there is not a water conversation district associated with Lila Canyon Mine.

525.200. Protected Areas

525.210. Since there are no public buildings or other facilities such as churches, school or hospitals, and since there are no impoundments with a storage capacity of more than 20 acre-feet, this section does not apply.

525.220. Since R645-301-525.210 does not apply, this section does not apply.

525.230. Since there are no planned operations under urbanized areas, cities, towns, and communities, or adjacent to industrial or commercial buildings, major impoundments, or perennial streams this section does not apply.

525.240. A detailed plan of the underground workings, including maps and descriptions of significant features of the underground mine, including the size, configuration, and approximate location of pillars and entries, extraction ratios, measures taken to prevent or minimize subsidence and related damage, and areas of full extraction can be found in the R^2P^2 on file with the BLM local and state offices.

525.300. Subsidence control.

525.310. Measures to prevent or minimize damage.

525.311 No attempt will be made to prevent subsidence in any area except where the escarpment near the outcrop is to be protected and to insure that subsidence remains within the permit area. The use of continuous miners in a pillar section as well as longwall technology provides for planning subsidence in a predictable and controlled manner. Some surface expressions of tension cracks, fissures, or sink holes may be experienced but should be insignificant. The chances of subsidence related damage to any perceived renewable resource is minimal. The value and foreseeable use of the surface lands will not be affected by potential subsidence.

525.312 Since there are no buildings or occupied residential dwellings or structures within the Lila Canyon project area this section does not apply.

525.313 Room-and-pillar mining in addition to longwall methods will be used at the Lila Canyon Mine.

525.400. Since state-appropriated water supplies exist on the surface, 525.400 has been addressed.

525.410 Coal will be removed using a combination of continuous miner and long wall methods as described in sections 522 and 523. Sequence and timing for the development of underground workings are also discussed in sections 522 and 523.

525.420 Plate 5-5 shows the underground workings and depicts areas where first mining or partial mining will be utilized to protect the escarpment and raptor nests that may exist on the escarpment, and to insure that subsidence remains within the permit area. State-appropriated water rights are shown on Plates 5-3, 5-5 as well as Plate 7-1.

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

The coal seam is approximately 12.5 feet thick with only about 10.5 feet being extracted, and the depth of cover ranges from 0' to approximately 2,300'. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden and depth of workings, even with full seam extraction, only minimal subsidence if any is anticipated.

525.440 Aerial subsidence monitoring will be done annually while the significant subsidence is taking place. The subsidence monitoring will be initiated in an area prior to any 2nd mining being done within that area. Initially a 200 foot grid along with baseline photograph will be established prior to any 2nd mining. Approximately 12-16 control points will be needed to cover the total mining area. Six of these points will be located outside of the subsidence zone. The accuracy of this survey will be plus or minus 6" horizontally and vertically. From this data a map will be created that will show subsided areas. Once per year a follow up aerial will be performed to determine the extent and degree of active subsidence. Subsidence monitoring will continue for a minimum of 5 years after the mining ceases. If at the end of the 5 year period the annual subsidence in any of the 3 prior years measures more than 10 percent of the highest annual subsidence amount, subsidence monitoring will continue until there are 3 consecutive years where the annual subsidence amount is less than 10 percent of the highest annual subsidence amount. If for three years in a row the subsidence is measured to be less than 10% of the highest subsidence year, subsidence will be determined to be complete, and no additional monitoring for that area will be required.

“A ground survey of the mine permit area ‘where secondary extraction has occurred over the last year’ will be conducted in conjunction with the quarterly water monitoring program.” Identified features will be monitored until they are repaired or self-healed. The survey will be conducted on roads, adjacent to stock watering ponds, and in drainage channels where they cross tension areas relative to the underground extraction areas.”

“The results of this survey will be documented quarterly in a written report which provides global positioning co-ordinates as well as the following information;

A) a description of the identified subsidence related feature,
B) length, and width measurements, and compass bearing,
C) dated photographic documentation,
D) located on a topographic overlay map of the

underground disturbed area.

E) if the feature is determined as significant, the Division will be notified within a 48 hour period.

F) A written report, <u>compiling the four quarterly reports for the monitoring year</u>, will be submitted as part of the Annual Report required by the Division.

G) The commitment “to restore the land where subsidence damage has affected the use of the surface” must be revised to read “to restore the land where subsidence damage has been determined as significant enough to require repair, as determined by the Division”.

Two areas of the permit have stream reaches with less than 1,000 feet of cover over the coal seam. As discussed in Section 525.120, it is not envisioned that subsidence will negatively impact these areas. During periods of 2nd mining under areas of intermittent or perennial streams, a ground survey will be conducted of the stream channels every two weeks. These ground surveys will be continued for a period of 3 months following the 2nd mining.

The ground survey will consist of walking and photographing the various areas of the surface over the mine where subsidence might occur. If evidence of subsidence is identified, the area of subsidence will be surveyed and the extent of the disruption identified. Depending on the extent and location of the damage, mitigation measures will be reviewed and implemented. Due to the fact that mitigation options change with time as new technology and measures are developed, better options may be implemented in the future. However, UEI provides a commitment that where subsidence damage affects uses of the surface, the land will be restored to a condition capable of maintaining the value and reasonable foreseeable uses which it was capable of supporting before the subsidence. The surface effects will be repairs as described in Section 525.500.

525.450 Subsidence control measures.

525.451. No backstowing or backfilling of voids used as a subsidence control measure is planned at this time. Therefore, this section is not applicable.

525.452. Support pillars as a subsidence control measure is not anticipated at this time. However, an area of partial mining where an unmined coal block will be left for subsidence control is shown on Plate 5-5. First mining indicates an area where a block of coal is roomed leaving pillars for support with no mining of the remaining pillars. Partial mining as shown on Plate 5-5 indicates an area where a block of coal has been isolated without the rooms being developed. Both first mining and partial mining will leave support that can be used to control subsidence. If the partially mined area shown on Plate 5-5 is ever roomed out, the area now defined as partially mined would become an area defined as being first mined.

525.453. An outcrop barrier of coal will be left to protect the escarpments at the outcrop. As per the R2P2 only first mining will be allowed within 200' of the outcrop. Mains, submains, and ventilation portals will be allowed within the outcrop.

525.454 No measures will be taken on the surface to prevent material damage or lessening of the value or reasonable foreseeable use of the surface.

525.460. Anticipated effects of planned subsidence may include tension cracks, fissures, or sink holes. Areas of minimal ground lowering may be anticipated. The chances of subsidence-related damage to any perceived renewable resource is minimal.

525.470. Since no urbanized areas, cities, towns, public buildings, facilities, churches, schools, or hospitals exist within the permit area this section does not apply.

525.480. There are no plans to change or modify the mining plan to protect any springs or seeps. Springs with water rights will be monitored for flow and quality as described in Chapter 7 Section 731.211. UEI has committed to provide for mitigation of any lost water rights as per Chapter 7 Section 727.

525.490. Other information specified by the Division as necessary to demonstrate that the operation will be conducted in accordance with R645-301-525.300 will be provided.

525.500. Repair of damage.

525.510. If effects of subsidence are confirmed, any material damage to the surface lands will be restored to the extent technologically and economically feasible. The land will be restored to a condition capable of maintaining the value and reasonable foreseeable uses which it was capable of supporting before the subsidence.

525.520. Since no structures exist within or adjacent to the permit area which could be damaged by subsidence, should it occur, this section does not apply.

525.530. The Little Park Road exists in the subsidence zone. In the unlikely event the road is damaged by subsidence, UEI will repair the damage as per Section 525.120.

525.600. Public Notice.

At least six months prior to mining, or within that period if approved by the Division, the underground mine operator will mail a notification to all owners and occupants of surface property and structures above the underground workings. The notification oil include, at a minimum, identification of specific areas in which mining will take placce, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined.

526. A narrative explaining the construction, modification, use, maintenance and removal of the mine facilities follows. Additional information can be found in Appendix 5-4 and Chapter 8.

526.100 Mine Structures and Facilities.

526.110 The only existing structures are found in Horse Canyon (Part "A" of this permit) and are the remains of the United States Steel operation. Horse Canyon has received phase II bond release and the remaining structures have been left in place for future use. Only three existing structures, a 60" and a 48" CMP culverts located near the new proposed surface facilities, and the County road on top of Little Park, can be found within the Lila Canyon Permit. The existing culvert is shown on plate 5-1A. The existing road on Little Park can be found on Plate 5-1 as well as most other plates showing the surface area of the Lila Canyon Permit. Several vehicle ways will be used for water and subsidence monitoring. These ways branch off the Little Park Road and generally follow the ephemeral drainages. The ways are shown on Plate 5-1 as well as most other plates showing the surface area of the Lila Canyon Permit. More detail of the existing Little Park Road can be found in Appendix 5-4.

526.111 The location of the existing culverts is shown on Plate 5-1A.

526.112 Most of the existing 48" culvert is outside the permit boundary and is the Counties responsibility. UEI will grade the site so that during reclamation and operations surface flows will be directed away from the 48" culvert. The 60" culvert is in poor condition and will be replaced by the county. UEI will add on to the culvert during the operation and reclamation phase. The bottom 30' is the responsibility of the County, the upper portion is the responsibility of UEI.

526.113 It is believed that the existing culverts were installed with the road construction around 1940.

526.114 Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply.

526.115 Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. The County road and the culvert within the disturbed area boundary will be modified or reconstructed by the County.

526.115.1. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.115.2. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.115.3. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.115.4. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.116 The only coal mining and reclamation operations that are planed within 100 feet of the County Road are office complex, sediment pond, topsoil pile, and security shack. The permit area adjacent to the county road will be fenced to protect the public from the sediment pond and other mine associated buildings. Other than fencing no additional measures are planned after the construction phase. During construction measures to control traffic on the County Road will be taken to protect the public from construction related hazzards.

526.116.1. A cooperative agreement with Emery County as stated in Appendix 1-4 requires a six foot chain link fence to be constructed adjacent to the Lila Canyon Road to provide safety to the general public in the proximity to the mine site and mine related structures and activities.

526.116.2. At the current time there are no plans to relocate any public road.

526.200 Utility Installation and Support Facilities.

526.210 All coal mining and reclamation operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by oil, gas, and water wells, oil, gas, and coal-slurry pipelines, railroads, electric and telephone lines, and water and sewage lines which may pass over, under, or through the permit area, unless otherwise approved by the owner of those facilities and the Division. Since no existing services are found within the projected disturbed area, no negative impact to any service is anticipated.

526.220 The new support facilities are described in section 520 and in Appendix 5-4 and shown on plate 5-2 and will be operated in accordance with the mine reclamation plan. Plans and drawings for each support facility to be constructed, used or maintained within the permit area are found in Appendix 5-4, Plates 5-7A, 5-7B, and 5-8.

526.221 The new facilities designs shown in Appendix 5-4 prevents or controls erosion and siltation, water pollution, and damage to public or private property, and:

526.222 The new facilities designs shown in Appendix 5-4 minimizes damage to fish, wildlife, and related environmental values; and minimizes additional contributions of suspended solids to stream flow or runoff outside the permit area to the extent possible by using the best technology currently available.

Islands of undisturbed areas within the permit area will be visually monitored for coal fines deposition. If monitoring reveals coal fine deposition, then water sprays on the area from which the fines are originating will be warranted as per August 27, 1999 Approval Order.

526.300 Water pollution control facilities consist of sedimentation control and properly designed sewage systems.

The sedimentation control is accomplished by containing all disturbed area runoff in a properly sized sedimentation pond. Complete designs are presented in Appendix 7-4 and on Plate 7-6.

The sewage system will consist of a septic tank and drainfield. The system is shown on Plate 5-2. Complete designs are presented in Appendix 5-4.

The drain field design and layout is shown on plate 5-2 and details are shown in Appendix 5-4.

526.400 Since Lila Canyon Mine is an underground operation this section does not apply.

527. Transportation Facilities.

527.100 All new roads within the disturbed area have been classified as primary.

527.110 See Sections 527.120 and 527.130.

527.120 The Slope Access Road / Portal Access Road and the Mine Facilities Road / Truck Loadout Road will be used frequently for access for a period in excess of six months, and or will transport coal, they are classified as primary roads.

527.121 See 527.120 above.

527.122 See 527.120 above.

527.123 Since none of the new roads planned within the disturbed area will be retained for an approved postmining land use this section does not apply.

527.130 There are no ancillary roads within the disturbed area. .

527.200 A detailed design and description for each road, and conveyor to be constructed used, and maintained within the proposed permit area is included in Appendix 5-4. The roads are show on Plate 5-

2.

527.210 The specifications for each road width, road gradient, road surface, road cut, fills, embankments culverts, drainage ditches and drainage structures are shown on Plate 5-2, 7-2, 7-5, 7-6a and 7-6b, and in Appendixes 5-4 and 7-4.

527.220 Since no alteration or relocation of natural drainage ways is anticipated this section is not applicable.

527.230 Roads shall be maintained in manner that allows them to meet their design standards throughout their use.

527.240 If any of the roads on the disturbed area is damaged by a catastrophic event, the road will be repaired as soon as practical after the damage has occurred.

527.250 Steep cut slopes or requests for alternative specifications are not anticipated at this time therefore this section does not apply.

528. Handling and Disposal of Coal, Overburden, etc:

A narrative explaining the construction modifications, use, maintenance and removal of coal, overburden, excess spoil and coal mine waste.

528.100 Coal will be mined using continuous miners and longwall equipment. The coal will be transported from the face and deposited on the underground mine belts using shuttle cars or continuous haulage equipment. The coal will be transported by a series of conveyor belts from the section to the run of mine stockpile. The coal will be removed from the run of mine stockpile by a reclaim belt to an enclosed crusher/screen. Once crushed the coal will be conveyed to a storage bin from which it will loaded in to coal haul trucks for transportation to a unit train loadout.

528.200 Overburden: Lila Canyon is an underground operation and it is not anticipated that any material that overlays the coal seam, consolidated, or unconsolidated, other than topsoil, will be disturbed. Therefore, this section does not apply.

528.300 Spoil, coal processing waste, mine development waste, and noncoal waste removal, handling, storage, transportation, and disposal areas and structures are discussed below.

528.310 Excess Spoil: Since Lila Canyon is an underground operation it is not anticipated than any spoil will be generated. Therefore this section does not apply.

528.320 Coal Mine Waste: All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream. Portions of the rock slope material, not containing coal, will be used as structural fill for the shop/warehouse pad. The temporary mine development waste pile and slope rock disposal area are shown on Plate 5-2 and in Appendix 5-7.

528.321 Coal processing waste produced from the screen will not be returned to any abandoned underground workings. Any and all of the coal processing waste from the screen will be crushed and reintroduced into the ROM stream for sale.

528.322 Refuse Piles. Each pile will meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215, meet the design criteria of R645-301-210, R645-301-512.230, R645-301-513.400, R645-301-514.200, R645-301-515.200, R645-301-528.320, R645-301-536 through R645-301-536.200, R645-301-536.500, R645-301-536.900, R645-301-542.730, R645-301-553.250, R645-301-746.100, R645-301-746.200, and any other applicable requirements.

528.323 Burning and Burned Waste Utilization.

528.323.1. Coal mine waste fires will be extinguished by the person who conducts coal mining and reclamation operations, in accordance with a plan approved by the Division and MSHA. The plan will contain, at a minimum, provisions to ensure that only those persons authorized by the operator, and who have an understanding of the procedures to be used, will be involved in the extinguishing operations. The coal mine waste fire plan can be found in Appendix 5-3. MSHA approval is not required unless you have an actively burning fire. (Phone conversation with Billy Owens MSHA Denver 5/31/05)

528.323.2. No burning or burned coal mine waste will be removed from the permitted disposal area.

528.330 Noncoal Mine Waste.

528.331 Noncoal mine wastes including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustible materials generated during mining activities will be placed and stored in a controlled manner in a designated portion of the permit area. The noncoal mine waste will be placed in dumpsters and emptied on a as needed basis. The designated noncoal waste area is shown on Plate 5-2.

528.332 It is anticipated that final disposal of noncoal mine wastes will be at the ECDC facility near East Carbon City. Concrete will be disposed of in a specified area, refer to Plate 5-6 for this location. The disposal site will be located under the reclaimed coal stockpile. This area will receive the maximum fill during reclamation. Placement of this fill around the concrete will help to eliminate runoff. This will ensure that leachate and drainage does not degrade surface or underground water. The noncoal mine waste will be placed in dumpsters and emptied on a as needed basis.

528.333 The noncoal mine waste will be disposed of at the ECDC facility near East Carbon City.

528.334 Notwithstanding any other provision to the R645 Rules, any noncoal mine waste defined as "hazardous" under 3001 of the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-580, as amended) and 40 CFR Part 261 will be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

528.340 A description of the disposal methods for placing underground waste and excess spoil generated at surface areas according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-301-512.220, R645-301-514.100, R645-301-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-536.600, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.300, and R645-301-745.400 is covered in sections 535, and 536.

528.350 A description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of in accordance with R645-301-528.330, R645-301-537.200, R645-301-542.740, R645-301-553.100 through R645-301-553.600, R645-301-553.900, and R645-301-747 is included.

528.400 Dams, embankments and other impoundments.
See Section 700 and Appendix 7-4.

529. Management of Mine Openings:

The permit application includes a description of the measures to be used to seal or manage the openings within the proposed permit area. New slope or drift openings required to be sealed shall be sealed with solid, substantial, noncombustible material for a distance of at least 25 feet into such openings. The closure design for portals, slopes, and drifts, can be found in Appendix 5-6.

529.100 Shafts or other exposed underground opening when no longer in use will be cased, lined, or otherwise managed as approved by the Division. All openings exposed by mining operations within the permit area will be permanently closed unless approved for water monitoring.

529.200 For the purposes of Underground Coal Mining and Reclamation Activities:

529.210 Mine entries which are temporarily inactive, but have a further projected useful service under the approved permit application, 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 operating condition by the person who conducts the activity.

529.220 Since no portals are projected to return underground development waste, coal processing waste or water to the mine, this section does not apply. There is no current need to return any waste to the underground workings.

529.300 Section 529 does not apply to holes drilled and used for blasting.

529.400 No openings have been identified for use to return coal processing waste to underground workings. Therefore this section is not applicable.

530. Operational Design Criteria and Plans.

531. General plans for the sediment ponds and refuse pile are found within this section.

532. Sediment control measures can be found in Chapter 7.

532.100 The smallest practicable area will be disturbed during the life of the project. Progressive backfilling, grading, and prompt revegetation of applicable will be completed as per R645-301-353.200.

532.200 Backfilled material will be stabilized to promote a reduction of the rate and volume of runoff in accordance with R645-301-537.200, R645-301-552 through R645-301-553.230, R645-301-553.260 through R645-301-553.420, R645-301-553.600, and R645-301-553.900.

533. Impoundments.

533.100 Since no impoundments meeting the criteria of 30 CFR 77.216(a) this section does not apply.

533.200 The only impoundments planned for this site ~~is the sediment pond. The sediment pond is a temporary structure. A detailed design~~are two (2) sediment ponds. Detailed designs for the Sediment ~~p~~Ponds can be found in Appendix 7-4, Section 3.1 and on Plate~~ 7-6~~s 7-6a and 7-6b.

533.210 The sediment ponds will be incised, except for the dam/road embankment at Pond #1. This embankment will be reconstructed and compacted to at least 95%. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1 and on Plate~~ 7-6~~s 7-6a and 7-6b.

533.220 Where fill is to be placed, natural ground shall be removed 12" below the structure. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1 and on Plate~~ 7-6~~s 7-6a and 7-6b.

533.300 Rip-rap or other protection (culverts, concrete) will be placed at all inlets and outlets to prevent scouring. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1. Also see Plate~~ 7-6~~s 7-6a and 7-6b.

533.400 External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability.~~ A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1.~~ A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1 and on Plate~~ 7-6~~s 7-6a and 7-6b.

533.500 This section does not apply, there are no vertical highwalls associated with this impoundment.

533.600 Since no impoundments are planned that meet the criteria of MSHA, 30 CFR 77.216(a) this section does not apply.

533.700 Design and construction requirements, as well as operation and maintenance requirements are detailed in Appendix 7-4, Section 3.1 and Plates 7-6a and 7-6b.

534. Roads. The designs for surface roads can be found in Appendix 5-4.

534.100 The roads have been designed, located, constructed and will be maintained to:

534.110 The roads have been designed, located, constructed and will be maintained to prevent or control damage to public or private property.

534.120 Nonacid or nontoxic-forming substances will be used in road surfacing.

534.130 The designs for the roads can be found in Appendix 5-4.

534.140 The reclamation plan for the roads can be found in section 542.600.

534.150 The roads have been designed to prevent or control erosion, siltation and air pollution.

534.200 Appropriate limits for grade, width, and surface materials have been used in the design of the roads.

534.300 Primary Roads. Primary roads will meet the requirements of R645-301-358, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-542.600, R645-301-542.600, and R645-301-762, any necessary design criteria established by the Division, and the following requirements. Primary roads will:

534.310 The roads will be located insofar as practical, on the most stable available surfaces.

534.320 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 the weight and speed of vehicles using the road;

534.330 The roads will be routinely maintained to include repairs to the road surface, blading, filling potholes and adding replacement gravel or asphalt. It will also include revegtating, brush removal, and minor reconstruction of road segments as necessary.

534.340 Culverts if required will be designed, installed, and maintained to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the road.

535. Spoil: It is anticipated that no spoil will be produced at the Lila Canyon Mine therefore this section is not applicable.

536. Coal Mine Waste: The proposed Lila Canyon Mine could produce 2 separate types of coal mine waste:

1. Normal coal processing waste or refuse and;
2. Underground development waste (rock slope material).

All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. The rock slope material / underground development waste will be examined and tested as necessary to determine acid- or toxic-forming potential.

536.100 All underground development waste, other than the rock slope material, will be brought to the surface and will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface.

536.110 The refuse pile will be designed to attain a minimum long-term slope stability safety factor of 1.5. See Appendix 5-7.

536.200 Underground development waste brought to the surface will be deposited according to the plan described in Appendix 5-7.

536.300 Since no spoil fills will be generated this section does not apply.

536.400 Since there will not be any impounding structures constructed of coal mine waste this section does not apply.

536.500 As discussed in Section 536 and 536.300, it is proposed to dispose of the rock slope material / underground development waste within the rock disposal area and be used as structural fill as shown on Plate 5-2.

536.510 It is not anticipated that coal mine waste materials from activities located outside the permit area be disposed of in the permit area. Therefore this section does not apply.

536.520 It is not anticipated that coal mine waste will be brought to the surface then taken back underground for disposal therefore this section does not apply.

536.600 In areas where slope rock or coal processing waste is deposited, the topsoil will be removed and stored in the topsoil stockpile area until reclamation.

536.700 It is not anticipated that coal processing waste will be returned to abandoned underground workings therefore this section does not apply

536.800 Since no coal processing waste banks, dams, or embankments are planned for the Lila Canyon Mine therefore, this section does not apply.

536.900 Refuse Piles. (See Appendix 5-7) The refuse pile is designed to meet the requirements of R645-301-210, R645-301-512.230, R645-301-513.400, R645-301-514.200, R645-301-515.200, R645-301-528.322, R645-301-528.320, R645-301-536 through R645-301-536.200, R645-301-536.500, R645-301-536.900, R645-301-542.730, R645-301-553.250, R645-301-746.100 through R645-301-746.200, and the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215.

537. Regraded Slopes.

537.100 Each application will contain a report of appropriate geotechnical analysis, where approval of the Division is required for alternative specifications or for steep cut slopes under R645-301-358, R645-301-512.250, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-534.300, R645-301-542.600, R645-301-742.410, R645-301-

742.420, R645-301-752.200, and R645-301-762.

540. Reclamation Plan. (See Appendix 5-8 for reclamation plan.)

541. General.

541.100. The operator is committed to performing all reclamation as in accordance with R645 rules.

541.200. N/A. The operator is not involved in surface mining activities.

541.300. The operator is committed to the removal of all equipment facilities and structures upon cessation of mining activities.

541.400. The operator will address all reclamation activities as referenced in Chapter 5 of this document.

542 Narratives, Maps and Plans.

542.100. See Table 3-3 time table based on project reserves markets and life of mine.

542.200. The perimeter of the disturbed area contains approximately 42.6 surface acres within the disturbed area but only 33.86 acres will be disturbed leaving 8.74 acres of undisturbed islands within the disturbed area. The following R645 regulations will give detailed description and reclamation procedures to address these areas of disturbance. The reclamation plan for the sediment pond and drainage control structures can be found in Appendix 7-4.

Topsoil amounts can be found in Section 232.100 and are calculated from Plate 203. Concrete amounts can be calculated from the text in Section 520. Coal Mine Waste volumes can be found in Appendix 5-7. Volumes were calculated using a Cad system.

542.300. Included.

542.310. Included. (See Plates 5-6 & 7-7)

542.320. There will not be any surface facilities left post mining.

542.400. Not applicable. No surface facilities will remain post bond liability period.

542.500. A reclamation time table is included as Table 3-3.

542.600. All roads within the disturbed area will be reclaimed immediately after they are no longer needed for mining and reclamation operations.

542.610. The time table of reclamation activities will enable the roads to be removed concurrently with reclamation activities. So, no closures specific to traffic would be anticipated.

542.620. All bridges and culverts will be removed concurrent with reclamation.

542.630. All disturbed areas will be ripped and top soiled prior to revegetation activities in compliance with all applicable R645 regulations. (See Appendix 5-8)

542.640. Road surfacing materials such as sand and gravel, which are not suitable for revegetation establishment will be buried on site and covered with a minimum of two feet of material that would support vegetation. Concrete will be disposed of in the designated area and covered with four feet of cover. Asphalt will be disposed of off site, either in a landfill or sent to a recycling facility.

542.700. Final Abandonment of Mine Openings and Disposal Areas.

542.710. Appendix 5-6 depicts a typical seal that will be constructed at all mine openings.

542.720. No excess spoil is anticipated at this time.

542.730. All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface.

542.740. Disposal of Noncoal Mine Wastes.

542.741. All non coal waste will be temporarily stored on site in approved waste bins and commercially picked up and transported to an approved disposal site. Non Coal waste generated during reclamation (such as concrete structure, buried culverts, utility lines, septic systems etc.) will be buried in the refuse disposal area and covered with a minimum of four feet of fill.

542.742. No noncoal waste will be stored on site or disposed of on site during the life of the mine.

542.800. A detailed cost break down is included in Chapter 8. Appendix 8-1 relative to bonding.

550 Reclamation Design Criteria and Plans. Each permit application will include site specific plans that incorporate the following design criteria for reclamation activities.

551. All underground openings will be sealed as detailed in Appendix 5-6.

552. Permanent Features.

552.100. In course of reclamation, areas that have been recontoured and top soiled will be “pock-marked” creating small basins that will facilitate vegetation establishment as well as minimizing erosion.

552.200. No permanent impoundments will be left post reclamation.

553. The operator will comply with all regulations applicable to underground mining activities relative to backfilling and grading as required by R645 regulations.

Some minor cut slopes along the reclaimed road may be left after reclamation due to the difficulty and inability to reclaim all material pushed over the side while making the road cut. See plate 5-7B-2 cross section 16+00 for details. UEI will make reasonable efforts to minimize the cut slopes being left.

553.100. Disturbed Areas. Disturbed areas will be backfilled and graded to:

553.110 The operator will obtain a post mining topography similar in form as what existed premining.

553.120 Since Lila Canyon is an underground operation, no spoil piles will be created. Minor highwalls may be created with the development of the rock slope portals. Upon completion of mining these entries will be seal as per Closure for Mine Openings Appendix 5-6 and all highwalls will be eliminated during the reclamation phase of the operation. Plate 5-9 shows the proposed portal plan. During reclamation, the fans will be dismantled and either salvaged or taken underground. The chainlink bolts will be cut off 6 inches below the surface and the shot-crete and mesh will be disposed of underground. The concrete will be burried during highwall reclamation and suitable material will be placed against the portals. This material will be shaped to eliminate the highwall and to bring the slope back to the approximate original contour.

553.130 All fill slope will have a static safety factor of 1.3 as shown in Appendix 5-5.

553.140 Erosion and water pollution will be minimized on site by the use of drainage control structures (burms, channels and silt fence) and the use of small depression, soil tackifiers, mulch and sediment pond design. No water is anticipated leaving the reclaimed site prior to adequate treatment in the form of retention and/or filtration that does not meet and/or exceed UPDES standards.

553.150 The post mining land use of wildlife and domestic grazing should be enhanced to some degree with the revegetation of a more desirable seed mix and a vegetative cover in excess of what was present premining.

553.200 Spoil and Waste.

553.210 All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream.

553.220 Since no spoil will be produced this section does not apply.

553.221 All vegetation and /or organic material will be removed prior to any coal mine waste being stored.

553.222 All useable topsoil or topsoil substitute will be removed from the structural fill and refuse areas prior to use. Table 2-1 shows estimates of salvageable soil by soil type based on current NRCS soil inventories. The location of the soil storage are shown on Plate 5-2. This material will be spread over the recontoured structural fill and refuse areas prior to seeding and mulching.

553.223 Since no spoil will be produced this section does not apply.

553.230 All recontoured areas will be compacted to minimize slippage. The area will then be over laid with topsoil and ripped. In addition the area will be "pock-marked" to minimize the potential for erosion as well as enhance revegetation establishment. It is not anticipated that soil will be disturbed in areas to steep for equipment to operate.

553.240 The structural fill area will have slopes of less than 8% upon final recontouring and revegetated to enhance the post mining land use of grazing and wildlife habitat.

553.250 A need for a refuse pile at Lila Canyon is not anticipated.

553.260 The operator will commit to all applicable R645 regulations relative to disposal of coal processing waste.

553.300 All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream.

553.400 Cut-and-fill terraces may be allowed by the Division

553.410 No cut and fill terraces will be required.

553.420 No terraces will be required for post mining land use.

553.500-540 and 553.600-553.650.500
The only area that falls under these provisions are the reclaimed Horse Canyon mine which lies in the north west portion of the lease area and is addressed under approved MRP Act #0013 (Part "A").

553.700-553.900

This operation will only involve underground mining and as such the above referenced regulations do not apply.

560. Performance Standards. Coal mining and reclamation operations will be conducted in accordance with the approved permit and requirements of R645-301-510 through R645-301-553.

WordPerfect Document Compare Summary

Original document: K:\Lila\2016\L16-003 Drainage and Ditches Deficiencies Task #5056\Original Submittal\Appendix 5-4 roads.wpd
Revised document: K:\Lila\2016\L16-003 Drainage and Ditches Deficiencies Task #5056\Revisions Task# 5056\Appendix 5-4 roads Edits.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 0 Deletion, 1 Insertion, 0 Moves.

APPENDIX 5-4

NEW FACILITY DESIGN

Information for Appendix 5-4 is mostly hard copies. Electronic copies do not exist for all information contained within the Appendix.

APPENDIX 5-4

ROADS

<u>Existing Lila Canyon Road:</u> (County Road 126)

The Lila Canyon road runs from the Horse Canyon Mine to the proposed Lila Canyon surface facilities then continues from the Lila Canyon surface to U.S. Highway 191/6. This road was constructed in the early 1940's to provide access to coal reserves south of the Horse Canyon Mine. The road extends south from Horse Canyon following the base of the Book Cliffs escarpment then turns south connecting to Highway 191/6. The road right-of-way consists of a total width of 100 feet. A small portion of this road is on BLM surface and a BLM right-of-way was issued to Kaiser Steel Corporation and is now owned by UEI. The portions of this road is on private property owned by UEI and William Marsing. Emery County also claims the road under the RS-2477 federal road designation. Any constructed facilities, including the 6 foot chain link fence, would not be placed on the county road right-of-way. County road 126 has been used for years by residents of Carbon and Emery Counties for recreation, ranching, and hunting purposes. Over the last 50 years, the majority portion of this road received little, if any maintenance. However, the first 2.5 miles from U.S. 191/6 to the correl has received frequent maintenance.

Main access to the mine site will be from U.S. Highway 191/6. The proposed access road will be constructed by Emery County and will be designated as Lila Canyon Road 126. Some areas of the road will be upgraded others areas will be realigned. This road will be a two lane, 30 foot wide gravel surface Class B road, totaling approximately 4.7 miles in length. The proposed road reconstruction and realignment will be designed for a maximum speed of 45 miles per hour, would be constructed according to the standards of the American Department of Transportation 1992 Standard Specifications for Road and Bridge Construction. The realigned and reconstructed road will provide a safer and more direct route to the mine from U.S. Highway 191/6. The road will follow closely the existing RS-2477 road. Only the section of county road 126 from U.S. Highway 191/6 to Lila Canyon surface will be improved and or reconstructed. The county has no current plans to upgrade the section of 126 from Lila Canyon to Horse Canyon. All engineering, construction and maintenance on the reconstructed and realigned road will be implemented and controlled by the Emery County Road Department. Emery County will also control all necessary rights-of-way.

A single-lane unpaved road extends south from County Road 126, just short of where the mine facility road begins, and extends along the west boundary of the surface facilities' disturbed area then continues to the south. This unpaved road is owned by Emery County and is a part of a network of unpaved roads used for recreation and to access range land to the south of Country Road 126. This road is also used by UEI to access the Topsoil Pile and Pond #1, and for access to water quality monitoring sites. This road was reconstructed in the area of Pond #1 when the pond was first constructed. With the approval of Emery County, the road at the dam will be regraded and widened to accommodate a slightly deeper Pond #1. As the dam is outside the mine's disturbed area, final reclamation of the dam and county road will be addressed per the existing agreement with Emery County.

New Mine Facility Road:

The mine facility road shown on Plate 5-2 begins at the edge of County Road 126 and allows for access to the various surface facilities. The road has been located in the most practical location taking into consideration grade, stability, and alignment. Employees will use this road to access the office & bathhouse facilities. Coal haul trucks will use this road to access the scales and truck loadout. All supplies will be hauled on a short portion of this road from the supply storage area to the slope access road. The road will initially be graveled but will be paved in the long term to minimize dust and provide good surface for heavy truck traffic as well as facility access. The facility access road will be approximately 24' wide to provide for two lane traffic and will have the appropriate drainage controls to insure long term life and low maintenance. The has been constructed and will be maintained according to the appropriate R645-534 and R645-527 regulations. When detailed engineering design is complete a copy of the detailed road design will be included in Appendix 5-4.

New Slope Access / Portal Access Road

The slope access road splits off the facility access road near the north-east corner of the equipment and supply storage area, and follows an alignment that takes into consideration grade and direct access. The slope access road will be used to provide access to the rock slopes which in-turn proved access to the underground workings. The slope access road will be used as access for all men, material and equipment need in the mine. Since the slope access road provides for frequent access for men, equipment and materials for a period of six months or longer the slope access road is classified as a primary road. The slope access road will be designed, constructed, and maintained according to appropriate R645 regulations. The slope access road is shown on Plate 5-2. When detailed engineering design is complete a copy of the detailed road design will be included in Appendix 5-4.

Existing Little Park Road:

The Little Park road runs from the Horse Canyon Mine, up to the top of Little Park, and across Little Park to Turtle Canyon, then down Turtle Canyon to the Green River. This road has been used for years by residents of Carbon and Emery Counties for recreation, ranching, and hunting purposes. It is a public road and is maintained by either the BLM and or Emery County. The road is “Cherry Stemed” by the new BLM wilderness reinventories. The road is used by UEI to monitor water and will continue to be used on a frequent basis for subsidence monitoring and water monitoring. Plate 5-1 as well as others show the location of the Little Park road.

Existing Vehicle Ways:

Several vehicle ways off from the Little Park road are used by UEI for water monitoring. UEI will continue to use these vehicle ways frequently for water and subsidence monitoring. The vehicle ways vary from 5 to 15 feet wide. These ways are located either in dry stream channels, or are old drilling roads both accessed by ATV. No future maintenance is projected for these vehicle ways. Plate 5-1 as well as others show the location of the vehicle ways used by UEI.

WordPerfect Document Compare Summary

Original document: K:\Lila\2016\L16-003 Drainage and Ditches Deficiencies Task #5056\Original Submittal\15-001 Appendix 7-4.wpd
Revised document: K:\Lila\2016\L16-003 Drainage and Ditches Deficiencies Task #5056\Revisions Task# 5056\15-001 Appendix 7-4 Edits.wpd
Deletions are shown with the following attributes and color:
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Insertions are shown with the following attributes and color:
 Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 67 Deletions, 55 Insertions, 0 Moves.

Appendix 7-4
Lila Canyon Mine
Sedimentation and Drainage Control Plan

Revised

January 2001
October 2002 RJM
February 2007 TJS
April 2008 TJS
July 2008 TJS
June 2009 TJS
January 2010 TJS
January 2012 TJS
October 2014 TJS
December 2015 KM-PJ

SEDIMENTATION AND DRAINAGE CONTROL PLAN

TABLE OF CONTENTS

Section **Page Number**

SEDIMENTATION AND DRAINAGE CONTROL PLAN

1- Introduction

The Sedimentation and Drainage Control Plan for the Lila Canyon Mine has been designed according to the State of Utah R645- Coal Mining Rules, November 1, 1996. All design criteria and construction will be certified by a Utah Registered Professional Engineer.

This plan has been divided into the following three sections:

1) Design of Drainage Control Structures for the Proposed Construction

2) Design of Sediment Control Structures

3) Design of Drainage Control Structures for Reclamation

The general surface water control plan for this project will consist of the following:

(a) This is a new site construction. All areas proposed for disturbance will be sloped to drain to surface ditches and/or culverts where runoff will be carried to two sediment ponds. All minesite drainage controls and watersheds are shown on Plate 7-5 “Proposed Sediment Control Map”.

(b) The majority of undisturbed runoff will be diverted around the minesite and/or beneath the sediment pond #1 by properly sized culverts. Undisturbed diversion culvert UC-1, is located on the northwest end of the site. This diversion will allow the majority of undisturbed runoff from the Right Fork of Lila Canyon to bypass the mine area beneath sediment pond #1. All undisturbed diversions are designed to carry runoff from a 100 year - 6 hour precipitation event. UC-1 is oversized at 60" diameter.

(c) Two adequately sized sediment ponds will be constructed at the lower end of the site. These ponds are sized to contain and treat the runoff from all of the disturbed area and any contributing undisturbed areas for a 10 year - 24 hour precipitation event. The ponds will be equipped with C.M.P. culvert principle spillway and decant and CMP culvert emergency spillway sized to safely pass runoff from a 25 year - 6 hour precipitation event. The spillways from sediment pond #1 will discharge into the UC-1 CMP culvert running beneath the pond. This culvert will discharge onto an engineered discharge structure and into the Right Fork of Lila Canyon channel below the minesite. The spillways from sediment pond #2 will discharge onto an engineered discharge structure and into the Middle Fork of Lila Canyon channel below the minesite.

DESIGN OF DRAINAGE CONTROL STRUCTURES

Design Parameters:

Tables:

Figures:

Design Parameters

2.1 Precipitation

The precipitation-frequency values for the area were taken from the approved Mining and Reclamation Plan, Horse Canyon Mine, Emery County, Utah, Volume III, submitted by I.P.A.

Frequency - Duration	Precipitation
10 year - 6 hour	1.30"
10 year - 24 hour	1.90"
25 year - 6 hour	1.50"
100 year - 6 hour	1.90"

2.2 Flow

Peak flows were determined from rainfall depths, drainage areas, and curve numbers and were calculated using the computer program "Triangular Hydrograph Calculations", based on SCSHYDRO Program developed by Hawkins and Marshall (1979) prepared for the Division of Oil, Gas, and Mining.. All flows are based on the SCS Curve Number Method for both SCS 6-hour and NOAA Type II, 24-hour storms.

Time of concentration of storm events were calculated for each drainage area using SCS Lane's Formula. (U.S. Soil Conservation Service, 1972):

$$L = \frac{l^{0.8} * (S+1)^{0.7}}{1900 * Y^{0.5}}$$

and

$$Tc = 1.67 * L$$

where L = watershed lag (hours)
l = hydraulic length of the watershed, or distance along the main channel to the watershed divide (feet)
S = watershed storage factor defined in Equation (2-2)
Y = average watershed slope (percent)
Tc = time of concentration (hours)

2.3 Velocity

Flow velocities for each ditch structure were also calculated using the Storm computer program with Manning's Formula:

$$V = \frac{1.49}{n} * R^{2/3} * S^{1/3}$$

where:

V	=	Velocity (fps)
R	=	Hydraulic Radius (ft.)
S	=	Slope (ft. per ft.)
n	=	Manning's n; Table 3.1, p. 159,

"Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner & Haan, 1983.

Note: The following Manning's n were used in the calculations:

Structure Manning's n

Culverts (cmp)	0.024
Culverts (HDPE)	0.013
Unlined Disturbed Area Ditches	0.030
Lined Disturbed Area Ditches	0.032 - 0.040

2.4 Drainage Areas

All drainage areas were determined directly from Plate 7-1, “Permit Area Hydrology Map”, Plate 7-2, “Disturbed Area Hydrology/Watershed”, or Plate 7-5 “Proposed Sediment Control”.

2.5 Slopes, Lengths

All slopes and lengths were measured directly from the topography on Plates 7-1, 7-2, and/or 7-5.

2.6 Runoff Volume

Runoff was calculated using the SCS Curve Number formula for both NOAA Type II, 24-hour and SCS 6-hour storms; using the SCSHYDRO computer program:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

where:

Q = Runoff in inches

P = Precipitation in inches

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

CN = Runoff Curve Number

2.7 Runoff Curve Numbers

Two curve numbers were utilized for the undisturbed areas. Areas with milder slopes (less than 30%) were given a runoff curve number of 75. All other undisturbed areas (30% slope or greater) were given a runoff curve number of 83. These numbers were taken directly from the approved “Mining and Reclamation Plan, Horse Canyon Mine, Emery County, Utah, Volume III”, submitted by I.P.A. The numbers in that plan were based on vegetation and soils data from on-site.

A runoff CN of 90 is used for all disturbed areas. This value is based on commonly used and approved values and from Table 2.20, (p. 82, Barfield, et al, 1983).

The following is a summary of runoff curve numbers used in these calculations:

Watershed	Runoff CN
Undisturbed (<30% slopes):	75
Undisturbed (>30% slopes):	83
Disturbed:	90

2.8 Culvert Sizing

Minimum culvert sizing is based on the either the inlet control nomograph or Manning's Equation. Culverts were evaluated for inlet control conditions to determine the minimum pipe size using the Culvert Nomograph included as Figure 1 of this Appendix. If the pipe had a HW/D ratio equal to or greater than 1.0 or the slope were less than 2% the Hydraulic Toolbox, Version 4.0 or later version computer program was used to determine the pipe flow diameter using:

$$D = \left(\frac{2.16\ Q\ n}{\sqrt{s}}\right)^{0.35}$$

where:	D	=	Required Diameter (feet)
	Q	=	QP = Peak Discharge (cfs)
	n	=	Roughness Factor (0.025 for CMP)
	S	=	Slope (ft. per ft.)

2.9 Culverts

Culverts have been sized according to the calculations previously described, and are shown on Plate 7-5, “Proposed Sediment Control”. Culverts carrying undisturbed drainages are designated with UC- Letters (i.e. UC-1). All undisturbed area drainage culverts will be fitted with trash racks to minimize plugging by rocks or other debris.

Trash racks will be provided at the inlet for all undisturbed drainage culverts. These will consist of 3/4" steel bars welded on 6" centers across the flared inlet structures of each culvert. Bars will be sloped from the front of the inlet structure up to the top of the culvert. This ramp configuration will allow trash, branches and other potential obstructions to be swept up and away from the inlet rather than being impinged against the grates during a flow event. Rip rap will be placed around the flared inlet structure and above it to a height of at least 6" above the required headwall for each culvert. (See Figure 4 for details). Trash racks will be checked on a routine schedule and following precipitation events and all trash, branches and other obstructions will be removed.

It should be noted that all undisturbed area culverts are adequately sized to handle the expected runoff from a 100 year - 6 hour event for maximum protection of the mine area, sediment pond and undisturbed drainage. This is well in excess of the 10 year - 6 hour event required by the regulations and is proposed as an extra measure of safety.

Disturbed area culverts and ditches are shown on the “Proposed Sediment Control”, Plate 7-5. Culverts carrying disturbed drainage are designated with a DC-number (i.e. DC-1). Calculations for all disturbed area culverts and ditches are also included with this report, along with design criteria. Disturbed drainage areas draining to culverts and ditches are marked with a DA-number (i.e. DA-1). It should be noted that at culvert DC-5, there is accomodation for the introduction of discharge of mine water at a rate of 4.5 cfs (2,020 gpm).

Culverts will be inspected regularly, and cleaned as necessary to provide for passage of drainage flows. Inlets and outlets shall also be maintained so as to prevent plugging or undue restriction of water flow.

All disturbed area culverts are temporary, and will be removed upon final reclamation.

2.10 Main Canyon Culvert - Outlet Structure

The outlet of culvert UC-1 has been designed to flow onto a rip-rap apron to protect against scouring and to allow for energy dissipation. The rip-rap apron is designed to fit the natural channel configuration as closely as possible, and will allow runoff to re-enter the natural channel at a reduced velocity which is no greater than natural flow conditions. Runoff from the 100 year - 6 hour precipitation event in the canyon below the minesite has been calculated at 55.60 cfs, including sediment pond overflow.

The rip-rap apron design is based on Figure 7-26, Design of Outlet Protection - Maximum Tailwater Condition, “Applied Hydrology and Sedimentology for Disturbed Areas”, Barfield, Warner and Haan, 1983. Based on the figure, the apron should be a minimum of 15' in length, widening from 5' to 9', with a 0.1% slope. The proposed length has been increased to 20', to ensure adequate time for velocity reduction. The apron slope is kept at 0.1%. Rip-rap size is conservatively placed at 12" D_{50}. Rip-rap will be placed to a depth of 1.5 D_{50} and will be placed on a 6" layer of 2" drain rock filter. Rip-rap will also be placed on the 2H:1V side slopes to the height of the culvert (5') at the culvert outlet tapering to 3' at the outlet of the apron. This rip-rap apron has been sized and designed to adequately dissipate energy from flow velocities of a 100 year - 6 hour precipitation event and resist dislodgement. The drain rock filter bed will also serve to secure the rip-rap boulders firmly in place, to add an additional element of stability, and prevent scouring underneath the armored apron. (See Figure 4A for construction details). The natural channel below the culvert has a gradient of approximately 7.76%. When the flow is routed from the culvert across the apron to the natural channel, the velocity is reduced from 6.31 fps at the culvert outlet to 1.54 fps at the outlet of the apron. (See Culvert Outlet Rip-Rap Apron Flow Velocity Calculations in Appendix 1.)

It should be noted that these calculations are based on a <u>100 year - 6 hour event</u>.

2.11 Ditches

All ditches will carry disturbed area drainage to the ponds. Ditches are shown on the "Proposed Sediment Control", Plate 7-5, and are designated with a DD-number (i.e. DD-1 for Disturbed Area Ditches) or UD-number (i.e. UD-1 for Undisturbed Area Ditches).

All ditches are designed to carry the expected runoff from a 10 year - 6 hour event with a minimum freeboard of 0.5' (See Table 8 and Figure 3).

Ditches which exhibit expected flow velocities of 5 fps or greater will be lined with rip-rap. A typical cross-section is shown on Figure 3 and flow depths and areas for all lined and unlined ditches are presented in Table 8 of this report.

Ditch slopes have been determined from Plates 7-2 and 7-5.

All ditches will be inspected regularly, and maintained to the minimum dimensions to provide adequate capacity for the design flow. All ditches are temporary and will be removed as described under the reclamation hydrology section. (Section 4)

TABLE 1

Undisturbed Watershed Summary		
Watershed	Drains To	Final
UA-1	UC-1	Right Fork Lila Canyon
UA-2	DD-1	Sediment Pond
UA-3	DD-1	Sediment Pond
UA-4	Sediment Pond	Sediment Pond
UA-5a	DD-14	Sediment Pond
UA-5b	DD-15	By-Pass Culvert
UA-6a	DD-2	Sediment Pond
UA-6b	DD-2	Sediment Pond
UA-7	ASCA Area	Left Fork Lila Canyon

TABLE 2

Disturbed Watershed Summary		
Watershed	Drains To	Final
DA-1	DD-1	Sediment Pond
DA-2	DD-2	Sediment Pond
DA-3	DD-3	Sediment Pond
DA-4	DD-4	Sediment Pond
DA-5	DD-5a	Sediment Pond
DA-6a	DC-6	Sediment Pond
DA-6b	DC-6	Sediment Pond
DA-7	DC-7	Sediment Pond
DA-8	DC-8	Sediment Pond
DA-9	DC-9	Sediment Pond
DA-10	DD-7	Sediment Pond
DA-11	DD-7	Sediment Pond
DA-12	DD-8	Sediment Pond
DA-13a	DD-15	Sediment Pond
DA-13b	DD-9	Sediment Pond
DA-14a	DD-10	Sediment Pond
DA-14b	DD-15	Sediment Pond
DA-15a	DD-11a	Sediment Pond
DA-15b	DD-11b	Sediment Pond
DA-16	DD-13	Sediment Pond
DA-17	POND 2	Sediment Pond
DA-18	DD-17	Sediment Pond
DA-19	~~DD-18~~Sediment Pond 2	Sediment Pond
Fan Portal	ASCA Area	Right Fork Lila Canyon
TS-1	Topsoil Berm	Sediment Pond
POND 1	Sediment Pond	Sediment Pond
POND 2	Sediment Pond	Sediment Pond

TABLE 3

Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Undisturbed Watersheds					
UA-1	258.29	9475	2020	21.32	75
UA-2	1.63	1360	1000	74.26	83
UA-3	2.40	660	410	62.12	83
UA-4	14.08	1950	595	30.51	83
UA-5a	1.05	340	54	15.88	75
UA-5b	1.63	600	68	11.33	75
UA-6a	0.54	230	80	34.78	83
UA-6b	0.46	90	30	33.33	83
UA-7	0.90	100	30	30.00	75
Disturbed Watersheds					
DA-1	1.25	610	79	12.95	90
DA-2	0.30	330	47	14.24	90
DA-3	0.25	240	10	4.17	90
DA-4	0.50	295	51	17.29	90
DA-5	2.87	580	103	17.76	90
DA-6a	0.17	150	28	18.67	90
DA-6b	0.50	315	61	19.37	90
DA-7	0.22	170	33	19.41	90
DA-8	0.41	400	50	12.50	90
DA-9	0.30	290	32	11.03	90
DA-10	0.13	250	35	14.00	90
DA-11	0.25	230	20	8.70	90
DA-12	4.38	875	85	9.71	90
DA-13a	1.29	480	59	12.29	90
DA-13b	2.05	470	32	6.81	90
DA-14a	0.59	630	43	6.83	90
DA-14b	0.63	720	43	5.97	90
DA-15a	1.55	650	87	13.38	90
DA-15b	3.11	710	71	10.00	90
DA-16	0.22	200	24	12.00	90
TS-01	1.87	310	53	17.10	75
POND 1	1.92	815	30	3.68	100

TABLE 3 (Continued)

Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Disturbed Watersheds					
DA-17	1.12	240	11	4.58	90
DA-18	0.48	370	37	10.00	90
DA-19	0.55	710	63	8.87	90
Fan Portal	0.60	195	25	12.82	90
POND 2	0.47	234	30	12.82	100

TABLE 4

Runoff Summary
Undisturbed Watersheds (Not Draining to Ponds)

Watershed	10 yr. / 6 hr. Peak Flow - cfs	25 yr. / 6 hr. Peak Flow - cfs	100 yr. / 6 hr. Peak Flow - cfs	10 yr. / 24 hr. Peak Flow - cfs	10 yr. / 24 hr. Volume - ac.ft.
UA-1	7.99	13.69	30.52	35.07	7.17
UA-7	0.05	0.12	0.29	0.36	0.03

TABLE 5

Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Undisturbed Watersheds draining to Pond #1				
UA-2	0.40	0.58	1.12	0.09
UA-3	0.62	0.89	1.70	0.13
UA-4	3.00	4.48	9.00	0.74
UA-5a	0.04	0.12	0.46	0.03
UA-5b	0.06	0.15	0.55	0.05
UA-6a	0.14	0.20	0.39	0.03
UA-6b	0.12	0.18	0.33	0.02
Disturbed Watersheds				
DA-1	0.64	0.82	1.29	0.11
DA-2	0.16	0.20	0.32	0.03
DA-3	0.13	0.17	0.26	0.02
DA-4	0.26	0.34	0.53	0.04
DA-5	1.48	1.90	3.00	0.24
DA-6a	0.09	0.12	0.18	0.01
DA-6b	0.26	0.34	0.53	0.04
DA-7	0.12	0.15	0.23	0.02
DA-8	0.21	0.27	0.43	0.03
DA-9	0.16	0.20	0.32	0.03
DA-10	0.07	0.09	0.14	0.01
DA-11	0.13	0.17	0.26	0.02
DA-12	2.16	2.79	4.46	0.37
DA-13a	0.66	0.85	1.35	0.11
DA-13b	1.04	1.34	2.12	0.37
DA-14a	0.29	0.38	0.60	0.56
DA-14b	0.31	0.40	0.64	0.05
DA-15a	0.79	1.02	1.60	0.13
DA-15b	1.56	2.01	3.20	0.26
DA-16	0.12	0.15	0.23	0.02
TS-1	0.96	1.24	1.95	0.05
POND 1	19.66	24.81	39.74	3.19

TABLE 5 (Continued)

Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Disturbed Watersheds				
Fan Portal	0.21	0.27	0.40	0.43
DA-17	0.58	0.74	1.17	0.09
DA-18	0.25	0.32	0.50	0.04
DA-19	0.27	0.35	0.56	0.05
POND 2	1.10	1.41	1.17	0.26

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
UC-1	Culvert	UA-1, Fan Portal, Sediment Pond Overflow
DD-1	Ditch	DA-1, UA-2, UA-3
DC-1	Culvert	DD-1
DD-2	Ditch	DC-1, DA-2, UA-6a, UA-6b
DC-2	Culvert	DD-2
DD-3	Ditch	DA-3
DC-3	Culvert	DD-3
DD-4	Ditch	DA-4, DC-2, DC-3
DC-4	Culvert	DD-4
DD-5a	Ditch	DA-5
DD-5b	Ditch	DD-5a
DD-6	Ditch	DA-6a
DC-5	Culvert	DD-5b, DD-6, Mine Water
DC-6	Culvert	DC-4, DC-5, DA-6b
DC-7	Culvert	DC-6, DA-7
DC-8	Culvert	DC-7, DA-8
DC-9	Culvert	DC-8, DA-9
DD-7	Ditch	DC-9, DA-10, DA-11
DC-10	Culvert	DD-7
DD-8	Ditch	DC-7, DA-12
DC-11	Culvert	DD-8
DD-9	Ditch	DC-11, DA-13b

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-12a	Culvert	DD-9
DC-12b	Culvert	DC-12a
DC-12c	Culvert	DC-12b
DC-12d	Culvert	DC-12c
DD-10	Ditch	DA-14a
DD-11a	Ditch	DA-15a
DD-11b	Ditch	DA-15b
DD-12	Ditch	DD-11a, DD-11b
DD-13	Ditch	DA-16
DD-14	Ditch	DD-12, DD-13, UA-5a
DD-15	Ditch	DD-14, DA-13a, DA-14b, UA-5b
DD-16	Ditch	DC-12d, DD-10, DD-15
DD-17	Ditch	DA-18
~~DD-18DitchDA-19~~ DC-13	Culvert	~~DD-18~~DA-17
DC-14	Culvert	~~DC-13~~DA-18, ~~DD-17~~DA-19

TABLE 7

Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	25yr. /6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
UC-1*	Culvert	33.07	38.77	60.15	55.60
DD-1	Ditch	1.66	0.66	4.11	- -
DC-1	Culvert	1.66	1.49	4.11	- -
DD-2	Ditch	2.08	1.81	5.15	- -
DC-2	Culvert	2.08	1.81	5.15	- -
DD-3	Ditch	0.13	0.14	0.26	- -
DC-3	Culvert	0.13	0.14	0.26	- -
DD-4	Ditch	2.47	2.44	5.94	- -
DC-4	Culvert	2.47	2.44	5.94	- -
DD-5a	Ditch	1.48	0.18	3.00	- -
DD-5b	Ditch	1.48	0.18	3.00	- -
DD-6	Ditch	0.09	3.46	0.18	- -
DC-5	Culvert	6.07	3.61	7.68	- -
DC-6	Culvert	8.94	3.89	14.15	- -
DC-7	Culvert	9.06	0.11	14.38	- -
DC-8	Culvert	9.27	0.11	14.81	- -
DC-9	Culvert	9.43	0.11	15.13	- -
DD-7	Ditch	9.63	0.11	15.53	- -
DC-10	Culvert	9.63	0.11	19.99	- -
DD-8	Ditch	11.79	4.00	19.99	- -
DC-11	Culvert	11.79	2.06	22.11	- -
DD-9	Ditch	12.83	1.52	22.11	- -
DC-12a	Culvert	12.83	3.58	22.11	- -
DC-12b	Culvert	12.83	3.12	22.11	- -
DC-12c	Culvert	12.83	3.12	22.11	- -

TABLE 7

Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	25yr. /6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
DC-12d	Culvert	12.83	0.12	22.11	- -
DD-10	Ditch	0.29	3.71	0.60	- -
DD-11a	Ditch	0.79	0.05	1.60	- -
DD-11b	Ditch	1.56	0.05	3.20	- -
DD-12	Ditch	2.35	1.68	4.80	- -
DD-13	Ditch	0.12	1.68	0.23	- -
DD-14	Ditch	2.51	0.62	5.49	- -
DD-15	Ditch	3.54	1.56	8.03	- -
DD-16	Ditch	16.66	2.18	30.74	- -
DD-17	Ditch	0.25	3.86	0.50	- -
~~DD-18Ditch0.27 4.500.56- -~~ DC-13	Culvert	0.27	4.50	0.56	- -
DC-14	Culvert	0.52	4.74	1.73	- -
POND 1	Pond	19.66	24.81	39.74	- -
POND 2	Pond	1.10	1.41	1.17	- -

* UC-1flow values includes sum of peak flows for UA-1 from Table 4 and 25yr-6hr Sediment Pond 1 peak flow of 24.81 cfs & Fan Portal flow from Table 5- 0.27cfs.

TABLE 8

Disturbed Ditch Design Summary

Ditch	DD-1	DD-2	DD-3	DD-4	DD-5a	DD-5b
Slope (%)	1~~3~~2.~~01~~82	11.~~98~~64	1.11	13.~~56~~85	3.33	~~55.45~~54.54
Length (ft.)	6~~07~~21	33~~4~~7	180	29~~5~~9	390	1~~10~~26
Manning's No.	0.035	0.035	0.03	0.035	0.03	0.04
Side Slope (H:V)	3:1	3:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	2.00	2.00	0.00	2.00	2.00	2.00
Peak Flow 10/6 (cfs)	1.66	2.08	0.13	2.47	1.48	1.48
Peak Flow 10/24 (cfs)	4.11	5.15	0.26	5.94	3.00	3.00
Flow Depth (ft.) 10/6	0.17	0.19	0.24	0.21	0.21	0.11
Flow Depth (ft.) 10/24	0.27	0.32	0.31	0.35	0.32	0.17
Flow Area (ft.^{2}) 10/6	0.41	0.49	0.11	0.51	0.52	0.25
Flow Area (ft.^{2}) 10/24	0.77	0.93	0.18	0.93	0.84	0.40
Velocity (fps) 10/6	4.03	4.22	1.17	4.86	2.84	5.93
Velocity (fps) 10/24	5.35	5.55	1.39	6.39	3.55	7.58
Rip-Rap Req'd (Y/N)	N	N	N	N	N	Y
Rip-Rap D_{50}	-	-	-	-	-	3"
Note: Slope/Lengths from Plate 7-2.						

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-6	DD-7	DD-8	DD-9	DD-10	DD-11a	DD-11b
Slope (%)	4.74	7.~~508.11~~28	2.22	3.10	6.00	0.97	0.51
Length (ft.)	2~~00~~12	1~~48~~51	142	265	417	206	394
Manning's No.	0.03	0.035	0.03	0.035	0.03	0.03	0.03
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	0.00	2.00	2.00	2.00	0.00	0.00	2.00
Peak Flow 10/6 (cfs)	0.09	9.63	11.79	12.83	0.29	0.79	1.56
Peak Flow 10/24 (cfs)	0.18	15.53	19.99	22.11	0.60	1.60	3.20
Flow Depth (ft.) 10/6	0.14	0.52	0.74	0.77	0.23	0.48	0.37
Flow Depth (ft.) 10/24	0.63	0.66	0.97	1.01	0.31	0.62	0.55
Flow Area ($ft.^2$) 10/6	0.04	1.56	2.58	2.72	0.11	0.45	1.03
Flow Area ($ft.^2$) 10/24	0.07	2.21	3.80	3.47	0.19	0.77	1.72
Velocity (fps) 10/6	2.18	6.16	4.56	4.71	2.68	1.74	1.52
Velocity (fps) 10/24	2.59	7.04	5.26	5.45	3.22	2.08	1.87
Rip-Rap Req'd (Y/N)	N	Y	N	N	N	N	N
Rip-Rap D_{50}	-	3"	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-12	DD-13	DD-14	DD-15	DD-16	DD-17	~~DD-18~~
Slope (%)	30.86	5.~~16~~63	1~~1~~0.~~015.97~~67	6.50	2.29	~~8.43~~7.~~75~~85	
Length (ft.)	8~~1~~5	1~~55~~60	3~~27~~30	7~~2~~10	260	4~~15~~34	~~710~~
Manning's No.	0.04	0.03	0.032	0.03	0.03	0.03	~~0.03~~
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	~~2:1~~
*Bottom Width (ft.)	0.0	2.0	2.0	2.0	4.0	0.0	~~0.0~~
Peak Flow 10/6 (cfs)	2.35	0.12	2.51	3.54	16.66	0.25	~~0.27~~
Peak Flow 10/24 (cfs)	4.80	0.23	5.49	8.03	30.74	0.50	~~0.56~~
Flow Depth (ft.) 10/6	0.17	0.17	0.21	0.30	0.66	0.21	~~0.22~~
Flow Depth (ft.) 10/24	0.26	0.22	0.33	0.47	0.92	0.27	~~0.28~~
Flow Area ($ft.^2$) 10/6	0.41	0.06	0.52	0.77	3.51	0.09	~~0.09~~
Flow Area ($ft.^2$) 10/24	0.66	0.10	0.89	1.38	5.39	0.14	~~0.16~~
Velocity (fps) 10/6	5.74	2.03	4.84	4.57	4.75	2.94	~~2.90~~
Velocity (fps) 10/24	7.26	2.39	6.18	5.84	5.70	3.49	~~3.48~~
Rip-Rap Req'd (Y/N)	Y	N	N	N	N	N	~~N~~
Rip-Rap D_{50}	3"	-	-	-	-	-	~~-~~
Note: Slope/Lengths from Plate 7-2.							

TABLE 9

Disturbed Culvert Design Summary

Culvert	DC-1	DC-2	DC-3	DC-4	DC-5	DC-6
Slope (%)	11.67	10.00	53.85	9.~~81~~19	4.~~60~~38	28.~~04~~97
Length (ft.)	60	60	65	27~~0~~4	250	107
Manning's No.	0.024	0.024	0.024	0.024	0.024	0.024
Peak Flow 10/6 (cfs)	1.66	2.08	0.13	2.47	6.07	8.94
Peak Flow 10/24 (cfs)	2.85	3.37	0.21	0.17	0.17	0.17
Diam. Proposed (ft.)	1.5	1.5	1.5	2.0	2.0	2.0
Velocity (fps) 10/6	6.72	6.79	5.32	6.86	6.80	14.50
Rip-Rap D_{50}	3"	3"	3"	3"	3"-	-*

Note: Slope/Lengths from Plate 7-5.
Velocity: (Haestad Methods, Flowmaster Program)

* Discharge is into manhole - no riprap needed

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-7	DC-8	DC-9	DC-10	DC-11	DC-12a
Slope (%)	~~7~~5.~~74~~84	5.~~99~~35	~~5~~8.~~912.27~~06	3.~~31~~33	4.00	0.~~48~~71
Length (ft.)	155	16~~7~~8	186	60	~~35~~25	140
Manning's No.	0.024	0.024	0.024	0.024	0.024	0.015
Peak Flow 10/6 (cfs)	9.06	9.27	9.43	9.63	11.79	12.83
Peak Flow 10/24 (cfs)	14.38	14.81	15.13	15.53	19.99	22.11
Diam. Proposed (ft.)	2.0	2.0	2.0	2.0	2.0	2.5
Velocity (fps) 10/6	9.18	8.41	8.41	5.94	7.20	5.15
Rip-Rap D_{50}	3"	3"	3"	3"	3"	-*
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster Program)						

* Discharge is into manhole - no riprap needed

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-12b**	DC-12c**	DC-12d	DC-13	DC-14	SP2-1*
Slope (%)	1.~~55~~32	2.~~46~~54	-0.12	29.~~22~~10	11.2	0.50
Length (ft.)	7~~9~~6	35~~7~~4	9	~~45~~60	25	165
Manning's No.	0.015	0.015	0.015	0.024	0.024	0.024
Peak Flow 10/6 (cfs)	12.83	12.83	12.83	0.27	0.52	-
Peak Flow 10/24 (cfs)	22.11	22.11	22.11	0.56	1.06	2.72*
Diam. Proposed (ft.)	2.0	2.0	2.5	1.5	1.5	1.50
Velocity (fps) 10/6	8.80	10.65	4.74	2.72	5.80	2.45
Rip-Rap D_{50}	3"	3"	-	-	3"	-
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster Program)						

* SP2-1 Peak Flow is a 25/6 event

** Discharge is into a manhole - no riprap required

TABLE 10

Undisturbed Culvert Design Summary		
Culvert	UC-1	
Min. Slope (%)**	0.50	
Length (ft.)	480	
Manning's No.	0.025	
Peak Flow 10/6 (cfs)*	33.07	
Peak Flow 100/6 (cfs)*	55.60	
Diam. Proposed (ft.)	5.00	
Velocity (fps) 100/6	5.22	

* Note: Peak flow values include 25 year-6 hour flow from Sediment Pond 1 (see Tables 4 and 7).
** Pipe slope from Plate 7-6a.

References:

Hawkins, R.H. and K.A. Marshall. 1979. Storm Hydrograph Program. Final Report to the Utah Division of Oil, Gas and Mining. Utah State University. Logan, Utah.

DESIGN OF SEDIMENT CONTROL STRUCTURES

Design Specifications:

Tables:

Figures:

3.1 Design and Construction Specifications for Sedimentation Pond

- All construction of sedimentation ponds will be performed under the direction of a qualified, registered professional engineer.

- The sediment pond #1 will be located in an existing low area where the Right Fork of Lila Canyon passes beneath the existing road. The existing road fill and culvert will be removed, and the pond embankment (road fill) will be reconstructed and compacted. The existing culvert will be replaced with UC-1 which will extend approximately 400' up the Right Fork of Lila Canyon. This culvert will be equipped with an inlet section and trash rack, and will allow undisturbed runoff and treated access road drainage to pass beneath the sediment pond. The majority of the pond will be in an existing channel area, and is therefore considered incised. The pond will be equipped with a culvert riser principal spillway with an oil skimmer, a decant, and a second culvert riser emergency spillway with an oil skimmer. Both spillways will discharge to the oversized (60") CMP culvert running beneath the pond.

- The area of pond constructed shall be examined for topsoil, and where present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.

- In areas where fill is to be placed for the pond impoundment structures, natural ground shall be removed to at least 12" below the base of the structure.

- Native materials shall be used where practical. Fill will be placed in lifts not to exceed 6" and compacted prior to placement of next lift. Compaction of all fill materials shall be at least 95%.

- Rip-rap or other protection (culverts, concrete, etc.) will be placed at all pond inlets to prevent scouring. Rip-rap will consist of substantial, angular (non-slaking) rock material of adequate size.

- Decanting of the pond, as required, will be accomplished by use of a decant pipe with an inverted inlet as shown on Plate~~ 7-6~~s 7-6a and 7-6b. Samples will be collected prior to decanting of the pond. If the quality of the water meets the requirements of the U.P.D.E.S. Permit, decanting will proceed. Discharge samples will be collected as per the approved U.P.D.E.S. Discharge Permit.

- Slopes of the embankments shall not be steeper than 2h:1v, inside or outside, with a total of the inslope and outslope not less than 5h:1v, except where areas of the pond are incised.

- External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability.

- Top width of the embankment shall be not less than (H+35)/5, where H = Height of Dam in feet from the upstream toe.

3.2 Sediment Yield

The Universal Soil Equation (USLE) was used to estimate sediment yield from disturbed areas. All soil loss from this area was assumed to be delivered to, and deposited in the sedimentation pond.

Erosion rate (A) in tons-per-acre-per-year is determined using the USLE as follows:

$$A = (R)\,(K)\,(LS)\,(CP)$$

Where the variables R, K, LS, and CP are defined as follows:

Variable "R" is the rainfall factor which can be estimated from $R = 27P^{2.2}$; where P is the 2-year, 6-hour precipitation value. P for the Lila Canyon area is 0.75" as shown in Figure 5.4, page 315, Barfield, et.al. 1983. Therefore, the estimated value of "R" for this area is 14.34.

Variable "K" is the soil erodibility factor. For disturbed areas, the "K" value is conservatively estimated to be 0.5. For disturbed runoff, but uncompacted and ungraded areas, "K" is estimated at 0.320. "K" is estimated to be 0.035 for undisturbed areas.

Variable "LS" is the length-slope factor. This figure was determined by applying the slope length and percentage for each sub-drainage area to the chart in Figure 5.15, p. 334, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983.

Variable "CP" is the control practice factor, which can be divided into a cover and practice factor. Values were determined from Appendix 5A, Barfield, et.al., 1983.

Site	CP Factor
Compacted Areas	1.20
Disturbed/Uncompacted Areas	0.20
Undisturbed Areas	0.15

The sediment volume is based on a density of 100 pounds per cubic foot of sediment.

SEDIMENT YIELD CALCULATIONS - USLE - Drainages to Sediment Ponds

Drainage	R	K	Area (ac)	Slope Length (Ft)	Slope (%)	LS	CP	A (T/ac)	Yield (ac-ft)
Draining to Sediment Pond 1									
DA-1	14.34	0.500	1.25	610	12.95	4.99	1.20	42.93	0.0246
DA-2	14.34	0.500	0.30	330	14.24	4.26	1.20	36.67	0.0051
DA-3	14.34	0.500	0.25	240	4.17	0.59	1.20	5.09	0.0006
DA-4	14.34	0.500	0.5	295	17.29	5.50	1.20	47.29	0.0109
DA-5	14.34	0.500	2.87	580	17.76	8.05	1.20	69.26	0.0913
DA-6a	14.34	0.500	0.17	150	18.67	4.44	1.20	38.20	0.0030
DA-6b	14.34	0.500	0.50	315	19.37	6.83	1.20	58.79	0.0135
DA-7	14.34	0.500	0.22	170	19.41	5.04	1.20	43.36	0.0044
DA-8	14.34	0.500	0.41	400	12.50	3.82	1.20	32.90	0.0062
DA-9	14.34	0.500	0.30	290	11.03	2.69	1.20	23.14	0.0032
DA-10	14.34	0.500	0.13	250	14.00	3.61	1.20	31.06	0.0019
DA-11	14.34	0.500	0.25	230	8.70	1.68	1.20	14.50	0.0017
DA-12	14.34	0.500	4.38	875	9.71	3.86	1.20	33.22	0.0668
DA-13a	14.34	0.500	1.29	480	12.29	4.08	1.20	35.12	0.0208
DA-13b	14.34	0.500	2.05	470	6.81	1.71	1.20	14.75	0.0139
DA-14a	14.34	0.500	0.59	630	6.83	1.99	1.20	17.13	0.0046
DA-14b	14.34	0.500	0.63	720	5.97	1.79	1.20	15.36	0.0044
DA-15a	14.34	0.500	1.55	650	13.38	5.42	1.20	46.66	0.0332
DA-15b	14.34	0.500	3.11	710	10.00	3.63	1.20	31.24	0.0446
DA-16	14.34	0.500	0.22	200	12.00	2.54	1.20	21.84	0.0022
UA-2	14.34	0.500	1.63	1360	73.53	110.75	0.15	119.11	0.0891
UA-3	14.34	0.500	2.40	660	62.12	62.05	0.15	66.73	0.0735
UA-4	14.34	0.500	14.08	1950	30.51	36.93	0.15	38.64	0.2498
UA-5a	14.34	0.500	1.05	340	15.88	5.15	0.15	5.53	0.0027
UA-5b	14.34	0.500	1.63	600	11.33	4.03	0.15	4.33	0.0032
UA-6a	14.34	0.500	0.54	230	34.78	15.27	0.15	16.42	0.0041
UA-6b	14.34	0.500	0.46	90	33.33	8.92	0.15	9.59	0.0020
TS-01*	14.34	0.500	1.87	660	17.10	8.08	0.20	11.58	0.0099
POND 1	14.34	0.500	1.92	340	3.68	0.59	1.20	5.11	0.0045
TOTAL									0.7957
Draining to Sediment Pond 2									
DA-17	14.34	0.500	1.12	240	4.58	0.66	1.20	5.68	0.0029
DA-18	14.34	0.500	0.48	370	10.00	2.62	1.20	22.55	0.0050
DA-19	14.34	0.500	0.55	710	8.87	3.05	1.20	26.22	0.0066
POND 2	14.34	0.500	0.47	45	12.82	1.33	1.20	11.48	0.0025
TOTAL									0.0269

* Disturbed Runoff / Uncompacted Area
** Paved Areas

3.3 Sediment Pond Volume

The volumes shown in Tables 11a and 11b are from the volumes calculated from the precipitation, runoff and sediment yield for a 10 year-24 hour precipitation event. The volumes were calculated based on the disturbed areas (and contributing undisturbed areas) runoff values, developed using the design parameters described in this section.

TABLE 11a

Sediment Pond #1 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (3.17 ac-ft, from Table 5, 10yr/24hr Vol) =	3.17 ac-ft [1]
3. Sediment Storage Volume USLE 0.7957 ac-ft./yr. x 3.5 yrs. =	2.87 ac-ft
4. Total Required Pond Volume 3.17 + 2.87 =	6.04 ac-ft
5. Peak Flow (25 yr. - 6 hr. event) =	24.81 cfs [2]
6. Pond Design Volume @ Principle Spillway = (See Table 12a)	13.04 ac-ft
7. Mine water storage [3]	7.00 ac-ft

(1) This includes flow from UA-5 within mine boundary. There is a possibility that this undisturbed area may be needed if the surface facilities were to be expanded.

(2) This is to allow for flow from UA-5. There is a possibility that UA-5 may be needed if the surface facilities were to be expanded.

(3) difference in storage between the top of the require storm water storage and the spillway elevation

TABLE 12a

Sediment Pond #1 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (cu. ft.)	Acc. Volume (ac. ft.)	Remarks
5839	26870	0	0.00	Bottom of Pond
5830	28640	27755	0.64	
5831	30480	29560	1.32	Sediment Storage - 2.87 ac-ft
5842	32320	31400	2.04	
5843	34210	33265	2.80	Sediment Cleanout Level 5843.6
5844	36140	35175	3.61	Decant 5844.6 - 4.21 ac-ft
5845	38110	37125	4.46	Runoff Storage - 3.17 ac-ft
5846	40120	39115	5.36	
5847	42160	41140	6.30	Runoff + Sed Storage - 6.04 ac-ft
5848	44260	43210	7.29	
5849	46390	45325	8.33	
5850	48550	47470	9.42	Mine Water Storage - 7.00 ac-ft
5851	50970	49760	10.57	
5852	53490	52230	11.77	
5853	55010	54250	13.01	Principal Spillway - 5853
5854	56590	55800	14.29	Emergency Spillway - 5854
5855	58380	57485	15.61	Top of Embankment

TABLE 11b

Sediment Pond #2 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (from Table 5, 10yr/24hr) =	0.31 ac-ft.
3. Sediment Storage Volume USLE 0.0269 ac-ft./yr. x 3 yrs. =	0.08 ac-ft
4. Total Required Pond Volume 0.31 + 0.08 =	0.39 ac-ft
5. Peak Flow (25 yr. - 6 hr. event)* =	1.41 cfs
6. Pond Design Volume @ Principle Spillway = (See Table 12b)	1.36 ac-ft
* Peak Flow values from Table 5, sum of all contributing watersheds.	

TABLE 12b

Sediment Pond #2 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (cu. ft.)	Acc. Volume (ac. ft.)	Remarks
5845	0	0	0	Bottom of Pond 5845.0
5846	312	156	0.00	
5847	6935	3623.5	0.08	Sediment Cleanout Level 5847.0
5848	8045	7490	0.26	Decant 5847.9
5849	8650	8348	0.45	
5850	9270	8960	0.65	Principal Spillway 5849.61
5851	9910	9590	0.87	
5852	10560	10235	1.11	Emergency Spillway 5851.25
5853	11230	10895	1.36	
5854	11920	11575	1.62	
5855	12890	12406	1.91	
5855.5	14120	6753	2.06	Top of Embankment

TABLE 13a

Sediment Pond #1 Stage/Discharge Data			
Head above Spillway(ft.)	Q (cfs) Weir Controlled	Q (cfs) Orfice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	2.53	15.22	95.68
0.4	7.15	21.53	96.23
0.6	13.14	26.36	96.77
0.8	20.23	30.44	97.31
1.0	28.27	34.04	97.85
1.2	37.17	37.28	98.38
1.4	46.84	40.27	98.91
1.6	57.22	43.05	98.91
1.8	68.28	45.66	99.44
2.0	79.97	48.13	99.97

Note: 1- 25 year - 6 hour flow = 24.81 cfs.
2- Flow will be weir controlled at a head of 0.91' over riser inlet.

Weir Controlled

$Q = CLH^{1.5}$; where: C= 3.0, L= Circumference of Riser = 9.4248', R=1.5'

Orfice Controlled

$Q = C'a\,(2gH)^{0.5}$; where: C= 0.6, a= Area of Riser = 7.0686 ft^2, R=1.5', g= 32.2 ft/sec^2

Pipe Flow Controlled

$$Q = \frac{a\,(2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$$

; where
a = Area of Pipe = 7.07 ft^2, R = 1.5'
H' = Head = H + 14.5 (Riser) + 0.35 (Slope) + 0.6*4 (barrel height)
Ke = 1.0
Kb = 0.5
Kc = 0.043
L = 70'

TABLE 13b

Sediment Pond #2 Stage/Discharge Data			
Head above Spillway (ft.)	Q (cfs) Weir Controlled	Q (cfs) Orfice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	0.84	1.69	5.81
0.4	2.38	2.39	5.88
0.6	4.38	2.93	5.95
0.8	6.74	3.38	6.02
1.0	9.42	3.78	6.09
1.2	12.39	4.14	6.16
1.4	15.61	4.47	6.22
1.6	19.07	4.78	6.29
1.8	22.76	5.07	6.36
2.0	26.66	5.35	6.42

Note: 1- 25 year - 6 hour flow =1.41 cfs.
2- Flow will be Weir controlled at a head of 0.36' over riser inlet.

Weir Controlled

$Q = CLH^{1.5}$; where: C= 3.0, L= Circumference of Riser =3.14', R=0.5'

Orfice Controlled

$Q = C'a\,(2gH)^{0.5}$; where: C= 0.6, a= Area of Riser = 0.79 ft^2, R=0.5', g= 32.2 ft/sec^2

Pipe Flow Controlled

$$Q = \frac{a\,(2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$$

; where

a = Area of Pipe = 0.79 ft^2, R = 0.5'
H' = Head = H + 6.0 (Riser) + 0.8 (Slope) + 0.6*2 (barrel height)
Ke = 1.0
Kb = 0.5
Kc = 0.043
L = 160'

3.4 Sediment Pond Summary

a) The sedimentation ponds have been designed to contain the disturbed area (and contributing undisturbed area) runoff from a 10 year-24 hour precipitation event, along with multiple years of sediment storage capacity. Runoff to the ponds will be directed by various ditches and culverts as described in the plan.

b) The required volume for Sediment Pond #1 is calculated at 6.04 acre feet, including 3.5 years of sediment storage. The proposed sediment pond size will have a volume of approximately 13.0~~4~~1 acre feet (at the principal spillway), which is more than adequate. The extra storage 7 acre-foot in Pond 1 will be used for optional mine water handling. The required volume for Sediment Pond #2 is calculated at 0.39 acre feet, including 3 years of sediment storage. The proposed sediment pond size will have a volume of approximately ~~1~~0.~~36~~57 acre feet (at the principal spillway), which is more than adequate.

c) The ponds will meet a theoretical detention time of 24 hours. Both are equipped with a decant, a culvert principal spillway and a culvert emergency spillway. Any discharge from the ponds will be in accordance with the approved UPDES Permit.

d) The pond inlets will be protected from erosion, and the spillways will discharge into the natural drainages in a controlled manner.

e) The ponds are temporary, and will be removed upon final reclamation of the property.

f) The ponds will be constructed according to the regulations and under supervision of a Registered, Professional Engineer.

DESIGN OF DRAINAGE CONTROL STRUCTURES FOR RECLAMATION

Reclamation Hydrology:

Tables:

Figures:

Reclamation Hydrology

4.1 General

Upon completion of operations at the Lila Canyon Minesite, the portals will be sealed and backfilled and all structures will be removed except for the sediment ponds, bypass culvert UC-1, reclamation ditches and temporary sediment controls such as silt fences or straw bales.

Any refuse or mine development waste previously deposited under the approved plan will also be left in place. Concrete will be buried beneath at least 2' of non-toxic, non-acid material. Any potentially toxic or acid-forming material buried on site will be covered with a minimum of 4' of material.

The sediment ponds, and all remaining drainage controls will be removed upon completion of Phase II Bond Release.

4.2 Reclamation Area Drainage Control

During the initial phase of reclamation, all drainage controls will be removed with the exception of the two sediment ponds, bypass culvert UC-1, reclaimed ditches RD-1 and RD-2 and temporary sediment controls such as straw bales or silt fences installed in the undisturbed drainages.

As undisturbed drainage culverts are removed, a minimum of two straw bale or silt fence barriers will be installed downstream of each location for sediment control purposes.

Disturbed areas will be regraded and reclaimed ditches RD-1 and RD-2 will be installed to collect the runoff from the site area and direct it to the outlet structures (see Plate 7-7).

When the vegetation and sediment contribution levels meet requirements for Phase II Bond Release, a series of at least three straw bale or silt fence barriers will be placed downstream of the sediment pond outlets. All upstream sediment controls will be removed. Reclaimed ditches RD-1 and RD-2 will also be removed, regraded and reseeded. Culvert UC-1 will be cut off at the location of the principal pond spillway.

The portion of culvert UC-1 remaining beneath the road will be left as a permanent drainage control. The culvert will be equipped with an inlet section and rip-rapped headwall. The culvert is adequately sized to safely pass runoff from a 100 year - 6 hour event, as shown in Table 10. To ensure that state of the art technology is incorporated, the final reclamation plans for the sedimentation pond areas will be submitted prior to commencement of final reclamation of this area.

The remainder of culvert UC-1 will be removed, and the natural channel restored through the sediment pond #1 area. The sediment pond structures will also be removed, the pond areas regraded as necessary and reseeded. The pond #1 embankment will remain as a permanent feature, since the existing (and proposed future) road through the area passes over the embankment.

Following the successful establishment of vegetation and when effluent standards are met, the sediment ponds will be removed. The same methodologies relative to recontouring, top soil application and seeding will be utilized in grading and revegetating the pond areas as outlined in Chapters 2, 5, and Appendix 5-8.

The pond embankment will be narrowed to facilitate the even character of the Lila Canyon Road. The 60 inch bypass culvert (UC-1) will be removed to within six feet of the road embankment. A newly formed channel will be constructed at an approximate four percent grade to intercept the inlet of the culvert at its intersection of the road. The road embankment and associated new channel will be armored by the Operator with an underlayment of filter gravel, with D_{50} -30 inch rip-rap. The new area of disturbance including the newly formed channel will have top soil spread in and around the rip-rap. The Operator will use the same seeding and mulching methods described in Appendix 5-8 will be used on this area as well. See Figure 4 for a detailed design.

TABLE 14

Final Reclamation Drainage Areas Contributing to Structures	
Channel	Contributing Watershed/Structure
RD-1	RW-1
RD-2	RW-2
UC-1	UA-1, UA-4, RD-1

TABLE 15

Final Reclamation Drainage Structure Flow Summary	
Channel	*100/6 Flow (cfs)
RD-1	13.26
RD-2	10.89
UC-1	**72.62

* CN = 83.
** Combined flow for watersheds UA-1, UA-4, and RW-2.

TABLE 16

Final Reclamation Reclamation Structure Design Parameters					
Channel	Bottom Width (ft.)	Side Slope H:V	Slope %	Reclaimed Depth (ft.)	Manning's No.
RD-1	3	2:1	5.00	1.5	0.035
RD-2	3	2:1	10.00	1.5	0.035
UC-1	60" Diam.	-	0.90*	60" Diam.	0.025

* Pipe slope for Plate 7-6

TABLE 17

Final Reclamation Reclamation Structure Flow Calculations			
Channel	RD-1	RD-2	UC-1
100 year - 6 hour event (in.)	1.90	1.90	1.90
Peak Flow (cfs)	13.26	10.89	72.62
Velocity (fps)	5.44	6.52	6.74
Required Area (ft.^{2})	2.44	1.67	10.80
Flow Depth (ft.)	0.58	0.43	2.69

Alternate Sediment Control for Fan Site and Topsoil Storage Area

5.1 ASCA Areas

Sediment Control at the slope below water treatment area, and topsoil storage area sites will be accomplished with a combination of one or more of the following: berms, silt fences, and straw bales.

The ventilation breakouts are just punch outs and will have insignificant disturbance associated with them. (Plate 5-2) However, they are addressed as ASCA's and are addressed here even though there will be only insignificant surface disturbance. The ASCA's will be seeded upon final reclamation.

The topsoil collected from the topsoil storage area sites will be located downslope from the sites and will be used in the construction of the berm. The berm will be constructed a minimum of two feet high and have 2:1 side slopes. The berm will control the flow from a 10 year-24 hour precipitation event. Silt fence will be selectively placed to help control run-off. The berm will be stabilized with vegetation to prevent erosion. As much as practical, the vegetation techniques used on the main topsoil pile will be utilized on the fan topsoil berm.

The outside of the berm will be protected with a silt fence or gravel. The gravel, if used, would help augment the revegetation. Construction details of the silt fence/filter fence are shown if Figure 5.

The outslope of the portal access road, outslope of the water treatment pad, and ventilation break outs will have a silt fence located along the disturbed area boundary to treat the runoff from the slope. While some portions of this area will be disturbed as a result of the fill material placed for the pad and road construction, the major portion of this area is expected to remain undisturbed. As an added protection, the portions of the area that are disturbed by the fill placement will be covered with a erosion control mat to minimize the erosion from this slope and that area seeded to aid in the establishment of a vegetative cover.

Due to lack of final engineering details, the exact location of the berms, silt fences, and subsequent erosion techniques will be determined in field with the approval of UDOGM. The final determination will be made prior to the start of topsoil removal.

Run-off Calculations

5.2 Ventilation Break Outs

Insignificant surface disturbance.

5.3 Topsoil Storage Area

Acreage:	2.61 acres
Design Storm:10 year/24 hour:	1.90"
CN:	90
S:	1.111

$$Q = \frac{(P-0.25S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.22 acre feet

5.4 Water Treatment Area

Acreage:	0.37 acres
Design Storm:10 year/24 hour:	1.90"
CN:	90
S:	1.111

$$Q = \frac{(P-0.2S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.03 acre feet

Lila Canyon Mine
Watershed Peakflow Calculations

Lila Canyon Mine
Ditch And Culvert Calculations

Save Print

APPLICATION FOR COAL PERMIT PROCESSING

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

Permittee: Horse Canyon Mine Lila Canyon
Mine:
Permit Number: C/007/013
Title: Bond Update

Description, Include reason for application and timing required to implement:

Bond Release on reclaimed areas TS- 8, 10 11 and portions of 7

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

☐ Yes ☒ No 1. Change in the size of the Permit Area? Acres: ________ Disturbed Area: ________ ☐ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# ________
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☒ Yes ☐ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☐ Yes ☒ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # ________
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: ________
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☒ Yes ☐ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☒ Yes ☐ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☒ Yes ☐ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☒ Yes ☐ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?
☐ Yes ☒ No 24. Does the application include confidential information and is it clearly marked and separated in the plan?

Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) copies, thank you. (These numbers include a copy for the Price Field Office)

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

Print Name ________ Position ________ Date ________ Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this ____ day of ________, ______

Notary Public: ________, state of Utah.

My commission Expires: ________ }
Commission Number: ________ } ss:
Address: ________ }
City: ________ State: ____ Zip: ________ }

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining

Form DOGM- C1 (Revised December 10, 2007)

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Horse Canyon Mine Lila Canyon
Mine:
Permit Number: C/007/013
Title: Bond Update

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	☒ Replace	☐ Remove	Redline Total Bond Cost
☐ Add	☒ Replace	☐ Remove	Redline Total Dem. page and Culvert page under Dem Cost
☐ Add	☒ Replace	☐ Remove	Redline Total Earth, Backfill and Support pages
☐ Add	☒ Replace	☐ Remove	Plate 7-2 Disturbed Area Hydrology and Watershed Map
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
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☐ Add	☐ Replace	☐ Remove	

Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	Received by Oil, Gas & Mining

Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	New Cost
Office Bathouse																			$100,178	
Shop Warehouse																			$128,779	
Security Shack																			$893	
Mine Substation																			$11,165	
Underground Power Lines																			left in place	
Water Treatment Plant																			$2,009	
Potable Water Tank																			$1,374	
Process Water Tank																			$1,374	
Sewer Tank																			$1,431	
Drain Field																			left in place	
Ventilation fan																			$52,024	
Coveyor Tunnels to Coal Stockpile																			$33,336	
Conveyor ROM Stockpile to Crusher																			$12,084	
Conveyor Crusher to Loadout Bin																			$8,475	
Conveyor Loadout Bin Truck Loadout																			938	
Reclaim Escape Tunnel Fan Fan House																			18,981	
Conveyor Storage Pile Staking Tube																			11,936	
Crusher Scree Plant																			5,037	
Truck Scale to Loadout																			$8,033	
Coal Storgae Pile																			$4,134	
Gruad Rail																			$4,149	
Underground Pipes																			left in place	
Chain Link Fence																			$5,118	
Mine Facilities Rd Truck Loadout RD																			$32,900	
Offece Bathhouse Warehouse Parking																			$55,823	
Mine Parking																			$14,016	
Fuel Tanks																			$2,842	
Powder and Cap Magizine																			$2,440	
Culverts																			~~13534~~	$26,387
Old Horse Canyon Fan Portals in Lila Canyon																			$5,000	
Lila Ventilation Portals North and South																			$26,000	
Pole Barn																			$6,413	
Rock Dust Silo																			$2,201	
Total																			~~$572,617~~	$585,470

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length		Width		Height		Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	New Quantity	Unit	Cost	New Costs
	Culverts																								
	DC-1	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	60		1.5		3									FT			10	CY		17
	DC-1	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	60		1.5		3									FT			10	CY		19
	DC-2	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	60		1.5		3									FT			10	CY		17
	DC-2	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	60		1.5		3									FT			10	CY		19
	DC-3	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	65		1.5		3									FT			11	CY		19
	DC-3	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	65		1.5		3									FT			11	CY		21
	DC-4	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	274		2		3									FT			61	CY		104
	DC-4	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	274		2		3									FT			61	CY		117
	DC-5	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	~~50~~	250	~~1.5~~	2	3									FT		~~8~~	56	CY	~~14~~	96
	DC-5	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	~~50~~	250	~~1.5~~	2	3									FT		~~8~~	56	CY	~~15~~	108
	DC-6	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	~~80~~	107	2		3									FT		~~18~~	24	CY	~~31~~	41
	DC-6	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	~~80~~	107	2		3									FT		~~18~~	24	CY	~~35~~	46
	DC-7	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	~~110~~	155	2		3									FT		~~24~~	34	CY	~~41~~	58
	DC-7	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	~~110~~	155	2		3									FT		~~24~~	34	CY	~~46~~	65
	DC-8	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	~~85~~	168	~~1.5~~	2	3									FT		~~14~~	37	CY	~~24~~	63
	DC-8	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	~~85~~	168	~~1.5~~	2	3									FT		~~14~~	37	CY	~~27~~	71
	DC-9	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	~~40~~	186	~~1.5~~	2	3									FT		~~7~~	41	CY	~~12~~	70
	DC-9	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	~~40~~	186	~~1.5~~	2	3									FT		~~7~~	41	CY	~~13~~	79
	DC-10	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	60		2		3									FT			13	CY		22
	DC-10	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	60		2		3									FT			13	CY		25
	DC-11	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	25		2		3									FT			6	CY		10
	DC-11	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	25		2		3									FT			6	CY		12
	DC-12a	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	140		2.5		3.5									FT			45	CY		77
	DC-12a	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	140		2.5		3.5									FT			45	CY		86
	DC-12b	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	76		2		3									FT			17	CY		29
	DC-12b	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	76		2		3									FT			17	CY		33
	DC-12c	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	354		2		3									FT			79	CY		135
	DC-12c	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	354		2		3									FT			79	CY		152
	DC-12d	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	9		2.5		3.5									FT			3	CY		5
	DC-12d	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	9		2.5		3.5									FT			3	CY		6
	DC-13	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	45		1.5		3									FT			8	CY		14
	DC-13	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	45		1.5		3									FT			8	CY		15
	DC-14	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	25		1.5		3									FT			4	CY		7
	DC-14	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	25		1.5		3									FT			4	CY		8
	SP2-1	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	165		1.5		3									FT			28	CY		48
	SP2-1	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	165		1.5		3									FT			28	CY		54
	UC-1	Excavation Bulk Bank 2 CY (322BL)	312316420260	1.71	/CY	480		5		6									FT		533		CY	911	911
	UC-1	Backfill Trench Minimal Haul 2 1/4 CY	312316133020	1.92	/CY	480		5		6									FT		533		CY	1023	1023
	Subtotal																							~~2192~~	3702
	Equipment 's Disposal Cost																								
	Dismantling Cost																								
	Equipment 's Vol. Demolished																								
	Loading Costs																								
	Transport Costs																								
	Disposal Costs																								
	Subtotal																								
	Concrete Demolition																								
	Demolition Cost	36" CMP (5)	024113400180	11.98	LF	365				3									LF		365			4373	4373
	Demolition Cost	72" CMP (1)	024113400200	38.15	LF	480				6									LF		480			18312	18312
	Loading Cost																								
	Transportation Cost																								
	Disposal Costs																								
	Subtotal																								22685
	Concrete Demolition																								
	Demolition Cost																								
	Concrete's Vol. Demolished																								
	Loading Cost																								
	Transportation Cost																								
	Disposal Costs																								
	Subtotal																								
	Concrete Demolition																								
	Demolition Cost																								
	Concrete's Vol. Demolished																								
	Loading Cost																								
	Transportation Cost																								
	Disposal Costs																								
	Subtotal																								
	Total																							~~13534~~	26387

T	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost	New Costs
Load and Haul Backfill Material															~~169528~~	180547
#REF!															223689	223689
Support															~~101098~~	102546
Total															~~494315~~	506782

	Means Number	Per Day Equipment Rent Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	New Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	New Equip. + Labor time/Dsi	Units	Cost	New Cost
Horse Canyon Mine Lila Canyon Project Grading																			
Load and Haul Backfill Material																			
Scraper 631E	015433203700	2197.65	132.68	0.1	60.45	330.48	3	991.45	$/HR	~~28928~~	31428	CY	393	CY/HR	73.6	80	HR	~~72971~~	79316
D9R	015433204360	2173.50	130.36	0.1	60.45	326.65	1	326.65	$/HR						73.6	80	HR	~~24041~~	26132
Subtotal																		**~~97012~~**	105448
Spread and Compact Material																			
Assume 4 passes 8 mph 10 in. lift																			
D9R	015433204360	2173.50	130.36	0.1	60.45	326.65	1	326.65	$/HR						73.6	80	HR	~~24041~~	26132
Compactor 825B	015433201200	190.00	6.76	0.1	58.20	76.84	1	76.84	$/HR						73.6	80	HR	~~5655~~	6147
Subtotal																		**~~29696~~**	32279
Upper Road Area																			
Cat 769 D off road truck 40 Ton	015433205610	1569.75	99.40	0.1	48.30	167.71	1	167.71	$/HR	5000		CY	289	CY/HR	17.3		HR	2901	
988 Loader 8CY	015433204810	1738.80	111.70	0.1	60.45	187.00	4	748	$/HR						17.3		HR	12940	
CAT 325BL (10-21)(2nd04)	015433200320	1497.30	105.83	0.1	48.30	120.67	1	120.67	$/HR						17.3		HR	15841	
D9R	015433204360	2173.50	130.36	0.1	60.45	267.11	1	267.11	$/HR	5000			120	CY/HR	41.7		HR	11138	
Subtotal																		**42820**	
Total																		**~~169528~~**	180547

	Means Number	Rent / Day Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	New Equip. + Labor Time/Dis	Units	Cost	New Cost
Horse Canyon Mine Lila Canyon Project Grading																		
Support																		
5,000 gallon water truck 015433406900	015433406950	763.14	86.12	0.1	47.05	180.87	1	180.87	$/HR					~~384.2~~	389.7	HR	~~69490~~	70485
Pickup Truck Crew 4x4 1 ton (20-17) (2N04)	015433407200	71.00	14.68	0.1	63.15	82.27	1	82.27	$/HR					~~384.2~~	389.7	HR	~~31608~~	32061
Foreman Average, Outside							1	0	$/HR					~~384.2~~	389.7	HR	~~0~~	0
																	~~101098~~	102546
Total																	~~101098~~	102546

Bonding Calculations
Horse Canyon MineC/007/013
Lila Canyon Section

Bond Summary

Direct Costs

Subtotal Demolition and Removal	~~$572,615.00~~		$585,470.00
Subtotal Backfilling and Grading	~~$494,315.00~~		$506,782.00
Subtotal Revegetation	$238,309.00		$238,309.00
Direct Costs	~~$1,305,239.00~~		$1,330,561.00
Indirect Costs			
Mob/Demob	~~$130,524.00~~	10.0%	$133,056.00
Contingency	~~$65,262.00~~	5.0%	$66,528.00
Engineering Redesign	~~$32,631.00~~	2.5%	$33,264.00
Main Office Expense	~~$88,756.00~~	6.8%	$90,478.00
Project Mainagement Fee	~~$32,631.00~~	2.5%	$33,264.00
Subtotal Indirect Costs	~~$349,804.00~~	26.8%	$356,590.00
Total Cost	~~$1,655,043.00~~		$1,687,151.00
Escalation factor for 2013 @1.5%		1.50%	
Number of years		5	
Escalation	~~$127,908.00~~		$130,390.00
Reclamation Cost	~~$1,782,951.00~~		$1,817,541.00
Bond Amount (rounded to nearest $1,000)	~~$1,783,000.00~~		$1,818,000.00
2013 Dollars			
Bond Posted Up to December 2010	$1,807,000.00		
Difference Between Cost Estimate and Bond	~~$24,000.00~~		$11,000.00
Percent Difference	~~1.33%~~		0.61%

Operation Plan

Mining Operations and Facilities

Deficiencies Details:

R645-301-512 .120, R645-301-532, R645-301-533 .200, R645-301-542. 800, R645-301-553, and R645-301-830. 140: The Permittee must provide updated narrative and/or tables within Chapter 5 and Earthwork grading bonding sheets that detail the changes in volumes of grading detailed on Plate 7-5.
Chapter 5 has been updated. The bonding sheets have been updated as well.

R645-301-512 .200, R645-301-521 .180-.190, and R645-301-532: The Permittee must provide correct culvert and ditch lengths throughout the MRP (Chapter 5, Appendix 7-4, and Plates 7-5, 5-2.)
The culvert and ditch lengths have been coordinated throughout Chapter 5; Appendix 7-4; Plates 7-2, 7-5, 7-6a and 7-6b. Culverts and ditches are not shown on Plate 5-2, thus this plate has not been revised.

Relocation or Use of Public Roads

Deficiencies Details:

R645-301-521 .133, R645-103-224.422, R645-301-527, and R645-301-534: The Permittee will clarify the ownership and primary use of the roadway adjacent to the Disturbed area.
The ownership and use of the roadway adjacent to the Disturbed Area has been clarified in Appendix 5-4.

R645-301-527, R645-301-552: The Permittee will clarify the reclamation or final retention of the newly graded segment of the roadway at final reclamation within Chapter 5 and/or Appendix 5-4 narrative.
The reclamation and final retention of the segment of roadway has been addressed in Appendix 5-4.

Topsoil and Subsoil

Deficiencies Details:

R645-301-121.100 and R645-301-231.400, (1) The application must provide a topsoil salvage report for soil salvage activity conducted in 2015. (2) The application must update the Actual Salvaged Topsoil column of the Available Soil Resources Table of Section 232.100 of the MRP and the topsoil volume calculations in Figure 1 of the MRP for soil salvaged in 2014 and 2015. (3) The application must revise the narrative in Chapter 2 to reflect the current status of undisturbed soil within the disturbed area and provide the final configuration of the topsoil stockpile. (3) The application must state the location of topsoil placement in 2015 on the topsoil stockpile (NW, SW, NE or SE) and indicate surface roughening treatment and date of seeding and refer to the seed mix used. If seed mix differed from that described in Chapter 2 of the MRP, describe the seed mix.
See the attached 2015 topsoil survey and attached seed mix documentation.

R645-301-121.200, (1) Plate 7-5b should show the locations of flow entering the pond either by culvert or ditch. (2) If topsoil remains in the path of culverts to be installed, the application must call out to soil salvage, storage and protection.
Plate 7-5b has been revised to show the locations of flow entering Pond #2. Topsoil salvage and storage is noted for all new excavations in undisturbed areas on Plates 7-2, 7-5, 7-6a and 7-6b.

Road Systems Classification

Deficiencies Details:
R645-301-521.133, R645-103-224.422, R645-301-527, and R645-301-534: The Permittee will clarify the ownership and primary use of the roadway adjacent to the Disturbed area.
The ownership and use of the roadway adjacent to the Disturbed Area has been clarified in Appendix 5-4.

R645-301-527, R645-301-552: The Permittee will clarify the reclamation or final retention of the newly graded segment of the roadway at final reclamation within Chapter 5 and/or Appendix 5-4 narrative.
The reclamation and final retention of the segment of roadway has been addressed in Appendix 5-4.

Hydrologic Sediment Control Measures

Deficiencies Details:
The amendment does not meet the State of Utah R645 requirements for Hydrology: Sediment Control Measures. The following deficiencies must be addressed prior to final approval. R645-301-732 The added note on page 42 of Appendix 7-4 must be removed. The design and operations of all aspects of the sediment pond should be clear at each phase of operations.
The note on Page 42 of Appendix 7-4 has been removed.

R645-301-732 There are numerous inconsistencies between Appendix 7-4, chapter 5 specifications, and what was put in the revised plates. These must be revised and corrected. For example, DC-6 is listed as 30 feet long and 1.5 feet in diameter in Table 9. In the revised chapter 5 text, DC-6 is listed as 107 feet long and 2 feet in diameter. To further add to problems, there is a note at the bottom of Table 9 stating that this culvert was replaced by culverts 20, 21 and 22. However, this culvert is still shown in the submitted plates. There are similar issues with Table 6 notes about ditches that no longer exist, but are still shown on plates. All of the hydrology information should be reviewed before resubmitting information to ensure that it is consistent throughout the MRP, as these examples are just some of the problems encountered.
Culvert and ditch sizes and lengths have been coordinated throughout the MRP.

Hydrologic Ponds Impoundments Banks Dams

Deficiencies Details:
The amendment does not meet the State of Utah R645 requirements for Hydrologic: Ponds. The following deficiency must be addressed prior to final approval: R645-301-742.220 The Division is unable to review the design of the sediment ponds until inconsistencies between Appendix 7-4 and the submitted plates have been corrected. Table 11 a thru 13b of Appendix 7-4 are inconsistent with the design shown of ponds in Plates 7-5, 7-6a, and 7-6b. For example, Table 12a states that the bottom of sediment pond 1 is at elevation 5829, but plate 7-6a state that the bottom of the pond is at elevation 5839. The Permittee must review and correct all sediment pond discrepancies before resubmitting the amendment.
Inconsistencies between the plates and Appendix 7-4 have been resolved.

Maps Affected Area

Deficiencies Details:
I R645-301-521 .140: The Permittee must correct all plates to show the approved disturbance area and permit area.
The attached plates show the correct disturbance area. Work will be performed on and around the county road that will be coordinated with Emery County per UEI's existing agreement regarding the road.

Maps Facilities

Deficiencies Details:
R645-301-512.200, R645-301-521.180-.190, and R645-301-532: The Permittee must provide correct culvert and ditch lengths throughout the MRP Chapter 5, Appendix 7-4, and Plates 7-5, 5-2.
Culvert and ditch lengths have been coordinated between Chapter 5, Appendix 7-4 and Plates 7-2, 7-5, 7-6a and 7-6b. Plate 5-2 does not note culverts or ditches and thus has not been revised.

Reclamation Plan

Backfill and Grading General

Deficiencies Details:
R645-301-512.120, R645-301-532, R645-301-533.200, R645-301-542.800, R645-301-553, and R645-301-830.140: The Permittee must provide updated narrative and/or tables within Chapter 5 and Earthwork grading bonding sheets that detail the changes in volumes of grading detailed on Plate 7-5.
Bonding sheets have been revised and are attached.

Road System Retention

Deficiencies Details:
R645-301 -534: The Permittee will clarify the ownership and primary use of the roadway adjacent to the Disturbed area.
The ownership and use of the roadway adjacent to the Disturbed Area has been clarified in Appendix 5-4.

R645-301-552: The Permittee will clarify the reclamation or final retention of the newly graded segment of the roadway at final reclamation within Chapter 5 narrative.
The reclamation and final retention of the segment of roadway has been addressed in Appendix 5-4.

Maps Bonded Area

Deficiencies Details:
R645-301-521.100, R645-301-800: The Permittee must correct Plate 7-5 to show all grading within the disturbed boundary area.
The attached plates show the correct disturbance area. Work will be performed on and around the county road that will be coordinated with Emery County per UEI's existing agreement regarding the road.

R645-301-542.800, R645-301-830.140: The Permittee must provide detailed grading volumes for the new reclamation requirements for all ditches and pond 1 shown on Plate 7-5.
See the attached revised bonding sheets.

Bonding and Insurance General

Deficiencies Details:
R645-301-121.200, R645-301-542.800, R645-301-553, and R645-301-843.140: The Permittee shall correct all tables within Chapter 5, Appendix 7-4, Bond sheets, and all relevant plates to match.
Tables within Chapter 5 and Appendix 7-4 have been corrected. The bonding sheets have been corrected and are attached.

R645-301-121.200, R645-301-542.800, R645-301-553, and R645-301-843.140: The Permittee shall update the additional grading required on the earthwork bond sheets.
See attached revised bonding sheets.

Bonding and Insurance General

Deficiencies Details:

R645-301-121.200, R645-301-542.800, R645-301-553, and R645-301-843.140: The Permittee shall correct all tables within Chapter 5, Appendix 7-4, Bond sheets, and all relevant plates to match.
Tables within Chapter 5 and Appendix 7-4 have been corrected. The bonding sheets have been corrected and are attached.

R645-301-121.200, R645-301-542.800, R645-301-553, and R645-301-843.140: The Permittee shall update the additional grading required on the earthwork bond sheets.
See attached revised bonding sheets.

Bonding Determination of Amount

Deficiencies Details:

R645-301-121 .200, R645-301-542.800, R645-301-553, and R645-301-843.140: The Permittee shall correct all tables within Chapter 5, Appendix 7-4, Bond sheets, and all relevant plates to match.
See attached revised bonding sheets.

R645-301-121 .200, R645-301-542.800, R645-301-553, and R645-301-843.140: The Permittee shall update the additional grading required on the earthwork bond sheets
See attached revised bonding sheets.

R645-301-121.200, R645-301-542.800, R645-301-553, R645-301-843.140: The Permittee will update the earthwork and re-veg sheets to the same year dollars as the demolition and change the escalate years from 5 to 2 to get 2018 dollars.
See attached revised bonding sheets. Bonding is in 2013 dollars per an email from Cheryl Parker to Karin Madsen on February 24, 2016 at 9:55 am.

place for redistribution on the topsoil pile. Topsoil material will be removed from those areas of the mine yard where material will be excavated in order to achieve final yard configuration and which have been identified as suitable topsoil for reclamation based on the soil survey. This includes the access road to and around the topsoil pile. This material will be used to construct a berm around the topsoil pile.

The following volumes represent soil resources that may be available for salvage, storage and subsequent redistribution during reclamation. The actual amount salvaged will be reported to DOGM following topsoil removal and stockpiling operations in the Annual Report.

AVAILABLE SOIL RESOURCES

Map Unit	Potential Salvage Depth In.	Potential Acres	Potential Estimated Volume YD3	**Actual Salvage Depth In.**	**Actual Salvaged Acres**	**Actual Salvaged Top Soil YD3**
SBG	48	11.83	76343	**18**	**11.61**	**28100**
VBJ	30	9.62	38801	**18**	**3.40**	**8227**
XBS	12	12.09	19505	**12**	**8.81**	**14207**
DSH	40	1.56	8389	**18**	**1.16**	**2809**
RBL	8	9.34	10046	**8**	**2.17**	**2340**
RBT	6	3.79	3057	**6**	**0.56**	**450**
TOTAL(2)		48.23	156141		**27.95**	**56133**
Bank to Loose Cubic Yards *1.18 (Amount topsoil pile is designed to hold.)						(1) **66237**

(1) An additional 800 yd^3 will come from the access road around the topsoil pile. This material will be placed in the berm around the topsoil pile.
(2) The 48.23 acres was taken from a soil survey and does not accurately reflect the operators intention to include 42.6 acres of disturbance within the disturbed area boundary.

The actual topsoil salvage will consist of removing a surface layer up to 18 inches thick over the disturbed area. If shale is encountered within 18 inches only the soil above the shale will be salvaged. (Plate 2-3). This would cover about 34 acres where soil would be salvaged and stored in the topsoil stockpile.

Total volumes of soil stored in the topsoil pile would be

Horse Canyon Extension
Lila Canyon Mine

Chapter 5
Engineering

Volume 4 of 7

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Chapter 5

500. ENGINEERING

510. Introduction

This section presents the engineering portion for the Lila Canyon Extension to the Horse Canyon Mine Reclamation Plan and is based upon previous publications, permit applications for the adjacent Sunnyside and South Lease areas and design which follows basic engineering standards. The objective of this chapter is to provide sufficient engineering design to support the mining and reclamation plan for the Lila Canyon Mine which is part “B” of the Horse Canyon Permit (ACT/007/013) and to satisfy the rules found in R645-301-500. All of the activities associated with the coal mining and reclamation operations are designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plan. The engineering section of the permit application is divided into the introduction, the operation plan, operational design criteria, reclamation plan, and performance standards. All design criteria associated with the operation and reclamation plan have been met.

511. General Requirements.

511.100 The permit application includes a description of the proposed coal mining and reclamation operations with appropriate maps, plans, and cross sections.

511.200 A description of the proposed mining operation and its potential impacts to the environment as well methods and calculations utilized to achieve compliance with design criteria is addressed within this chapter.

511.300 A description of the proposed reclamation plan is included in this chapter.

512. Certification

512.100. Cross Sections and Maps that require certification have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, with assistance from experts in related fields when needed. Cross Sections and Maps will be updated as needed or required by the Division. Listed below are some of the maps and cross sections that have been certified by a qualified registered professional engineer.

512.110. A map showing the extent of known existing mine workings and the approximate year mined has been included and certified by a qualified registered professional engineer and included as Plate 5-1.

512.120. All Surface facilities and operations are shown on the appropriate maps and have been certified by a qualified registered professional engineer.

512.130 Maps showing final surface configuration with cross sections have been included and certified by a qualified registered professional engineer. (See Plate 5-6, 5-7c, and Appendix 5-4)

512.140 Appropriated hydrology drawings and cross sections have been certified by a qualified registered professional engineer. (See Chapter 7)

512.150 Geologic cross sections and maps that are required to be, have been certified by a qualified registered professional engineer. See Chapter 6 and Plate 7-1B.

512.200 Plans and Engineering Designs which may include: Excess spoil piles, durable rock fills, coal mine waste, impoundments, primary roads and variances from approximate original contour. These Plans and Designs have been certified by a qualified registered professional engineer if appropriate.

512.210 Lila Canyon Mine is an underground operation, therefore it is anticipated that no excess Spoil will be produced. This section does not apply.

512.220 The professional engineer experienced in the design of earth and rock fills has certified that the durable rock fill design will ensure the stability of the fill and that the fill meets design requirements.

512.230 The professional engineer experienced in the design of coal mine waste piles has certified the design of the coal mine waste disposal facility. (See Appendix 5-7)

512.240 Prudent engineering practices was used in the design and construction of impoundments in the permit area. The impoundment designs have been certified by a qualified registered professional engineer. (See Plate 7-6)

512.250 The professional engineer has certified the design and construction or reconstruction of primary roads as meeting the appropriate design criteria.

512.260 The operator is not requesting a variance from the approximate original contours (AOC).

513. Compliance With MSHA Regulations and MSHA Approvals.

513.100 Neither Coal processing waste dams or embankments are anticipated during the term of this permit. Therefore, this section is not applicable.

513.200 Planned impoundments and sedimentation ponds do not meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a). Therefore, this section is not applicable.

513.300 Underground development waste transported to the surface, coal processing waste and excess spoil will not be disposed of underground. However, material such as overcast material, rock falls, and slope material, not transported to the surface, may be disposed of underground according to the appropriate MSHA regulations.

513.400 Refuse piles meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215 and all appropriate R645 regulations. (See Appendix 5-7)

513.500 Shafts, drifts, adits, tunnels, exploratory holes, entryways or other opening to the surface from the underground will be capped, sealed, backfilled or otherwise properly managed consistent with MSHA, 30 CFR 75.1711.

513.600 Surface water discharges into the underground mine workings is not anticipated or planned, Therefore, this section is not applicable.

513.700 Surface mining within 500 feet to an active underground mine is not planned nor anticipated. Therefore, this section does not apply.

513.800 Coal mine waste fires plans will be submitted to MSHA and the Division for their approval prior to extinguishing any coal mine waste fires. (See Appendix 5-3)

514. Inspections

All engineering inspections, except the quarterly inspections of impoundments not subject to MSHA, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

514.100 Lila Canyon is an underground operation and it is not anticipated that any spoil will be produced. Therefore, this section does not apply.

514.200 Refuse Piles. A professional engineer or specialist experienced in the construction of similar earth and waste structures will inspect the refuse pile during construction.

514.210 Regular inspections by the engineer or specialist will also be conducted during placement and compaction of coal mine waste materials. If it has been determined that a danger of harm exists to the public health and safety or the environment, more frequent inspections will be conducted. Inspections will continue until the refuse pile has been finally graded and revegetated or until a later time as required by the Division.

514.220 The refuse pile inspections will be performed at least quarterly throughout construction and during the following construction periods:

514.221 In addition to quarterly inspections, an inspection will be performed during foundation preparation which includes the removal of all organic material and topsoil;

514.222 Since no under-drain or protective filter systems are planned, this section is not applicable.

514.223 In addition to quarterly inspections, an inspection will be performed during the installation of the final surface drainage systems.

514.224 In addition to quarterly inspections, an inspection will be performed after the final grading and the facility has been revegetated.

514.230 The division will be provided a certified report prepared by, or under the supervision of, the qualified registered professional engineer after each inspection. The report will certify that the refuse pile has been constructed and maintained as designed and in accordance with the approved plan and R645 Rules. This report will include statements stating the appearances of instability, structural weakness, and other hazardous conditions if found. (See Appendix 5-1)

514.240 Since protective filters and under-drain are not required in the current design criteria this section is not applicable.

514.250 Required refuse pile reports will be retained at or near the mine site in an area convenient to the resident agent and the qualified registered professional engineer. Appendix 5-1 is an example of the refuse pile inspection form.

514.300 Impoundments

514.310 A professional engineer or specialist experienced in the construction of impoundments will inspect impoundments.

514.311 During construction inspections will be made on a regular basis and upon completion of the pond the inspections will be performed at least yearly. Inspections will continue yearly until the pond is removed or the performance bond is released.

514.312 After each inspection the qualified registered professional engineer will promptly provide to the Division, a certified report. This report will state that the impoundment has or has not been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules. The report will include a discussion of any appearances of instability, structural weakness or other hazardous conditions. All so included in the report will be the depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation and any other aspects of the structure affecting stability.

514.313 Required impoundment inspection reports will be retained at or near the mine site in an area convenient to the resident agent and the qualified registered professional engineer. Appendix 5-2 is an example of the impoundment inspection form.

514.320 Since the pond contained in the Lila Canyon Project is less than 20 feet high and stores less than 20 acre-feet of water it is not subject to MSHA, 30 CFR 77.216. Therefore, this section does not apply.

515. Reporting and Emergency Procedures.

515.100 If a slide occurs, the operator will telephone DOGM to notify them of the situation and recommend remedial measures to be taken to alleviate the problem. Additional remedial measures required by DOGM will be implemented.

515.200 During impoundment inspections any potential hazards noted will be reported to DOGM along with measures to be implemented to eliminate the hazard.

515.300 In the case of temporary cessation of operations the following will apply:

515.310 All provisions of the approved permit will be complied with during temporary cessation or abandonment.

515.311 In case of temporary cessation the operator will 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 approved permit.

515.312 Since Lila Canyon Mine is an underground operation this section does not apply.

515.320 Prior to a temporary cessation of coal mining and reclamation operations which is expected to last longer than 30 days, or when a temporary cessation is extended longer than 30 days, the operator will submit to the Division a notice of intention to cease or abandon operations. The following will be included in the notice of temporary cessation.

515.321 The temporary cessation notice will contain the exact number of surface acres and the horizontal and vertical extent of subsurface strata included in the permit area. In addition a description of the reclamation activities accomplished and activities such as backfilling regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

515.322 Since the Lila Canyon Mine is an underground operation this section does not apply.

516. Prevention of Slides: Since the Lila Canyon Mine is an underground operation this section does not apply.

520. Operation Plan.

At first glance it would appear to a non-mining person that the best access to UEI's leases would be from the existing (sealed) Horse Canyon portals using the current Horse Canyon surface disturbance. However, the existing Horse Canyon site is not suitable for a large longwall operation. The old Horse Canyon Mine was not designed to produce 4.5 million tons as will be Lila. Some strategic pillars in the old mains were extracted upon retreat preventing any future access. The number of entries in the old works are not adequate for ventilation purposes. Portions of the old mine are flooded preventing reentry. The distance from the old portals to the current leases would result in unacceptable travel times for crews and supplies. Rehabilitating and maintaining an old mine is extremely hazardous and expensive. As a result of the conditions described above it has been determined that new portals at the Lila Canyon site is the most logical and only feasible access to the permittee's coal leases.

Mine Facilities List
Lila Canyon Mine

A list of new structures and facilities follows:

Buildings

1) Office/Bathhouse
2) Shop Warehouse
3) Security Shack

Utilities

4) Mine Substation
5) Surface Power Lines
6) Water Treatment Plant
7) Potable Water Tank
8) Process Water tank
9) Sewer Tank
10) Drain Field

Mine Facilities

11) Ventilation Fan

12) 60-inch Conveyor from tunnels to Coal Stockpile
13) (ROM) Underground Belt from Stockpile to Crusher
14) 48-inch Conveyor from Crusher to Loadout Bin
15) Drop from Loadout Bin to Truck Loadout
16) Reclaim Tunnel, Escape Tunnel, Fan and Fan House
17) ROM Storage Pile, Coal Stacking Tube, 30 ton Rock Dust Silo
18) Crusher Screen Plant
19) Truck Scale and Loadout
20) Coal Loadout Storage Bin
21) Guardrails
22) Underground Pipes
23) Chain Link Fence

Support Facilities

24) Non-Coal Waste Area
25) Equipment & Supplies Storage Area
26) Topsoil Pile
27) Refuse Pile
28) Sediment Pond
29) Slope Access Road / Portal Access Road
30) Rock Slopes
31) Mine Facilities Road / Truck Loadout Road
32) Office/Bathhouse/Warehouse Asphalt Parking Area
33) Mine Parking
34) Fuel Tanks
35) Powder and Cap Magazines
36) Culvert locations are shown on Plate 7-2.

A description of new structures and facilities:

Office/Bathouse

The office and bathhouse building is shown on Plate 5-2. This building will jointly house all support personnel such as accounting, administration, engineering, and safety and will provide a comfortable office environment for all employees. Bathhouse and toilet facilities will be found for all employees at this location. The bathhouse will proved for a location for underground miners to change from clean street clothes to clothing suitable for underground use. The area will proved showers for employees for use after their scheduled work shifts so they can cleanup prior to returning home. Both the bathhouse and office buildings will be of prefab construction and will rest on a concrete pad. The pad dimensions will be approximately 150' by 100' by 12". The facility will be designed to accommodate up to 200 employees working rotating shifts.

Shop Warehouse

The shop warehouse building is shown on plate 5-2. Parts and supplies consumed during the mining process will be stored in the warehouse to be issued as needed. The shop area will be used to perform minor equipment repairs and overhauls. The shop warehouse will be a prefab modular type building approximately 100' by 150' and will rest on a 4" concrete pad.

Security Shack

The Security Shack shown of Plate 5-2, when used will provide security to the mine site. The security shack will be used primarily at times when the mine is not in production. Security may be provided to protect the public from hazards associated with a mine site and to protect company property from unauthorized use. The security shack will be approximately 10' by 20' by 8'` and will be of prefab construction and will rest on a 4" concrete slab.

Mine Substation

The mine substation will be located as shown on Plate 5-2 will proved power to surface and underground areas of the mine property. The substation will comprise of approximately four transformers setting on a concrete pad approximately 20' by 20' by 12" and fully fenced. The total area of the substation is approximately 40' by 40'. Power will be fed into the transformers at 46 KVA and will be transformed down to usage voltages for both the surface and underground facilities. It is anticipated that voltages of 110, 220, 440 will be used on the surface and 12,470 volts will be utilized underground. The mine substation will be constructed in a way to fulfill all appropriate MSHA regulations.

Underground Power Lines

Within the disturbed area both surface and underground power lines will be utilized. Underground lines will be run where feasible. As builds will be provided. Underground Power Lines will be left in place upon reclamation.

Water Treatment Plant

The water treatment plant is located on the north-east side of the surface facility area. The plant will rest on a 15' by 15' slab. Process water will flow through the treatment plant at which time it will be treated and made suitable for potable water uses. The potable water will be stored in the potable water tank until it is used. The location of the water treatment plant can be found on Plate 5-2.

Potable Water Tank

Water treated by the water treatment plant and intended to be used as potable water will be stored in this 15' diameter by 20' high tank. The tank will set on a 15' by 15' concrete pad designed for adequate support of the tank. The location of the potable water tank can be found on Plate 5-2.

Process Water Tank

Process water, water to be used for mine use or to be treated for potable use, will be stored in this tank. The 15' diameter by 20' high process water tank will rest on a 15' by 15' concrete pad. Process water tank will be filled by using mine discharge water or may be hauled in from off site. The location of the process water tank can be found on Plate 5-2.

Sewer Tank

The sewer tank has been designed to facilitate 200 employees working on rotating shifts. The sewer tank will be located under the south end of the office and bathhouse parking area. The location of the sewer tank can be found on Plate 5-2. The design for the Sewer Tank can be found in Appendix 5-4.

Drain Field

The drain field has been designed to facilitate 200 employees working on rotating shifts The drain field will be located at a lower elevation and south of the sewer tank. The location of the drain field can be found on Plate 5-2. The design for the drain field can be found in Appendix 5-4.

Ventilation Fan

Ventilation fans will be located on #0 Portal and on the Northern Breakouts. The ventilation fan will be accessed and installed from inside the mine. The need for surface access is not anticipated at this time. A concrete pad will be poured as a permanent support for the north fan. The highwall and approximately 40 feet of slope above the north breakout ledge will be chain-linked and shot-creted for stability. Prior to installing the chainlink fence, all trees will be cut off, and the vegetation material will be removed off the area and properly disposed. The location of the portal and fan is shown on Plate 5-2.

60-inch Conveyor from tunnels to Coal Stockpile(Main Conveyor)

The Run of Mine underground belt will provide for a means for coal to be conveyed from the working faces to the run of mine coal storage pile on the surface. The belt will provide capacity to convey to the surface, all coal mined in the underground workings. Preliminary design suggests that the conveyor that extends from the bottom of the rock slopes to the stacking tube at the coal storage area, shown on Plates 5-2 and 5-8, will have the following specifications: 60" wide, speed approximately 700 fpm with a length of approximately 810 feet long. Since the ground beneath the conveyor will not be disturbed due to the steepness and remoteness of the area, this conveyor will be completely contained within a tube type structure.

(ROM) Underground Belt from Stockpile to Crusher/ Screen

The Reclaim conveyor will provide for a means for coal to be conveyed from the coal stockpile to the crusher. The belt will provide capacity to convey to the screen and crusher at a suitable rate for crushing and screening. Preliminary design suggests that the reclaim conveyor, shown on Plates 5-2 and 5-8, will have the following specifications: 60" wide, speed approximately 700 fpm with a length of approximately 670 feet long. The portions of the conveyor running on the surface will be covered.

60-inch Conveyor from Crusher to Loadout Bin

The Loadout conveyor will provide for a means for coal to be conveyed from the crusher to the loadout bin. The belt will provide capacity to convey to the loadout at the same rate as the Reclaim conveyor. Preliminary design suggests that the Loadout conveyor, shown on Plates 5-2 and 5-8, will have the following specifications: 60" wide, speed approximately 500 fpm with a length of approximately 230 feet long. The portions of the conveyor running on the surface will be covered.

Drop from Loadout Bin to Truck Loadout

Coal will be dropped from the loadout bin to the trucks being loaded. The drop rate will provide capacity to the trucks at a rate suitable for truck loading.

Reclaim Tunnel, Escape Tunnel, Fans

Design for the escape and reclaim tunnels is not complete. Standard practice is to construct the tunnels from either concrete or corrugated metal. The reclaim tunnel is approximately 350' long with a 14' diameter. The escape tunnel will be approximately 300' long with a diameter of 4'. Appropriate safety and environmental concerns will be addressed upon detailed design. The preliminary layout is shown on Plates 5-2 and 5-8.

ROM Storage Pile

The run of mine storage pile receives coal directly from the underground works and provides storage for the coal until it is crushed and loaded into trucks for transportation to a unit train loadout. The coal from the underground run of mine belt will be dropped into a stacking tube located in the center of the run of mine storage pile. This tube will help reduce any fugitive dust. The stacking tube will be approximately 80' high and will allow for approximately 200,000 tons of open storage in the run of mine storage pile. A 30 ton rock dust bin will be located in this area. The run of mine storage pile is shown on Plates 5-2 and 5-8.

Crusher

The enclosed crusher will crush coal from the 8" minus down to a 2" minus size, at the rate of approximately 1000 tons per hour. The coal will be first screened then the oversized will be crushed. Crushed coal will be stored temporarily in a 500 ton storage bin located above the truck loadout. The crusher and screen locations are shown in Plates 5-2 and 5-8.

Truck Scale and Loadout

Coal will be reclaimed from the coal storage bin, weighed and then loaded into coal haul trucks for transportation to the various unit train loadouts. A small loadout shack will be constructed to provide cover and protection for the various equipment and controls need for the coal loading process. The truck scale and loadout are shown on Plates 5-2 and 5-8.

Coal Storage Bin

The coal storage bin is part of the truck loadout and is shown of Plate 5-2. The coal storage bin is where crushed coal is stored waiting to be loaded into coal haul trucks. The bin provides for surge capacity and allows for better control of crushing time. The coal storage bin provides for a enclosed dry location for temporary crushed coal storage. Coal is delivered from the crusher to the coal storage bin by use of a 60" covered surface conveyor running at a speed of approximately 700 FPM. The preliminary layout is shown on Plates 5-2 and 5-8.

Coal Stacking Tube.

The final design for the coal stacking tube is not yet complete. Preliminary design indicates that the stacking tube will be approximately 15' Diameter and approximately 80 feet high. Standard practice is to construct the tube of either concrete or steel. The preliminary layout is shown on Plates 5-2 and 5-8.

Culverts

A complete list and design for the culverts can be found in Appendix 7-4, Tables 6 through 10; and are shown on Plate 7-2. A summary of the culverts follows:

Culvert	Length	Size
DC-1	60'	18"
DC-2	60'	18"
DC-3	70'	18"
DC-4	274'	24"
DC-5	250'	24"
DC-6	107'	24"
DC-7	155'	24"
DC-8	168'	24"
DC-9	186'	24"
DC-10	60'	24"
DC-11	35'	24"
DC-12a	141'	30"
DC-12b	76'	30"
DC-12c	354'	30"
DC-12d	9'	30"
DC-13	60'	18"
DC-14	25'	18"
Sp2-1	165'	18"
UC-1	480'	60"

Guard Rails

Approximately 1,520 feet of Guard rails will be installed on the mine access road according to the detailed engineering plan being prepared. Appropriate MSHA and UDOT requirements will be taken into consideration.

Underground Pipes

Locations of the underground pipes have yet to be determined. Once detailed engineering design is completed the underground pipes will be added to Plate 5-2 or other appropriate Plates. Under ground pipes will be left in place upon reclamation.

Chain Link Fence

Approximately 1,500' of a six foot high chain link fence will be constructed as shown on Plate 5-2. The fence will be constructed to protect the public, and proved security along the section of county road that runs adjacent to the property.

Non-Coal Waste Area

An area for non-coal waste has been identified on Plate 5-2. Non-coal waste such as papers, timbers, cans, and miscellaneous scrap that is brought to the surface will be disposed of in a metal bin or “dumpster” located in the non-coal waste area identified on Plate 5-2. Metal will be separated from other forms of trash for salvage. Material not salvageable will be transported to the East Carbon Development Corporation (ECDC) dump or other approved disposal site for permanent disposal. Once a dumpster has reached capacity, the full dumpster will be replaced with an empty dumpster, and then the full dumpster will be hauled by a contract hauler to the specified disposal site.

Equipment & Supplies Storage Area

The equipment and supply storage area is approximately 350' by 400'. This storage area will be used to store mine supplies and equipment from the time of delivery until they are needed underground. Supplies such as timbers, bolts, plates, rock-dust, pipes, resin, screens, concrete blocks, steel, cables, and numerous other materials may be stored in this area. Equipment both new and used will be stored in this area. Many various longwall pieces such as shields, pan-lines, shears, chains, head and or tail drives, transformers, belt drives, pumps and numerous other material will be stored in this storage area. This secure area provides for a good storage area for diesel, gasoline, hydraulic, and roadway chemicals. All oil tanks will have appropriately designed berms or retaining walls. The equipment and supplies storage area is shown on Plate 5-2. Any explosives will be stored here according to appropriate MSHA regulations.

Topsoil Pile

The topsoil pile has been located on the south west end of the surface facilities. The pile has been designed to contain adequate topsoil for redistribution according to the reclamation plan found in Chapter 5. The proposed location provides for good protection from wind contamination as well as protection from mine related activities. The location of the topsoil pile is shown on Plate 5-2.

Mine Development Waste Pile

A temporary mine development waste area has been designed to provide a location for the storage of underground development waste that is brought to the surface. Any underground development waste, other than rock slope material, will be placed in the temporary pile then blended back into the coal stream for sale. The rock slope material will be used as fill as per Appendix 5-7. The capacity of the temporary pile will only be a few hundred tons. The area for the rock slope material is shown on Plate 5-2.

Sediment Pond

The sediment pond has been design to provide for adequate sediment protection for the project area. All water running off the disturbed area will be routed into the sediment pond for treatment. The sediment pond has been designed according to the appropriate R645 regulations and the designs can be found in Appendix 7-4 and Plate 7-6. Because the sediment pond does not fit into the requirement of 30 CFR 77.216(a) an MSHA number for the proposed pond is not required. The sediment pond is located on the south-west end of the property and shown on Plate 5-2.

Slope Access / Portal Access Road

The slope access road splits off the facility access road near the north-east corner of the equipment and supply storage area, and follows an alignment that takes into consideration grade and direct access. The slope access road will be used to provide access to the rock slopes which in-turn proved access to the underground workings. The slope access road will be used as access for all men, material and equipment need in the mine. Since the slope access road provides for frequent access for men, equipment and materials for a period of six months or longer the slope access road is classified as a primary road and will be paved. The slope access road will be designed, constructed, and maintained according to appropriate R645 regulations. The slope access road is shown on Plate 5-2.

Rock Slopes

Access to the underground workings of the Lila Canyon Mine will be provide by two rock slopes driven from the top of the Mancos shale up-dip to the intersection of the coal seam. One portal will proved for access for men, equipment and material to the mine. The second access slope will contain the run of mine belt line from the underground workings of the mine to the run of mine stock pile. There is a possibility that only one larger slope will be driven and then divided. to provide for two separate entries. The two 1,227 foot long slopes will slope up at approximately 12%, from a starting elevation of approximately 6150'. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation. The length of the slopes were minimized by taking advantage of the coal seam dip which is approximately 12% to the east. The rock material removed from the slopes will be used as fill material for the surface facilities. The rock slope material / underground development waste will contain mostly shale, sandstone and mudstone. Traces of coal may be found but the amount will be insignificant. There are no known coal seams or significant rider seams found below the Sunnyside Seam in the Lila Canyon Portal Area. The rock slope locations are shown on Plate 5-2.

Mine Facilities Road / Truck Loadout Road

The mine facility road shown on Plate 5-2 begins at the edge of County Road 164 and allows for access to the various surface facilities. The road has been located in the most practical location taking into consideration grade, stability, and alignment. Employees will use this road to access the office &

bathhouse facilities. Coal haul trucks will use this road to access the scales and truck loadout. All supplies will be hauled on a short portion of this road from the supply storage area to the slope access road. The road will be paved during construction of the facilities and before coal ming operations begin in order to to minimize dust and provide good surface for heavy truck traffic as well as facility access. The facility access road will be approximately 24' wide to provide for two lane traffic and will have the appropriate drainage controls to insure long term life and low maintenance. The has been constructed and will be maintained according to the appropriate R645-534 and R645-527 regulations.

Office/Bathhouse/Visitor Parking Area

Parking will be as shown on Plate 5-2. Parking facilities for office, mine, and warehouse employees will be provided jointly as shown. This area will also provide parking for all vendors, and visitors. The surface of the 220' by 350' area will be paved. The parking area is located and designed to allow for convenient and safe parking of personal vehicles. The sewer tank and drain field will be located on the north end of this parking area.

Mine Parking

A mine parking area will be provided as shown on Plate 5-2. The mine parking area is where all mine and mine related mobile equipment will be parked when on the surface. This is the location where the underground work crews will be loaded into man trips for transportation to the various work areas. The mine parking area will be paved. The mine parking area will be approximately 70' by 220'.

Fuel Tanks

Fuel tanks will be located in the Equipment & Supplies Storage Area and be installed as discussed under Equipment & Supplies Storage Area. A 1,500 gallon diesel tank, 500 gallon hydraulic tank and a 500 gallon gasoline tank will be needed.

Powder and Cap Magazines

Powder and cap magazines will be mobile temporary, and supplied by the explosive distributer. Upon reclamation the powder and cap magazines will be returned to the distributer.

As per the approved Air Quality Order all roads will be paved and the pad areas used by mobile equipment will be treated with water or dust suppressant, open stockpiles will be watered as conditions warrant.

521. Included in this section are maps, cross sections, narratives, descriptions and calculations used to satisfy the relevant requirements. This section describes and identifies the lands subject to coal mining and reclamation operations covering the estimated life of the project.

521.100 This application includes the cross sections, maps and plans needed to present the relevant information required by the Division. This information includes the following:

521.110. Plate 5-1 Shows area previously mined and approximate dates of mining.

521.111 Plate 5-1 of part ‘B” and 2-2 of part “A” shows the location and extent of known workings of inactive, or abandoned underground mines. The surface portals or mine openings to the surface are shown. Plates 5-1 and 2-2 of part “A” have been prepared and certified by or under the direction of a registered professional engineer.

Doelling lists several coal mines and mining activity in within or adjacent to the permit area. Doelling lists the Calkins prospect, the Lila Canyon prospect, and the Prentiss prospect. In addition Doellng lists several coal mines Prentiss, Utah Blue Diamond, Blue Diamond and Heiner Mines. The research has shown that the Prentiss, Utah Blue Diamond, Blue Diamond and Heiner Mines were engulfed by the Book Cliffs mine. The Lila Canyon prospect refers to the old Lila Canyon mine fan portals used to ventilate the Geneva (Horse Canyon mine. The Calkins prospect is believed to have been engulfed by the Geneva mine.

An outcrop fire has been detected in an area north of the exiting permit area “A”. The fire is off the permit area and located in an area that has been sealed from the old horse canyon works.

The outcrop fire is not anticipated to cause any problems with mining at the Lila Canyon Mine.

521.112 No surface mined areas are found within the permit area. Therefore, this section does not apply.

521.120 Three existing structures, a 48" and a 60" CMP culvert located near the new proposed sediment pond, and the Little Park Road can be found at the Lila Canyon Mine. The existing culverts are shown on plate 5-1A and the road on Plate 5-1. Existing Horse Canyon facilities are discussed in part “A” of this plan.

521.121 There are no buildings within 1000 feet of the proposed permit area for the Lila Canyon Mine, Part “B”.

521.122 There are no subsurface man-made features, other than the culverts discussed in 521.200, within, passing through, or passing over the proposed permit area for Part “B”.

521.123 Plate 4-1, as well as others, shows the existing county road 126 which is located partly within 100 feet of the proposed permit area. In Addition, the Little Park road is located above the surface facilities within the permit area. The Little Park road is also shown on plate 4-1

521.124 There are no known existing areas of spoil, waste, coal development waste, or non-coal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities within part “B” of the proposed permit area. This section is not Applicable.

521.125 There are no existing sedimentation ponds, permanent water impoundment, coal processing waste banks or coal processing waste dams near or within the permit area.

521.130 Landowner and right of entry maps are included in the permit application. These maps and cross sections show the following:

521.131 Plate 4-1 shows the surface ownership and Plate 5-4 shows the coal ownership of land included in or contiguous to the permit area.

521.132 The applicant has the legal right to enter and begin coal mining and reclamation operations on all areas shown within the permit area. The permit area is shown on Plates 5-3 and 5-4 as well as others.

521.133 Coal mining or reclamation operations are planned within 100 feet of a public road. There are no plans to relocate public roads.

521.133.1 Emery County has given permission to conduct coal mining or reclamation operations within 100 feet of the county road. (See Appendix 1-4)

521.133.2 The current permit does not propose any relocation of public roads. Therefore, this section is not applicable.

521.140 Mine maps and permit area maps and or cross-sections will clearly indicate the following:

521.141 Plate 5-1 shows the permit boundary and Plate 5-2 shows the disturbed area boundary. Additional subareas that might require additional permits are addressed in Section 112.800 and 4-1B.

521.142 The underground workings are shown on Plate 5-5.

521.143 The proposed disposal site for placing the slope rock is shown on Plate 5-2 as well as other appropriate plates.

521.150 Plates 6-2, 6-3, and 6-4, show surface contours that represent the existing land surface configuration of the proposed permit area.

521.151 The Plates show the surface contours for all areas to be disturbed as well as over the total permit area. The Plates showing the surface contours has been prepared by or under the supervision of a registered engineer.

521.152 No previously mined areas are included within Part "B". Therefore this section does not apply.

521.160 The maps, plates, and cross sections associated with this chapter clearly show:

521.161 Proposed buildings, utility corridors, and facilities are shown on Plate 5-2 as well as others.

521.162 Area of land affected according to the sequence of mining and reclamation is shown on the appropriate plates.

521.163 Land for which a performance bond will be posted is shown on the appropriate plate. Plate 5-2 as well as others show the area for which the performance bond will be posted. All disturbed areas within the permit boundary has been bonded.

521.164 Coal storage and loading areas are shown on Plate 5-2 and certified as required. Additional information can be found in Appendix 5-4.

521.165 Topsoil, and waste piles are shown on Plate 5-2 as well as others.

521.166 The waste disposal areas are shown for non-coal waste and underground mine waste on Plate 5-2.

521.167 No explosives are expected to be stored on site. However, if explosives are stored they will be stored as discussed in Section 520. on Plate 5-2.

521.168 Since Lila Canyon mine is an underground operation this paragraph is not applicable.

521.169 The refuse pile is shown on Plate 5-2 and discussed in Appendix 5-7.

521.170 Transportation facility maps describing roads, and conveyor maintained within the permit is shown with descriptions of roads, embankments, culverts, and drainage structures are presented in section 520 and are shown on Plates 5-2, and 7-2.

521.180 Support facilities are described in section 520 and are shown on Plate 5-2. Plate 5-2 is the official disturbed area boundary map.

521.190 Other relevant information required by the Division will be addressed.

521.200 Signs and markers will:

521.210 Signs and markers will be posted maintained, and removed by the person who conducts the coal mining and reclamation operations.

521.220 Signs and markers will be of uniform design that can be easily seen and read and be made of durable material and conform to local laws and regulations.

521.230 Signs and marker will be maintained during all activities to which they pertain.

521.240 Mine and Permit Identification Signs.

521.241 Mine and permit identification signs will be displayed at each point of access from public roads to areas of surface operations and facilities on permit areas.

521.242 Since Lila Canyon Mine is an underground operation, this section is not applicable.

521.243 Mine and permit identification signs where required, will show the name, business address, and telephone number of the permittee and the identification number of the permanent program permit authorizing coal mining and reclamation operations.

521.244 Mine and permit identification signs will be retained and maintained until after the release of all bonds for the permit area.

521.250 Perimeter Markers

521.251 The perimeter of all areas affected by surface operations or facilities before beginning mining activities will be clearly marked with perimeter markers.

521.252 Since Lila Canyon Mine is an underground operation this section is not applicable.

521.260 Buffer Zone Markers

521.261 Signs will be erected to mark buffer zones as required and will be clearly marked to prevent disturbance by surface operations and facilities.

521.262 Since Lila Canyon Mine is an underground operation this section is not applicable.

521.270 Topsoil Markers. Markers will be erected to mark where topsoil or other vegetation-supporting material is physically segregated and stockpiled.

522. Coal Recovery

Additional Details can be found in the R2P2 on file at the BLM Office.

Effective barrier and pillar designs are essential for safe and productive underground mining. Barrier pillars will be sized according to accepted engineering practices. One or more of the following methods may be used to properly size barrier pillars: Dunn's Rule, the Old English Barrier Pillar Law, Pennsylvania Mine Inspector's Formula, Ash and Eaton Impoundment Formula, Pressure Arch Method, British Coal Rule of Thumb, North American Method, Holland Rule of Thumb, or Holland Convergent Method.

Regardless of the methods or care taken to properly size barrier pillars the true effectiveness on any design can only be determined by conducting full-scale in-mine performance evaluations. Mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

Barrier pillars will be utilized to isolate the abandoned Horse Canyon Mine from the new Lila Canyon Mine. Barrier pillars will also be used to simplify ventilation, to provide independent escape routes and to possibly retain large quantities of mine water. Barrier pillars will be employed along the outcrop in order to maintain ventilation courses.

A barrier pillar where no second mining will be allowed within the barrier will be used to protect the escarpments. The width of the escarpment barrier will be determined by implementing a 21.5^{o} angle of draw project downward from the surface to the coal seam. Development mining or first mining will be allowed within the escarpment barrier.

For longwall mining applications the abutment loading is of prime importance. Initial longwall pillars will be designed using the ALPS method. Again mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

Mine pillars will be sized taking into consideration the coal strength, depth of cover, width and height of pillars using one or more of the following methodologies: Obert-Duvall, Holand-Graddy, Holland, Salamon-Munro, or Bieniawski. Again mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

523. Mining Methods:

Mining will begin in Section 15, T16S, R14E, in the Sunnyside seam. Development of the Sunnyside seam will be in a down dip direction toward the east. The seam will be accessed by two 1,200 foot slopes driven up at 12% from the base of the cliffs.

Production during the first year is estimated to be 200,000 tons, the second through the fifth year production should be between 1,000,000 and 1,500,000 using continuous mining methods. If and when tonnage demand increases to justify longwall mining, production could peak as high as 4,500,000 tons a year and continue at that level for the life of the mine.

Mine production will begin with the slope construction. Once the coal is encountered development will continue using continuous miners and various haulage types. Battery, cable, or continuous haulage may be used in conjunction with continuous miners in development. Continuous miners will account for all the production during the first two to five years. Mining will consist of driving mains, developing room and pillar panels and gate entries for future longwall mining.

The majority of the second mining will be performed using longwall equipment. However, in isolated areas room and pillar type of mining may be used in areas not suitable for longwall mining. Longwall panels are sited approximately parallel lengthwise to the strike with a slight up dip orientation to provide drainage for the development faces. This practice will be applied to the continuous miner panels wherever possible. (See plate 5-5)

Roof control and ventilation plans will be submitted to MSHA and approved prior to any underground mining activities.

An air quality permit from the State Division of Air Quality has been obtained and will be modified as needed.

Ventilation of the mine will be by an exhaust and or blowing type system. It has been estimated that 900,000 cfm will be required at full production. Intake air will be supplied by slopes and entries from the surface.

A water supply system will be installed. Potable water from an approved source will be hauled by truck and stored in a mine site storage tank located near the man and coal slope portals. Alternative sources for potable water are being considered. A treatment plant may be indicated. Process water will be hauled from the Price River or other approved source by truck and stored in another mine site storage tank. It is anticipated that once the old two entry development panel is encountered that adequate process water may be obtained from the old works. This process water will provide for dust control, water to the mine and fire suppression. Mine water will be used with the process water. See Appendix 7-3 (PHC) for water usage calculations.

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

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

Underground mining equipment to be used at Lila Canyon is typical of most room-and-pillar and longwall mine. A list of major equipment which may be used underground is listed below additional equipment not on the list may be used as needed.

Continuous Miners
Roof Bolters
Battery Shuttle Cars
Electric Shuttle Cars
Diesel Ram Cars
Feeder Breakers
Continuous Haulage Units
Battery Scoops
Diesel Scoops
Diesel Service Vehicles
Diesel Material Haulers
Diesel
Belts and Terminal Groups
Battery and Diesel Man Trips
Longwall Shields
Longwall Pan-lines
Longwall Shears
Longwall Stage-loaders
Longwall Pumps
Various Water Pumps
Various Transformers and Switches
Rock Drills
Loaders

523.100 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine, therefore this section is not applicable.

523.200 No Surface Coal Mining and Reclamation Activities are proposed with 500 feet of an underground mine, therefore this section is not applicable.

523.210 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine, therefore this section is not applicable.

523.220 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine, therefore this section is not applicable.

524. Blasting and Explosives: Surface blasting activities incident to underground coal mining is planned for the Lila Canyon mine during construction of the access slopes only.

524.100 Steps have been taken to achieve compliance with the blaster certification program and is described in this permit application.

524.110 Surface blasting involving 5 lbs of explosives or more will be conducted under the direction of a certified blaster.

524.120 Blasting certificates will be carried by the blasters or will be on file at the permit area during blasting operations.

524.130 The blaster and at least one other person will be present at the firing of a blast.

524.140 Persons responsible for blasting operations at a blasting site will be familiar with the blasting plan, if required, and site-specific performance standards and give on-the-job training to persons who are not certified and who are assigned to the blasting crew or assist in the use of explosives.

524.200 Since the planned blasting does not meet the requirements of 524.211 or 524.212 a blast design is not included in the permit application. If in the future blasting falls under section 524.200 then a plan will be submitted to Division for approval.

524.210 Since the planned blasting does not meet the requirements of 524.211 or 524.212 anticipated blast designs are not required.

524.300 Since planned blasting requires more than 5 lbs of explosives the preblasting survey is addressed where applicable in this permit application.

524.310 There are no dwellings or other structures located within one-half mile of the permit area owned by anyone but the operator. The operator will prepare the preblast survey if required. Notification procedures implied in this section are not applicable.

524.320 Since the operator is the only owner of structures and no dwelling exist within one-half mile of any part of the permit area this section is not applicable.

524.330 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.340 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.350 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.400 The blast schedule is as follows:

524.410 Since there are no residents within one-half mile of the projected blasting site this section does not apply.

524.420 All surface blasting will be conducted between sunrise and sunset unless nighttime blasting is approved by the Division.

524.430 Since there are no residents within one-half mile of the projected blasting site this section does not apply.

524.440 Since there are no residents within one-half mile of the projected blasting site a flexible blasting schedule is allowable. Surface blasting may take place anytime during daylight hours, unless approved differently by the Division.

524.450 Because of the remote location of the Lila Canyon Mine, over six miles from the nearest locality (Columbia), this section does not apply.

524.460 Since the town of Columbia is the nearest locality, and is over six miles distance from the permit area, this section does not apply.

524.500 The blasting signs, warnings and access control is described below.

524.510 Blasting signs will meet the specifications of R645-301-521.200. The following will apply.

524.511 Signs reading “Blasting Area” will be conspicuously place at the point where any road provides access to the blasting area.

524.512 The signs posted at all entrances to the permit area from public, roads, or highways will be placed in a conspicuous location and will state “Warning! Explosives in Use” and will clearly list and describe the meaning of the audible blast warning and all clear signals that are in use.

524.520 Audible warning and all-clear signals of different character or pattern will be given. Each person within the permit area will be trained in the meaning of the signals.

524.530 Access within the blasting area will be controlled until an authorized until the operator has reasonably determined the following:

524.531 No unusual hazards, such as imminent slides or undetonated charges, exist; and

524.532 Access to and travel within the blasting area can be safely resumed.

524.600 Adverse blasting effects are described as follows:

524.610 Blasting will be conducted to prevent injury to persons, damage to public or private property outside the permit area, adverse impacts on any underground mine, and change in the course, channel, or availably of surface or ground water outside the permit area.

524.620 Airblast Limits

524.621 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.622 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.630 Monitoring: Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.640 Ground Vibration: Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance form the permit area, this section does not apply.

524.650 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.660 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.670 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.680 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.690 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, sections 524.620 through 524.632 and 524.640 through 524.680 do not apply.

524.700 Records of blasting operations will be maintained at the mine site for at least three years and will be available for inspection by the Division or the public. Blasting records will contain the following information.

524.710 Blasting records will include.

524.711 The name of the operator will be on the blasting record.

524.712 The location, date, and time of the blast will be recorded on the blasting record.

524.713 The name, signature, and certification number of the blaster will be recorded on the blasting record.

524.720 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area, this section does not apply.

524.730 Weather conditions will be recorded on the blasting record.

524.740 A record of the blast will include the following:

524.741 The type of material blasted will be recorded on the blasting record.

524.742 Sketches of the blast pattern including number of holes, spacing, burden, decks, and delay pattern will be recorded on the blasting record.

524.743 The diameter and depth of holes will be recorded on the blasting record.

524.744 The type of explosives used will be recorded on the blasting record.

524.745 The total weight of the explosives used per hole will be recorded on the blasting record.

524.746 The maximum weight of explosives detonated in an eight-millisecond period will be recorded on the blasting record.

524.747 Information on the initiation system will be recorded on the blasting record.

524.748 The type and length of the stemming will be recorded on the blasting record.

524.749 Mats or other protections used will be recorded on the blasting record.

524.750 Since all structures are either owned by the permittee and not leased to another person or are located over six miles distance from the permit area a record of seismographic and airblast information is not required.

524.760 Since a blasting schedule is not required this section does not apply.

524.800 The operator will comply with the various appropriate State and Federal laws and regulations in the use of explosives.

525. Subsidence: The permittee will comply with the appropriate R645-301-525 requirements.

525.100 Subsidence Control Plan

525.110 Plate 5-3 shows the location of State appropriated water and 5-3 (Confidential) shows the eagle nests that potentially could be diminished or interrupted by subsidence.

525.120 SUBSIDENCE POTENTIAL (See also Section 5.4 of Part "A")

A review of renewable resources in and adjacent to the permit area found resources consisting of ground water, grazing, timber, and recharge areas. Subsidence from underground coal mines has been believed to affect overlying forest and grazing resource lands in the following ways:

- Formation of surface fissures which intercept near surface soil moisture thus draining the water away from the root zone with deleterious effects.

- Alterations in ground slope and destabilization of critical slopes and cliffs.

- Modification of surface hydrology due to the general downward migration of surface water through vertical fractures.

- Modification of groundwater hydrology including connection of previously separated aquifers, reduction in flows of seeps and springs which rely upon tight aquitards for their flow, and changes in recharge mechanisms.

- Emissions of methane originating from the coal seam through open fissures to the surface or at least the base of the surficial soil which has been known to have deleterious effects on woody plants.

Because these renewable resources exist with and adjacent to the permit area, a subsidence control plan is required. This plan is presented in Section 525.400.

A great deal of baseline data is available from many mining settings to develop subsidence damage criteria for surface structures (Bhattacharya et al. 1984). The formation of cracks and fissures are the general effects of subsidence and can have minor deleterious effects on groundwater resources without any fissuring to the surface. In the arid areas of Utah, impacts to and modification of the groundwater regime can be disruption of flow from natural seeps and springs which rely on the permeability contrast of interbedded sandstones and shale for their flows. These water resources are generally near surface occurrences and are essentially surface waters and subject to the same limiting damage criteria as surface water bodies. Subsidence damage to surface water bodies has been studied by a number of workers including Dunrud (1976), Wardell and Partners (1976), and U.S. Bureau of Mines (1977). The results of the Wardell and Partners studies of subsidence effects in a number of countries indicates that the limiting strain for the onset of minor impacts to surface waters is approximately 5 x 10^{-3}. The SME Mining Engineering Handbook also suggests a limiting extension strain value of 5 x 10^{-3} for pasture, woodland, range or wildlife food and cover.

Table 10.6.19 in the Mining Engineers Handbook suggests that the minimum safe cover required for total extraction of the coal resources under surface waters is approximately 60 times the seam thickness for coal beds at least 6 feet thick or approximately 450 feet. In their review of the foregoing, Singh and Bhattacharya (1984) recommended that the same limiting safe strain values and cover thickness ratios be used for protecting groundwater resources and recharge areas over coal mines. Where extension strain is greater than this limiting value, it is likely that surface fissures and cracks may develop. As the strain value decreases below the limiting value, the potential for surface damage decreases.

Figure 1 in Appendix 7-3 shows a typical subsidence profile. As shown in Figure 1, the zones are: a caved zone that occurs in the 6 to 10 times the thickness of the coal seam, a fractured zone which occurs 10 to 30 times the thickness of the coal seam, and deformation zone which occurs 30 to 60 times the thickness of the coal seam, and finally, a soil zone which occurs on the ground surface. The cover thickness of 1,000 to over 2,000 feet, over most of the mine area is also much greater than the limiting thickness of 630 feet recommended by International Engineers Inc. (1979) (10.5' x 60).

The Lila Canyon mine will be a longwall operation. As projected, 15 longwall panels at various depths will be mined. The longwall panels are laid out with the gate roads running along the strike roughly north-south, which will result in the longwall shear cutting up and down the dip. The depth of cover over the longwall panels approaches but never gets less than 500 feet toward the southwest and increases to over 2500 feet in the northeast. Only three of the 13 planned longwall panels are under less than 1,000 feet of cover. The remaining 10 panels are under 1,000 plus feet of cover. Maximum subsidence is expected to be approximately 9.5 feet in the areas approaching 500 feet of cover and less than 3' in the deeper cover areas. Extension strain varies from 12.4 x10^{-}3 in the 500 foot cover areas to .9 x 10^{-}3 in the 2,500 foot cover areas. Extension strain values of 5.0 x 10^{-}3 and above occurs in areas of approximately 1000' of cover and less.

A typical longwall panel at the Lila Canyon Mine will have dimensions of approximately 950 feet wide and up to 7,000 feet long and 2,000 feet deep. Using the methods described in the National Coal Board's *Subsidence Engineers' Handbook,* the S/m ratio for this geometry would be 0.38 where "S" is the maximum subsidence and "m" is the seam extraction thickness. For an average seam extraction thickness of 10.5 feet, the total subsidence would be 4.0 feet. However, as described above, the major impacts of this subsidence are due to extension strains and not total vertical subsidence. The prediction of average extension strain is accomplished with the use of the formula:

+E = 0.75 S/h where S=subsidence, and h=depth of cover

NOTE: The .75 factor is only an average. The factor changes with various w/h ratios. Figure 15 found in NCB's Subsidence Engineers Handbook takes into account the w/h ratio.

The solution of this equation for the Lila Canyon Mine configuration discussed above produces a predicted, average extension strain of 1.5×10^{-3} which is less than the limiting strain of 5×10^{-3} for protecting surface waters, groundwater sources, pasture, woodland, range or wildlife food and cover. Thus, it is unlikely that the gradual compression expected over much of the subsidence area will have any deleterious effects on the overlying renewable surface resources.

The table below shows the expected subsidence amount and expected extension strain for longwall panels at various mining depths. These calculations were done for a flat multiple seam mining. There are adjustments for single seam mining and for dipping seams. However, these adjustments are minor and are not expected to result in significant changes in values.

Maximum Subsidence
& Expected Extensive
Strain (NCB 1975)

	Feet	Meters
Panel Width =	900	274
Seam Height =	10.5	3

Depth of Cover		Width to Depth (a)	Maximum Subsidence(S)		Factor NCB Fig. 15	Extension Strain (E)
Feet	Meters	Ratio	Feet	Meters	Factor	x 10^{-3}
500	152	0.9	9.5	2.9	.65	12.4
1000	305	0.75	7.9	2.4	.66	5.2
1100	335	0.71	7.5	2.3	.68	4.6
1200	366	0.68	7.1	2.2	.70	4.1
1300	396	0.65	6.8	2.1	.70	3.7
1400	427	0.59	6.2	1.9	.75	3.3
1500	457	0.54	5.7	1.7	.78	3.0
2000	610	0.38	4.0	1.2	.82	1.6
2500	762	0.28	2.9	0.9	.80	0.9

The most favored technique until recently has been the use of the empirical charts developed by the National Coal Board (NCB). The above calculations were obtained using the empirical charts developed by the National Coal Board (NCB). Comparisons, as stated in the SME handbook, of US subsidence data with NCB predictions highlight the following differences between coalfields in the US and UK: Most of the studies in the US are limited to the Eastern US coalfields with a very limited data base applicable to western conditions.

With the exception of Illinois, maximum subsidence factors observed in US coalfields are less than predicted by NCB.

The limit (draw angles in the US coalfields tend to be less then the 35 degree value generally accepted by NCB.

The points of inflection of the subsidence profiles over US coal mines are generally closer to the panel centerline compared to the NCB profile. This effect is dependent not only on the percentage of competent strata in the overburden but also on their locations relative to the ground surface and their thickness.

Surface strains and curvatures observed over US longwall panels have been shown to be significantly higher then NCB predictions, almost four times larger in many cases.

The pace at which subsidence occurs depends on many controls including the type and speed of coal extraction, the width, length and thickness of the coal removed, and the strength and thickness of the overburden. Observations of subsidence by Dunrud over the Geneva and Somerset Mines indicate that subsidence effects on the surface occurred within months after mining was completed, and the maximum subsidence was essentially completed within 2 years of the completion of retreat mining.

Dr. Roy Sidle found in his study of Burnout Creek that subsidence impacts to streams are temporary and self healing.

The Sidle Study is representative of the conditions found in the Lila area because:

• the lithology is very similar between the Book Cliffs and the Wasatch Plateau

• the cover thickness ranges from 600 - 800 feet which falls within the rage expected at Lila, and

•the seam thickness of 8-10 feet is in the same range expect at Lila.

An Executive Summary of his study and published findings follows:

Title : Stream response to subsidence from underground coal mining in central Utah

5. Authors: Sidle-RC Kamil-I Sharma-A Yamashita-S

Short-term geomorphic and hydrologic effects of subsidence induced by longwall mining under Burnout Creek, Utah were evaluated. During the year after longwall mining, 0.3-1.5 m of subsidence was measured near impacted reaches of the mountain stream channel. The major channel changes that occurred in a 700-m reach of Burnout Creek that was subsided from 1992 to 1993 were: extent glides; (2) increases in pool length, numbers and volumes;

(3) increases in median particle diameter of bed sediment in pools; and (4) some constriction in channel geometry. Most of the changes appeared short-lived, with channel recovery approaching pre-mining conditions by 1994. In a 300-m reach of the South Fork drainage that was subsided from 1993 to 1994, only channel constriction was observed, although any impacts on pool morphology may have been confounded by heavy grazing in the riparian reaches during the dry summer of 1994. Similar near-channel sedimentation and loss of pool volume between 1993 and 1994 were noted throughout Burnout Creek and in adjacent, unmined James Creek. Subsidence during the 3-year period had no effect on baseflows or near- channel landslides.

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

The coal seam is approximately 12.5 feet thick with only about 10.5 feet being extracted, and the depth of cover ranges from 0' to approximately 2,500'. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden, and depth of workings, even with full seam extraction, only minimal subsidence, if any, is anticipated.

Some surface expressions of tension cracks, fissures, or sink holes may be experienced but should be insignificant. The chances of subsidence-related damage to any perceived renewable resource is minimal.

All dirt roads above the mine are in areas in excess of 1,000 feet of cover or in areas where mining will not take place. The chance of subsidence negatively effecting these dirt roads is minimal. However, in the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence, the road will remain accessible by regrading and filling in the cracks, fissures or sinkholes.

The unnamed ephemeral channel in the southwest corner of the permit area is located in an area where no mining is planned or over the top of a bleeder system that will not be second mined. The chance of subsidence negatively effecting this ephemeral channel is minimal. However, in the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence the channel will be regraded and the cracks, fissures or sinkholes will be filled in by hand methods due to its inaccessibility.

A small portion of Little Park Wash, which is ephemeral, has less than 1,000 feet of cover in the southwest corner of the permit area. The portion with less than 1,000 feet of cover runs diagonally across one longwall panel and then parallel to the bleeder system in the second longwall panel. In the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence the channel will be regraded and cracks, fissures or sinkholes will be filled in. Since this stream channel is accessible and is traversable by 4 wheel drive, access for repairs would not be a problem. If any subsidence repairs cannot be fixed using hand methods, small earth moving equipment could be used.

DWR and BLM Wildlife Biologists, in consultation with the Division, have determined that any loss of snake dens to subsidence would be random and a minor impact to the population of snakes.

525.130 A survey was conducted within the proposed permit area and adjacent area and it was determined that limited renewable resource lands exist within the area surveyed. Limited areas were found which contribute to the long-range productivity of water supply or fiber products. No structures exist within the permit area in which subsidence, if it occurred, could cause material damage or diminution for reasonably foreseeable use. See Plates 5-5 and 5-3 for areas of potential subsidence. Identification and data for the State appropriated water supplies can be found in chapter 7 section 727.

All State Appropriated water rights within the maximum limit of subsidence that could be affected, are either owned by the Operator or by the BLM. The BLM has been notified of the water rights survey by means of the submittal of the permit application.

According to Mark Page (State Water Rights), there is not a water conversation district associated with Lila Canyon Mine.

525.200. Protected Areas

525.210. Since there are no public buildings or other facilities such as churches, school or hospitals, and since there are no impoundments with a storage capacity of more than 20 acre-feet, this section does not apply.

525.220. Since R645-301-525.210 does not apply, this section does not apply.

525.230. Since there are no planned operations under urbanized areas, cities, towns, and communities, or adjacent to industrial or commercial buildings, major impoundments, or perennial streams this section does not apply.

525.240. A detailed plan of the underground workings, including maps and descriptions of significant features of the underground mine, including the size, configuration, and approximate location of pillars and entries, extraction ratios, measures taken to prevent or minimize subsidence and related damage, and areas of full extraction can be found in the R^2P^2 on file with the BLM local and state offices.

525.300. Subsidence control.

525.310. Measures to prevent or minimize damage.

525.311 No attempt will be made to prevent subsidence in any area except where the escarpment near the outcrop is to be protected and to insure that subsidence remains within the permit area. The use of continuous miners in a pillar section as well as longwall technology provides for planning subsidence in a predictable and controlled manner. Some surface expressions of tension cracks, fissures, or sink holes may be experienced but should be insignificant. The chances of subsidence related damage to any perceived renewable resource is minimal. The value and foreseeable use of the surface lands will not be affected by potential subsidence.

525.312 Since there are no buildings or occupied residential dwellings or structures within the Lila Canyon project area this section does not apply.

525.313 Room-and-pillar mining in addition to longwall methods will be used at the Lila Canyon Mine.

525.400. Since state-appropriated water supplies exist on the surface, 525.400 has been addressed.

525.410 Coal will be removed using a combination of continuous miner and long wall methods as described in sections 522 and 523. Sequence and timing for the development of underground workings are also discussed in sections 522 and 523.

525.420 Plate 5-5 shows the underground workings and depicts areas where first mining or partial mining will be utilized to protect the escarpment and raptor nests that may exist on the escarpment, and to insure that subsidence remains within the permit area. State-appropriated water rights are shown on Plates 5-3, 5-5 as well as Plate 7-1.

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

The coal seam is approximately 12.5 feet thick with only about 10.5 feet being extracted, and the depth of cover ranges from 0' to approximately 2,300'. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden and depth of workings, even with full seam extraction, only minimal subsidence if any is anticipated.

525.440 Aerial subsidence monitoring will be done annually while the significant subsidence is taking place. The subsidence monitoring will be initiated in an area prior to any 2nd mining being done within that area. Initially a 200 foot grid along with baseline photograph will be established prior to any 2nd mining. Approximately 12-16 control points will be needed to cover the total mining area. Six of these points will be located outside of the subsidence zone. The accuracy of this survey will be plus or minus 6" horizontally and vertically. From this data a map will be created that will show subsided areas. Once per year a follow up aerial will be performed to determine the extent and degree of active subsidence. Subsidence monitoring will continue for a minimum of 5 years after the mining ceases. If at the end of the 5 year period the annual subsidence in any of the 3 prior years measures more than 10 percent of the highest annual subsidence amount, subsidence monitoring will continue until there are 3 consecutive years where the annual subsidence amount is less than 10 percent of the highest annual subsidence amount. If for three years in a row the subsidence is measured to be less than 10% of the highest subsidence year, subsidence will be determined to be complete, and no additional monitoring for that area will be required.

“A ground survey of the mine permit area ‘where secondary extraction has occurred over the last year’ will be conducted in conjunction with the quarterly water monitoring program.” Identified features will be monitored until they are repaired or self-healed. The survey will be conducted on roads, adjacent to stock watering ponds, and in drainage channels where they cross tension areas relative to the underground extraction areas.”

“The results of this survey will be documented quarterly in a written report which provides global positioning co-ordinates as well as the following information;

A) a description of the identified subsidence related feature,
B) length, and width measurements, and compass bearing,
C) dated photographic documentation,
D) located on a topographic overlay map of the

underground disturbed area.

E) if the feature is determined as significant, the Division will be notified within a 48 hour period.

F) A written report, compiling the four quarterly reports for the monitoring year, will be submitted as part of the Annual Report required by the Division.

G) The commitment "to restore the land where subsidence damage has affected the use of the surface" must be revised to read "to restore the land where subsidence damage has been determined as significant enough to require repair, as determined by the Division".

Two areas of the permit have stream reaches with less than 1,000 feet of cover over the coal seam. As discussed in Section 525.120, it is not envisioned that subsidence will negatively impact these areas. During periods of 2nd mining under areas of intermittent or perennial streams, a ground survey will be conducted of the stream channels every two weeks. These ground surveys will be continued for a period of 3 months following the 2nd mining.

The ground survey will consist of walking and photographing the various areas of the surface over the mine where subsidence might occur. If evidence of subsidence is identified, the area of subsidence will be surveyed and the extent of the disruption identified. Depending on the extent and location of the damage, mitigation measures will be reviewed and implemented. Due to the fact that mitigation options change with time as new technology and measures are developed, better options may be implemented in the future. However, UEI provides a commitment that where subsidence damage affects uses of the surface, the land will be restored to a condition capable of maintaining the value and reasonable foreseeable uses which it was capable of supporting before the subsidence. The surface effects will be repairs as described in Section 525.500.

525.450 Subsidence control measures.

525.451. No backstowing or backfilling of voids used as a subsidence control measure is planned at this time. Therefore, this section is not applicable.

525.452. Support pillars as a subsidence control measure is not anticipated at this time. However, an area of partial mining where an unmined coal block will be left for subsidence control is shown on Plate 5-5. First mining indicates an area where a block of coal is roomed leaving pillars for support with no mining of the remaining pillars. Partial mining as shown on Plate 5-5 indicates an area where a block of coal has been isolated without the rooms being developed. Both first mining and partial mining will leave support that can be used to control subsidence. If the partially mined area shown on Plate 5-5 is ever roomed out, the area now defined as partially mined would become an area defined as being first mined.

525.453. An outcrop barrier of coal will be left to protect the escarpments at the outcrop. As per the R2P2 only first mining will be allowed within 200' of the outcrop. Mains, submains, and ventilation portals will be allowed within the outcrop.

525.454 No measures will be taken on the surface to prevent material damage or lessening of the value or reasonable foreseeable use of the surface.

525.460. Anticipated effects of planned subsidence may include tension cracks, fissures, or sink holes. Areas of minimal ground lowering may be anticipated. The chances of subsidence-related damage to any perceived renewable resource is minimal.

525.470. Since no urbanized areas, cities, towns, public buildings, facilities, churches, schools, or hospitals exist within the permit area this section does not apply.

525.480. There are no plans to change or modify the mining plan to protect any springs or seeps. Springs with water rights will be monitored for flow and quality as described in Chapter 7 Section 731.211. UEI has committed to provide for mitigation of any lost water rights as per Chapter 7 Section 727.

525.490. Other information specified by the Division as necessary to demonstrate that the operation will be conducted in accordance with R645-301-525.300 will be provided.

525.500. Repair of damage.

525.510. If effects of subsidence are confirmed, any material damage to the surface lands will be restored to the extent technologically and economically feasible. The land will be restored to a condition capable of maintaining the value and reasonable foreseeable uses which it was capable of supporting before the subsidence.

525.520. Since no structures exist within or adjacent to the permit area which could be damaged by subsidence, should it occur, this section does not apply.

525.530. The Little Park Road exists in the subsidence zone. In the unlikely event the road is damaged by subsidence, UEI will repair the damage as per Section 525.120.

525.600. Public Notice.

At least six months prior to mining, or within that period if approved by the Division, the underground mine operator will mail a notification to all owners and occupants of surface property and structures above the underground workings. The notification oil include, at a minimum, identification of specific areas in which mining will take placce, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined.

526. A narrative explaining the construction, modification, use, maintenance and removal of the mine facilities follows. Additional information can be found in Appendix 5-4 and Chapter 8.

526.100 Mine Structures and Facilities.

526.110 The only existing structures are found in Horse Canyon (Part "A" of this permit) and are the remains of the United States Steel operation. Horse Canyon has received phase II bond release and the remaining structures have been left in place for future use. Only three existing structures, a 60" and a 48" CMP culverts located near the new proposed surface facilities, and the County road on top of Little Park, can be found within the Lila Canyon Permit. The existing culvert is shown on plate 5-1A. The existing road on Little Park can be found on Plate 5-1 as well as most other plates showing the surface area of the Lila Canyon Permit. Several vehicle ways will be used for water and subsidence monitoring. These ways branch off the Little Park Road and generally follow the ephemeral drainages. The ways are shown on Plate 5-1 as well as most other plates showing the surface area of the Lila Canyon Permit. More detail of the existing Little Park Road can be found in Appendix 5-4.

526.111 The location of the existing culverts is shown on Plate 5-1A.

526.112 Most of the existing 48" culvert is outside the permit boundary and is the Counties responsibility. UEI will grade the site so that during reclamation and operations surface flows will be directed away from the 48" culvert. The 60" culvert is in poor condition and will be replaced by the county. UEI will add on to the culvert during the operation and reclamation phase. The bottom 30' is the responsibility of the County, the upper portion is the responsibility of UEI.

526.113 It is believed that the existing culverts were installed with the road construction around 1940.

526.114 Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply.

526.115 Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. The County road and the culvert within the disturbed area boundary will be modified or reconstructed by the County.

526.115.1. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.115.2. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.115.3. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.115.4. Since the existing culvert is going to be removed upon construction of the sediment pond this section does not apply. See Appendix 5-4 for existing road details.

526.116 The only coal mining and reclamation operations that are planed within 100 feet of the County Road are office complex, sediment pond, topsoil pile, and security shack. The permit area adjacent to the county road will be fenced to protect the public from the sediment pond and other mine associated buildings. Other than fencing no additional measures are planned after the construction phase. During construction measures to control traffic on the County Road will be taken to protect the public from construction related hazzards.

526.116.1. A cooperative agreement with Emery County as stated in Appendix 1-4 requires a six foot chain link fence to be constructed adjacent to the Lila Canyon Road to provide safety to the general public in the proximity to the mine site and mine related structures and activities.

526.116.2. At the current time there are no plans to relocate any public road.

526.200 Utility Installation and Support Facilities.

526.210 All coal mining and reclamation operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by oil, gas, and water wells, oil, gas, and coal-slurry pipelines, railroads, electric and telephone lines, and water and sewage lines which may pass over, under, or through the permit area, unless otherwise approved by the owner of those facilities and the Division. Since no existing services are found within the projected disturbed area, no negative impact to any service is anticipated.

526.220 The new support facilities are described in section 520 and in Appendix 5-4 and shown on plate 5-2 and will be operated in accordance with the mine reclamation plan. Plans and drawings for each support facility to be constructed, used or maintained within the permit area are found in Appendix 5-4, Plates 5-7A, 5-7B, and 5-8.

526.221 The new facilities designs shown in Appendix 5-4 prevents or controls erosion and siltation, water pollution, and damage to public or private property, and:

526.222 The new facilities designs shown in Appendix 5-4 minimizes damage to fish, wildlife, and related environmental values; and minimizes additional contributions of suspended solids to stream flow or runoff outside the permit area to the extent possible by using the best technology currently available.

Islands of undisturbed areas within the permit area will be visually monitored for coal fines deposition. If monitoring reveals coal fine deposition, then water sprays on the area from which the fines are originating will be warranted as per August 27, 1999 Approval Order.

526.300 Water pollution control facilities consist of sedimentation control and properly designed sewage systems.

The sedimentation control is accomplished by containing all disturbed area runoff in a properly sized sedimentation pond. Complete designs are presented in Appendix 7-4 and on Plate 7-6.

The sewage system will consist of a septic tank and drainfield. The system is shown on Plate 5-2. Complete designs are presented in Appendix 5-4.

The drain field design and layout is shown on plate 5-2 and details are shown in Appendix 5-4.

526.400 Since Lila Canyon Mine is an underground operation this section does not apply.

527. Transportation Facilities.

527.100 All new roads within the disturbed area have been classified as primary.

527.110 See Sections 527.120 and 527.130.

527.120 The Slope Access Road / Portal Access Road and the Mine Facilities Road / Truck Loadout Road will be used frequently for access for a period in excess of six months, and or will transport coal, they are classified as primary roads.

527.121 See 527.120 above.

527.122 See 527.120 above.

527.123 Since none of the new roads planned within the disturbed area will be retained for an approved postmining land use this section does not apply.

527.130 There are no ancillary roads within the disturbed area. .

527.200 A detailed design and description for each road, and conveyor to be constructed used, and maintained within the proposed permit area is included in Appendix 5-4. The roads are show on Plate 5-

2.

527.210 The specifications for each road width, road gradient, road surface, road cut, fills, embankments culverts, drainage ditches and drainage structures are shown on Plate 5-2, 7-2, 7-5, 7-6a and 7-6b, and in Appendixes 5-4 and 7-4.

527.220 Since no alteration or relocation of natural drainage ways is anticipated this section is not applicable.

527.230 Roads shall be maintained in manner that allows them to meet their design standards throughout their use.

527.240 If any of the roads on the disturbed area is damaged by a catastrophic event, the road will be repaired as soon as practical after the damage has occurred.

527.250 Steep cut slopes or requests for alternative specifications are not anticipated at this time therefore this section does not apply.

528. Handling and Disposal of Coal, Overburden, etc:

A narrative explaining the construction modifications, use, maintenance and removal of coal, overburden, excess spoil and coal mine waste.

528.100 Coal will be mined using continuous miners and longwall equipment. The coal will be transported from the face and deposited on the underground mine belts using shuttle cars or continuous haulage equipment. The coal will be transported by a series of conveyor belts from the section to the run of mine stockpile. The coal will be removed from the run of mine stockpile by a reclaim belt to an enclosed crusher/screen. Once crushed the coal will be conveyed to a storage bin from which it will loaded in to coal haul trucks for transportation to a unit train loadout.

528.200 Overburden: Lila Canyon is an underground operation and it is not anticipated that any material that overlays the coal seam, consolidated, or unconsolidated, other than topsoil, will be disturbed. Therefore, this section does not apply.

528.300 Spoil, coal processing waste, mine development waste, and noncoal waste removal, handling, storage, transportation, and disposal areas and structures are discussed below.

528.310 Excess Spoil: Since Lila Canyon is an underground operation it is not anticipated than any spoil will be generated. Therefore this section does not apply.

528.320 Coal Mine Waste: All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream. Portions of the rock slope material, not containing coal, will be used as structural fill for the shop/warehouse pad. The temporary mine development waste pile and slope rock disposal area are shown on Plate 5-2 and in Appendix 5-7.

528.321 Coal processing waste produced from the screen will not be returned to any abandoned underground workings. Any and all of the coal processing waste from the screen will be crushed and reintroduced into the ROM stream for sale.

528.322 Refuse Piles. Each pile will meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215, meet the design criteria of R645-301-210, R645-301-512.230, R645-301-513.400, R645-301-514.200, R645-301-515.200, R645-301-528.320, R645-301-536 through R645-301-536.200, R645-301-536.500, R645-301-536.900, R645-301-542.730, R645-301-553.250, R645-301-746.100, R645-301-746.200, and any other applicable requirements.

528.323 Burning and Burned Waste Utilization.

528.323.1. Coal mine waste fires will be extinguished by the person who conducts coal mining and reclamation operations, in accordance with a plan approved by the Division and MSHA. The plan will contain, at a minimum, provisions to ensure that only those persons authorized by the operator, and who have an understanding of the procedures to be used, will be involved in the extinguishing operations. The coal mine waste fire plan can be found in Appendix 5-3. MSHA approval is not required unless you have an actively burning fire. (Phone conversation with Billy Owens MSHA Denver 5/31/05)

528.323.2. No burning or burned coal mine waste will be removed from the permitted disposal area.

528.330 Noncoal Mine Waste.

528.331 Noncoal mine wastes including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustible materials generated during mining activities will be placed and stored in a controlled manner in a designated portion of the permit area. The noncoal mine waste will be placed in dumpsters and emptied on a as needed basis. The designated noncoal waste area is shown on Plate 5-2.

528.332 It is anticipated that final disposal of noncoal mine wastes will be at the ECDC facility near East Carbon City. Concrete will be disposed of in a specified area, refer to Plate 5-6 for this location. The disposal site will be located under the reclaimed coal stockpile. This area will receive the maximum fill during reclamation. Placement of this fill around the concrete will help to eliminate runoff. This will ensure that leachate and drainage does not degrade surface or underground water. The noncoal mine waste will be placed in dumpsters and emptied on a as needed basis.

528.333 The noncoal mine waste will be disposed of at the ECDC facility near East Carbon City.

528.334 Notwithstanding any other provision to the R645 Rules, any noncoal mine waste defined as "hazardous" under 3001 of the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-580, as amended) and 40 CFR Part 261 will be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

528.340 A description of the disposal methods for placing underground waste and excess spoil generated at surface areas according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-301-512.220, R645-301-514.100, R645-301-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-536.600, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.300, and R645-301-745.400 is covered in sections 535, and 536.

528.350 A description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of in accordance with R645-301-528.330, R645-301-537.200, R645-301-542.740, R645-301-553.100 through R645-301-553.600, R645-301-553.900, and R645-301-747 is included.

528.400 Dams, embankments and other impoundments.
See Section 700 and Appendix 7-4.

529. Management of Mine Openings:

The permit application includes a description of the measures to be used to seal or manage the openings within the proposed permit area. New slope or drift openings required to be sealed shall be sealed with solid, substantial, noncombustible material for a distance of at least 25 feet into such openings. The closure design for portals, slopes, and drifts, can be found in Appendix 5-6.

529.100 Shafts or other exposed underground opening when no longer in use will be cased, lined, or otherwise managed as approved by the Division. All openings exposed by mining operations within the permit area will be permanently closed unless approved for water monitoring.

529.200 For the purposes of Underground Coal Mining and Reclamation Activities:

529.210 Mine entries which are temporarily inactive, but have a further projected useful service under the approved permit application, 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 operating condition by the person who conducts the activity.

529.220 Since no portals are projected to return underground development waste, coal processing waste or water to the mine, this section does not apply. There is no current need to return any waste to the underground workings.

529.300 Section 529 does not apply to holes drilled and used for blasting.

529.400 No openings have been identified for use to return coal processing waste to underground workings. Therefore this section is not applicable.

530. Operational Design Criteria and Plans.

531. General plans for the sediment ponds and refuse pile are found within this section.

532. Sediment control measures can be found in Chapter 7.

532.100 The smallest practicable area will be disturbed during the life of the project. Progressive backfilling, grading, and prompt revegetation of applicable will be completed as per R645-301-353.200.

532.200 Backfilled material will be stabilized to promote a reduction of the rate and volume of runoff in accordance with R645-301-537.200, R645-301-552 through R645-301-553.230, R645-301-553.260 through R645-301-553.420, R645-301-553.600, and R645-301-553.900.

533. Impoundments.

533.100 Since no impoundments meeting the criteria of 30 CFR 77.216(a) this section does not apply.

533.200 The only impoundments planned for this site are two (2) sediment ponds. Detailed designs for the Sediment Ponds can be found in Appendix 7-4, Section 3.1 and on Plates 7-6a and 7-6b.

533.210 The sediment ponds will be incised, except for the dam/road embankment at Pond #1. This embankment will be reconstructed and compacted to at least 95%. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1 and on Plates 7-6a and 7-6b.

533.220 Where fill is to be placed, natural ground shall be removed 12" below the structure. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1 and on Plates 7-6a and 7-6b.

533.300 Rip-rap or other protection (culverts, concrete) will be placed at all inlets and outlets to prevent scouring. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1. Also see Plates 7-6a and 7-6b.

533.400 External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1 and on Plates 7-6a and 7-6b.

533.500 This section does not apply, there are no vertical highwalls associated with this impoundment.

533.600 Since no impoundments are planned that meet the criteria of MSHA, 30 CFR 77.216(a) this section does not apply.

533.700 Design and construction requirements, as well as operation and maintenance requirements are detailed in Appendix 7-4, Section 3.1 and Plates 7-6a and 7-6b.

534. Roads. The designs for surface roads can be found in Appendix 5-4.

534.100 The roads have been designed, located, constructed and will be maintained to:

534.110 The roads have been designed, located, constructed and will be maintained to prevent or control damage to public or private property.

534.120 Nonacid or nontoxic-forming substances will be used in road surfacing.

534.130 The designs for the roads can be found in Appendix 5-4.

534.140 The reclamation plan for the roads can be found in section 542.600.

534.150 The roads have been designed to prevent or control erosion, siltation and air pollution.

534.200 Appropriate limits for grade, width, and surface materials have been used in the design of the roads.

534.300 Primary Roads. Primary roads will meet the requirements of R645-301-358, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-542.600, R645-301-542.600, and R645-301-762, any necessary design criteria established by the Division, and the following requirements. Primary roads will:

534.310 The roads will be located insofar as practical, on the most stable available surfaces.

534.320 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 the weight and speed of vehicles using the road;

534.330 The roads will be routinely maintained to include repairs to the road surface, blading, filling potholes and adding replacement gravel or asphalt. It will also include revegtating, brush removal, and minor reconstruction of road segments as necessary.

534.340 Culverts if required will be designed, installed, and maintained to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the road.

535. Spoil: It is anticipated that no spoil will be produced at the Lila Canyon Mine therefore this section is not applicable.

536. Coal Mine Waste: The proposed Lila Canyon Mine could produce 2 separate types of coal mine waste:

1. Normal coal processing waste or refuse and;
2. Underground development waste (rock slope material).

All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. The rock slope material / underground development waste will be examined and tested as necessary to determine acid- or toxic-forming potential.

536.100 All underground development waste, other than the rock slope material, will be brought to the surface and will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface.

536.110 The refuse pile will be designed to attain a minimum long-term slope stability safety factor of 1.5. See Appendix 5-7.

536.200 Underground development waste brought to the surface will be deposited according to the plan described in Appendix 5-7.

536.300 Since no spoil fills will be generated this section does not apply.

536.400 Since there will not be any impounding structures constructed of coal mine waste this section does not apply.

536.500 As discussed in Section 536 and 536.300, it is proposed to dispose of the rock slope material / underground development waste within the rock disposal area and be used as structural fill as shown on Plate 5-2.

536.510 It is not anticipated that coal mine waste materials from activities located outside the permit area be disposed of in the permit area. Therefore this section does not apply.

536.520 It is not anticipated that coal mine waste will be brought to the surface then taken back underground for disposal therefore this section does not apply.

536.600 In areas where slope rock or coal processing waste is deposited, the topsoil will be removed and stored in the topsoil stockpile area until reclamation.

536.700 It is not anticipated that coal processing waste will be returned to abandoned underground workings therefore this section does not apply

536.800 Since no coal processing waste banks, dams, or embankments are planned for the Lila Canyon Mine therefore, this section does not apply.

536.900 Refuse Piles. (See Appendix 5-7) The refuse pile is designed to meet the requirements of R645-301-210, R645-301-512.230, R645-301-513.400, R645-301-514.200, R645-301-515.200, R645-301-528.322, R645-301-528.320, R645-301-536 through R645-301-536.200, R645-301-536.500, R645-301-536.900, R645-301-542.730, R645-301-553.250, R645-301-746.100 through R645-301-746.200, and the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215.

537. Regraded Slopes.

537.100 Each application will contain a report of appropriate geotechnical analysis, where approval of the Division is required for alternative specifications or for steep cut slopes under R645-301-358, R645-301-512.250, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-534.300, R645-301-542.600, R645-301-742.410, R645-301-742.420, R645-301-752.200, and R645-301-762.

540. Reclamation Plan. (See Appendix 5-8 for reclamation plan.)

541. General.

541.100. The operator is committed to performing all reclamation as in accordance with R645 rules.

541.200. N/A. The operator is not involved in surface mining activities.

541.300. The operator is committed to the removal of all equipment facilities and structures upon cessation of mining activities.

541.400. The operator will address all reclamation activities as referenced in Chapter 5 of this document.

542 Narratives, Maps and Plans.

542.100. See Table 3-3 time table based on project reserves markets and life of mine.

542.200. The perimeter of the disturbed area contains approximately 42.6 surface acres within the disturbed area but only 33.86 acres will be disturbed leaving 8.74 acres of undisturbed islands within the disturbed area. The following R645 regulations will give detailed description and reclamation procedures to address these areas of disturbance. The reclamation plan for the sediment pond and drainage control structures can be found in Appendix 7-4.

Topsoil amounts can be found in Section 232.100 and are calculated from Plate 203. Concrete amounts can be calculated from the text in Section 520. Coal Mine Waste volumes can be found in Appendix 5-7. Volumes were calculated using a Cad system.

542.300. Included.

542.310. Included. (See Plates 5-6 & 7-7)

542.320. There will not be any surface facilities left post mining.

542.400. Not applicable. No surface facilities will remain post bond liability period.

542.500. A reclamation time table is included as Table 3-3.

542.600. All roads within the disturbed area will be reclaimed immediately after they are no longer needed for mining and reclamation operations.

542.610. The time table of reclamation activities will enable the roads to be removed concurrently with reclamation activities. So, no closures specific to traffic would be anticipated.

542.620. All bridges and culverts will be removed concurrent with reclamation.

542.630. All disturbed areas will be ripped and top soiled prior to revegetation activities in compliance with all applicable R645 regulations. (See Appendix 5-8)

542.640. Road surfacing materials such as sand and gravel, which are not suitable for revegetation establishment will be buried on site and covered with a minimum of two feet of material that would support vegetation. Concrete will be disposed of in the designated area and covered with four feet of cover. Asphalt will be disposed of off site, either in a landfill or sent to a recycling facility.

542.700. Final Abandonment of Mine Openings and Disposal Areas.

542.710. Appendix 5-6 depicts a typical seal that will be constructed at all mine openings.

542.720. No excess spoil is anticipated at this time.

542.730. All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface.

542.740. Disposal of Noncoal Mine Wastes.

542.741. All non coal waste will be temporarily stored on site in approved waste bins and commercially picked up and transported to an approved disposal site. Non Coal waste generated during reclamation (such as concrete structure, buried culverts, utility lines, septic systems etc.) will be buried in the refuse disposal area and covered with a minimum of four feet of fill.

542.742. No noncoal waste will be stored on site or disposed of on site during the life of the mine.

542.800. A detailed cost break down is included in Chapter 8. Appendix 8-1 relative to bonding.

550 Reclamation Design Criteria and Plans. Each permit application will include site specific plans that incorporate the following design criteria for reclamation activities.

551. All underground openings will be sealed as detailed in Appendix 5-6.

552. Permanent Features.

552.100. In course of reclamation, areas that have been recontoured and top soiled will be "pock-marked" creating small basins that will facilitate vegetation establishment as well as minimizing erosion.

552.200. No permanent impoundments will be left post reclamation.

553. The operator will comply with all regulations applicable to underground mining activities relative to backfilling and grading as required by R645 regulations.

Some minor cut slopes along the reclaimed road may be left after reclamation due to the difficulty and inability to reclaim all material pushed over the side while making the road cut. See plate 5-7B-2 cross section 16+00 for details. UEI will make reasonable efforts to minimize the cut slopes being left.

553.100. Disturbed Areas. Disturbed areas will be backfilled and graded to:

553.110 The operator will obtain a post mining topography similar in form as what existed premining.

553.120 Since Lila Canyon is an underground operation, no spoil piles will be created. Minor highwalls may be created with the development of the rock slope portals. Upon completion of mining these entries will be seal as per Closure for Mine Openings Appendix 5-6 and all highwalls will be eliminated during the reclamation phase of the operation. Plate 5-9 shows the proposed portal plan. During reclamation, the fans will be dismantled and either salvaged or taken underground. The chainlink bolts will be cut off 6 inches below the surface and the shot-crete and mesh will be disposed of underground. The concrete will be burried during highwall reclamation and suitable material will be placed against the portals. This material will be shaped to eliminate the highwall and to bring the slope back to the approximate original contour.

553.130 All fill slope will have a static safety factor of 1.3 as shown in Appendix 5-5.

553.140 Erosion and water pollution will be minimized on site by the use of drainage control structures (burms, channels and silt fence) and the use of small depression, soil tackifiers, mulch and sediment pond design. No water is anticipated leaving the reclaimed site prior to adequate treatment in the form of retention and/or filtration that does not meet and/or exceed UPDES standards.

553.150 The post mining land use of wildlife and domestic grazing should be enhanced to some degree with the revegetation of a more desirable seed mix and a vegetative cover in excess of what was present premining.

553.200 Spoil and Waste.

553.210 All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream.

553.220 Since no spoil will be produced this section does not apply.

553.221 All vegetation and /or organic material will be removed prior to any coal mine waste being stored.

553.222 All useable topsoil or topsoil substitute will be removed from the structural fill and refuse areas prior to use. Table 2-1 shows estimates of salvageable soil by soil type based on current NRCS soil inventories. The location of the soil storage are shown on Plate 5-2. This material will be spread over the recontoured structural fill and refuse areas prior to seeding and mulching.

553.223 Since no spoil will be produced this section does not apply.

553.230 All recontoured areas will be compacted to minimize slippage. The area will then be over laid with topsoil and ripped. In addition the area will be “pock-marked” to minimize the potential for erosion as well as enhance revegetation establishment. It is not anticipated that soil will be disturbed in areas to steep for equipment to operate.

553.240 The structural fill area will have slopes of less than 8% upon final recontouring and revegetated to enhance the post mining land use of grazing and wildlife habitat.

553.250 A need for a refuse pile at Lila Canyon is not anticipated.

553.260 The operator will commit to all applicable R645 regulations relative to disposal of coal processing waste.

553.300 All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream.

553.400 Cut-and-fill terraces may be allowed by the Division

553.410 No cut and fill terraces will be required.

553.420 No terraces will be required for post mining land use.

553.500-540 and 553.600-553.650.500
The only area that falls under these provisions are the reclaimed Horse Canyon mine which lies in the north west portion of the lease area and is addressed under approved MRP Act #0013 (Part “A”).

553.700-553.900
This operation will only involve underground mining and as such the above referenced regulations do not apply.

560. Performance Standards. Coal mining and reclamation operations will be conducted in accordance with the approved permit and requirements of R645-301-510 through R645-301-553.

APPENDIX 5-4

NEW FACILITY DESIGN

Information for Appendix 5-4 is mostly hard copies. Electronic copies do not exist for all information contained within the Appendix.

APPENDIX 5-4

ROADS

Existing Lila Canyon Road: (County Road 126)

The Lila Canyon road runs from the Horse Canyon Mine to the proposed Lila Canyon surface facilities then continues from the Lila Canyon surface to U.S. Highway 191/6. This road was constructed in the early 1940's to provide access to coal reserves south of the Horse Canyon Mine. The road extends south from Horse Canyon following the base of the Book Cliffs escarpment then turns south connecting to Highway 191/6. The road right-of-way consists of a total width of 100 feet. A small portion of this road is on BLM surface and a BLM right-of-way was issued to Kaiser Steel Corporation and is now owned by UEI. The portions of this road is on private property owned by UEI and William Marsing. Emery County also claims the road under the RS-2477 federal road designation. Any constructed facilities, including the 6 foot chain link fence, would not be placed on the county road right-of-way. County road 126 has been used for years by residents of Carbon and Emery Counties for recreation, ranching, and hunting purposes. Over the last 50 years, the majority portion of this road received little, if any maintenance. However, the first 2.5 miles from U.S. 191/6 to the correl has received frequent maintenance.

Main access to the mine site will be from U.S. Highway 191/6. The proposed access road will be constructed by Emery County and will be designated as Lila Canyon Road 126. Some areas of the road will be upgraded others areas will be realigned. This road will be a two lane, 30 foot wide gravel surface Class B road, totaling approximately 4.7 miles in length. The proposed road reconstruction and realignment will be designed for a maximum speed of 45 miles per hour, would be constructed according to the standards of the American Department of Transportation 1992 Standard Specifications for Road and Bridge Construction. The realigned and reconstructed road will provide a safer and more direct route to the mine from U.S. Highway 191/6. The road will follow closely the existing RS-2477 road. Only the section of county road 126 from U.S. Highway 191/6 to Lila Canyon surface will be improved and or reconstructed. The county has no current plans to upgrade the section of 126 from Lila Canyon to Horse Canyon. All engineering, construction and maintenance on the reconstructed and realigned road will be implemented and controlled by the Emery County Road Department. Emery County will also control all necessary rights-of-way.

A single-lane unpaved road extends south from County Road 126, just short of where the mine facility road begins, and extends along the west boundary of the surface facilities' disturbed area then continues to the south. This unpaved road is owned by Emery County and is a part of a network of unpaved roads used for recreation and to access range land to the south of Country Road 126. This road is also used by UEI to access the Topsoil Pile and Pond #1, and for access to water quality monitoring sites. This road was reconstructed in the area of Pond #1 when the pond was first constructed. With the approval of Emery County, the road at the dam will be regraded and widened to accommodate a slightly deeper Pond #1. As the dam is outside the mine’s disturbed area, final reclamation of the dam and county road will be addressed per the existing agreement with Emery County.

New Mine Facility Road:

The mine facility road shown on Plate 5-2 begins at the edge of County Road 126 and allows for access to the various surface facilities. The road has been located in the most practical location taking into consideration grade, stability, and alignment. Employees will use this road to access the office & bathhouse facilities. Coal haul trucks will use this road to access the scales and truck loadout. All supplies will be hauled on a short portion of this road from the supply storage area to the slope access road. The road will initially be graveled but will be paved in the long term to minimize dust and provide good surface for heavy truck traffic as well as facility access. The facility access road will be approximately 24' wide to provide for two lane traffic and will have the appropriate drainage controls to insure long term life and low maintenance. The has been constructed and will be maintained according to the appropriate R645-534 and R645-527 regulations. When detailed engineering design is complete a copy of the detailed road design will be included in Appendix 5-4.

New Slope Access / Portal Access Road

The slope access road splits off the facility access road near the north-east corner of the equipment and supply storage area, and follows an alignment that takes into consideration grade and direct access. The slope access road will be used to provide access to the rock slopes which in-turn proved access to the underground workings. The slope access road will be used as access for all men, material and equipment need in the mine. Since the slope access road provides for frequent access for men, equipment and materials for a period of six months or longer the slope access road is classified as a primary road. The slope access road will be designed, constructed, and maintained according to appropriate R645 regulations. The slope access road is shown on Plate 5-2. When detailed engineering design is complete a copy of the detailed road design will be included in Appendix 5-4.

Existing Little Park Road:

The Little Park road runs from the Horse Canyon Mine, up to the top of Little Park, and across Little Park to Turtle Canyon, then down Turtle Canyon to the Green River. This road has been used for years by residents of Carbon and Emery Counties for recreation, ranching, and hunting purposes. It is a public road and is maintained by either the BLM and or Emery County. The road is “Cherry Stemed” by the new BLM wilderness reinventories. The road is used by UEI to monitor water and will continue to be used on a frequent basis for subsidence monitoring and water monitoring. Plate 5-1 as well as others show the location of the Little Park road.

Existing Vehicle Ways:

Several vehicle ways off from the Little Park road are used by UEI for water monitoring. UEI will continue to use these vehicle ways frequently for water and subsidence monitoring. The vehicle ways vary from 5 to 15 feet wide. These ways are located either in dry stream channels, or are old drilling roads both accessed by ATV. No future maintenance is projected for these vehicle ways. Plate 5-1 as well as others show the location of the vehicle ways used by UEI.

Appendix 7-4
Lila Canyon Mine
Sedimentation and Drainage Control Plan

Revised

January 2001
October 2002 RJM
February 2007 TJS
April 2008 TJS
July 2008 TJS
June 2009 TJS
January 2010 TJS
January 2012 TJS
October 2014 TJS
December 2015 KM-PJ

SEDIMENTATION AND DRAINAGE CONTROL PLAN

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SEDIMENTATION AND DRAINAGE CONTROL PLAN

1- Introduction

The Sedimentation and Drainage Control Plan for the Lila Canyon Mine has been designed according to the State of Utah R645- Coal Mining Rules, November 1, 1996. All design criteria and construction will be certified by a Utah Registered Professional Engineer.

This plan has been divided into the following three sections:

1) Design of Drainage Control Structures for the Proposed Construction

2) Design of Sediment Control Structures

3) Design of Drainage Control Structures for Reclamation

The general surface water control plan for this project will consist of the following:

(a) This is a new site construction. All areas proposed for disturbance will be sloped to drain to surface ditches and/or culverts where runoff will be carried to two sediment ponds. All minesite drainage controls and watersheds are shown on Plate 7-5 “Proposed Sediment Control Map”.

(b) The majority of undisturbed runoff will be diverted around the minesite and/or beneath the sediment pond #1 by properly sized culverts. Undisturbed diversion culvert UC-1, is located on the northwest end of the site. This diversion will allow the majority of undisturbed runoff from the Right Fork of Lila Canyon to bypass the mine area beneath sediment pond #1. All undisturbed diversions are designed to carry runoff from a 100 year - 6 hour precipitation event. UC-1 is oversized at 60" diameter.

(c) Two adequately sized sediment ponds will be constructed at the lower end of the site. These ponds are sized to contain and treat the runoff from all of the disturbed area and any contributing undisturbed areas for a 10 year - 24 hour precipitation event. The ponds will be equipped with C.M.P. culvert principle spillway and decant and CMP culvert emergency spillway sized to safely pass runoff from a 25 year - 6 hour precipitation event. The spillways from sediment pond #1 will discharge into the UC-1 CMP culvert running beneath the pond. This culvert will discharge onto an engineered discharge structure and into the Right Fork of Lila Canyon channel below the minesite. The spillways from sediment pond #2 will discharge onto an engineered discharge structure and into the Middle Fork of Lila Canyon channel below the minesite.

DESIGN OF DRAINAGE CONTROL STRUCTURES

Design Parameters:

Tables:

Figures:

Design Parameters

2.1 Precipitation

The precipitation-frequency values for the area were taken from the approved Mining and Reclamation Plan, Horse Canyon Mine, Emery County, Utah, Volume III, submitted by I.P.A.

Frequency - Duration	Precipitation
10 year - 6 hour	1.30"
10 year - 24 hour	1.90"
25 year - 6 hour	1.50"
100 year - 6 hour	1.90"

2.2 Flow

Peak flows were determined from rainfall depths, drainage areas, and curve numbers and were calculated using the computer program "Triangular Hydrograph Calculations", based on SCSHYDRO Program developed by Hawkins and Marshall (1979) prepared for the Division of Oil, Gas, and Mining.. All flows are based on the SCS Curve Number Method for both SCS 6-hour and NOAA Type II, 24-hour storms.

Time of concentration of storm events were calculated for each drainage area using SCS Lane's Formula. (U.S. Soil Conservation Service, 1972):

$$L = \frac{l^{0.8} * (S+1)^{0.7}}{1900 * Y^{0.5}}$$

and

$$Tc = 1.67 * L$$

where L = watershed lag (hours)
l = hydraulic length of the watershed, or distance along the main channel to the watershed divide (feet)
S = watershed storage factor defined in Equation (2-2)
Y = average watershed slope (percent)
Tc = time of concentration (hours)

2.3 Velocity

Flow velocities for each ditch structure were also calculated using the Storm computer program with Manning's Formula:

$$V = \frac{1.49}{n} * R^{2/3} * S^{1/3}$$

where:

V	=	Velocity (fps)
R	=	Hydraulic Radius (ft.)
S	=	Slope (ft. per ft.)
n	=	Manning's n; Table 3.1, p. 159,

"Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner & Haan, 1983.

Note: The following Manning's n were used in the calculations:

Structure Manning's n

Culverts (cmp)	0.024
Culverts (HDPE)	0.013
Unlined Disturbed Area Ditches	0.030
Lined Disturbed Area Ditches	0.032 - 0.040

2.4 Drainage Areas

All drainage areas were determined directly from Plate 7-1, "Permit Area Hydrology Map", Plate 7-2, "Disturbed Area Hydrology/Watershed", or Plate 7-5 "Proposed Sediment Control".

2.5 Slopes, Lengths

All slopes and lengths were measured directly from the topography on Plates 7-1, 7-2, and/or 7-5.

2.6 Runoff Volume

Runoff was calculated using the SCS Curve Number formula for both NOAA Type II, 24-hour and SCS 6-hour storms; using the SCSHYDRO computer program:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

where: Q = Runoff in inches

P = Precipitation in inches

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

CN = Runoff Curve Number

2.7 Runoff Curve Numbers

Two curve numbers were utilized for the undisturbed areas. Areas with milder slopes (less than 30%) were given a runoff curve number of 75. All other undisturbed areas (30% slope or greater) were given a runoff curve number of 83. These numbers were taken directly from the approved “Mining and Reclamation Plan, Horse Canyon Mine, Emery County, Utah, Volume III”, submitted by I.P.A. The numbers in that plan were based on vegetation and soils data from on-site.

A runoff CN of 90 is used for all disturbed areas. This value is based on commonly used and approved values and from Table 2.20, (p. 82, Barfield, et al, 1983).

The following is a summary of runoff curve numbers used in these calculations:

Watershed	Runoff CN
Undisturbed (<30% slopes):	75
Undisturbed (>30% slopes):	83
Disturbed:	90

2.8 Culvert Sizing

Minimum culvert sizing is based on the either the inlet control nomograph or Manning's Equation. Culverts were evaluated for inlet control conditions to determine the minimum pipe size using the Culvert Nomograph included as Figure 1 of this Appendix. If the pipe had a HW/D ratio equal to or greater than 1.0 or the slope were less than 2% the Hydraulic Toolbox, Version 4.0 or later version computer program was used to determine the pipe flow diameter using:

$$D = \left(\frac{2.16\ Q\ n}{\sqrt{s}}\right)^{0.35}$$

where:	D	=	Required Diameter (feet)
	Q	=	QP = Peak Discharge (cfs)
	n	=	Roughness Factor (0.025 for CMP)
	S	=	Slope (ft. per ft.)

2.9 Culverts

Culverts have been sized according to the calculations previously described, and are shown on Plate 7-5, “Proposed Sediment Control”. Culverts carrying undisturbed drainages are designated with UC- Letters (i.e. UC-1). All undisturbed area drainage culverts will be fitted with trash racks to minimize plugging by rocks or other debris.

Trash racks will be provided at the inlet for all undisturbed drainage culverts. These will consist of 3/4" steel bars welded on 6" centers across the flared inlet structures of each culvert. Bars will be sloped from the front of the inlet structure up to the top of the culvert. This ramp configuration will allow trash, branches and other potential obstructions to be swept up and away from the inlet rather than being impinged against the grates during a flow event. Rip rap will be placed around the flared inlet structure and above it to a height of at least 6" above the required headwall for each culvert. (See Figure 4 for details). Trash racks will be checked on a routine schedule and following precipitation events and all trash, branches and other obstructions will be removed.

It should be noted that all undisturbed area culverts are adequately sized to handle the expected runoff from a <u>100 year - 6 hour event</u> for maximum protection of the mine area, sediment pond and undisturbed drainage. This is well in excess of the 10 year - 6 hour event required by the regulations and is proposed as an extra measure of safety.

Disturbed area culverts and ditches are shown on the “Proposed Sediment Control”, Plate 7-5. Culverts carrying disturbed drainage are designated with a DC-number (i.e. DC-1). Calculations for all disturbed area culverts and ditches are also included with this report, along with design criteria. Disturbed drainage areas draining to culverts and ditches are marked with a DA-number (i.e. DA-1). It should be noted that at culvert DC-5, there is accomodation for the introduction of discharge of mine water at a rate of 4.5 cfs (2,020 gpm).

Culverts will be inspected regularly, and cleaned as necessary to provide for passage of drainage flows. Inlets and outlets shall also be maintained so as to prevent plugging or undue restriction of water flow.

All disturbed area culverts are temporary, and will be removed upon final reclamation.

2.10 Main Canyon Culvert - Outlet Structure

The outlet of culvert UC-1 has been designed to flow onto a rip-rap apron to protect against scouring and to allow for energy dissipation. The rip-rap apron is designed to fit the natural channel configuration as closely as possible, and will allow runoff to re-enter the natural channel at a reduced velocity which is no greater than natural flow conditions. Runoff from the 100 year - 6 hour precipitation event in the canyon below the minesite has been calculated at 55.60 cfs, including sediment pond overflow.

The rip-rap apron design is based on Figure 7-26, Design of Outlet Protection - Maximum Tailwater Condition, “Applied Hydrology and Sedimentology for Disturbed Areas”, Barfield, Warner and Haan, 1983. Based on the figure, the apron should be a minimum of 15' in length, widening from 5' to 9', with a 0.1% slope. The proposed length has been increased to 20', to ensure adequate time for velocity reduction. The apron slope is kept at 0.1%. Rip-rap size is conservatively placed at 12" D_{50}. Rip-rap will be placed to a depth of 1.5 D_{50} and will be placed on a 6" layer of 2" drain rock filter. Rip-rap will also be placed on the 2H:1V side slopes to the height of the culvert (5') at the culvert outlet tapering to 3' at the outlet of the apron. This rip-rap apron has been sized and designed to adequately dissipate energy from flow velocities of a 100 year - 6 hour precipitation event and resist dislodgement. The drain rock filter bed will also serve to secure the rip-rap boulders firmly in place, to add an additional element of stability, and prevent scouring underneath the armored apron. (See Figure 4A for construction details). The natural channel below the culvert has a gradient of approximately 7.76%. When the flow is routed from the culvert across the apron to the natural channel, the velocity is reduced from 6.31 fps at the culvert outlet to 1.54 fps at the outlet of the apron. (See Culvert Outlet Rip-Rap Apron Flow Velocity Calculations in Appendix 1.)

It should be noted that these calculations are based on a <u>100 year - 6 hour event</u>.

2.11 Ditches

All ditches will carry disturbed area drainage to the ponds. Ditches are shown on the "Proposed Sediment Control", Plate 7-5, and are designated with a DD-number (i.e. DD-1 for Disturbed Area Ditches) or UD-number (i.e. UD-1 for Undisturbed Area Ditches).

All ditches are designed to carry the expected runoff from a 10 year - 6 hour event with a minimum freeboard of 0.5' (See Table 8 and Figure 3).

Ditches which exhibit expected flow velocities of 5 fps or greater will be lined with rip-rap. A typical cross-section is shown on Figure 3 and flow depths and areas for all lined and unlined ditches are presented in Table 8 of this report.

Ditch slopes have been determined from Plates 7-2 and 7-5.

All ditches will be inspected regularly, and maintained to the minimum dimensions to provide adequate capacity for the design flow. All ditches are temporary and will be removed as described under the reclamation hydrology section. (Section 4)

TABLE 1

Undisturbed Watershed Summary		
Watershed	Drains To	Final
UA-1	UC-1	Right Fork Lila Canyon
UA-2	DD-1	Sediment Pond
UA-3	DD-1	Sediment Pond
UA-4	Sediment Pond	Sediment Pond
UA-5a	DD-14	Sediment Pond
UA-5b	DD-15	By-Pass Culvert
UA-6a	DD-2	Sediment Pond
UA-6b	DD-2	Sediment Pond
UA-7	ASCA Area	Left Fork Lila Canyon

TABLE 2

Disturbed Watershed Summary		
Watershed	Drains To	Final
DA-1	DD-1	Sediment Pond
DA-2	DD-2	Sediment Pond
DA-3	DD-3	Sediment Pond
DA-4	DD-4	Sediment Pond
DA-5	DD-5a	Sediment Pond
DA-6a	DC-6	Sediment Pond
DA-6b	DC-6	Sediment Pond
DA-7	DC-7	Sediment Pond
DA-8	DC-8	Sediment Pond
DA-9	DC-9	Sediment Pond
DA-10	DD-7	Sediment Pond
DA-11	DD-7	Sediment Pond
DA-12	DD-8	Sediment Pond
DA-13a	DD-15	Sediment Pond
DA-13b	DD-9	Sediment Pond
DA-14a	DD-10	Sediment Pond
DA-14b	DD-15	Sediment Pond
DA-15a	DD-11a	Sediment Pond
DA-15b	DD-11b	Sediment Pond
DA-16	DD-13	Sediment Pond
DA-17	POND 2	Sediment Pond
DA-18	DD-17	Sediment Pond
DA-19	Sediment Pond 2	Sediment Pond
Fan Portal	ASCA Area	Right Fork Lila Canyon
TS-1	Topsoil Berm	Sediment Pond
POND 1	Sediment Pond	Sediment Pond
POND 2	Sediment Pond	Sediment Pond

TABLE 3

Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Watershed Parameters					
Undisturbed Watersheds					
UA-1	258.29	9475	2020	21.32	75
UA-2	1.63	1360	1000	74.26	83
UA-3	2.40	660	410	62.12	83
UA-4	14.08	1950	595	30.51	83
UA-5a	1.05	340	54	15.88	75
UA-5b	1.63	600	68	11.33	75
UA-6a	0.54	230	80	34.78	83
UA-6b	0.46	90	30	33.33	83
UA-7	0.90	100	30	30.00	75
Disturbed Watersheds					
DA-1	1.25	610	79	12.95	90
DA-2	0.30	330	47	14.24	90
DA-3	0.25	240	10	4.17	90
DA-4	0.50	295	51	17.29	90
DA-5	2.87	580	103	17.76	90
DA-6a	0.17	150	28	18.67	90
DA-6b	0.50	315	61	19.37	90
DA-7	0.22	170	33	19.41	90
DA-8	0.41	400	50	12.50	90
DA-9	0.30	290	32	11.03	90
DA-10	0.13	250	35	14.00	90
DA-11	0.25	230	20	8.70	90
DA-12	4.38	875	85	9.71	90
DA-13a	1.29	480	59	12.29	90
DA-13b	2.05	470	32	6.81	90
DA-14a	0.59	630	43	6.83	90
DA-14b	0.63	720	43	5.97	90
DA-15a	1.55	650	87	13.38	90
DA-15b	3.11	710	71	10.00	90
DA-16	0.22	200	24	12.00	90
TS-01	1.87	310	53	17.10	75
POND 1	1.92	815	30	3.68	100

TABLE 3 (Continued)

Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Disturbed Watersheds					
DA-17	1.12	240	11	4.58	90
DA-18	0.48	370	37	10.00	90
DA-19	0.55	710	63	8.87	90
Fan Portal	0.60	195	25	12.82	90
POND 2	0.47	234	30	12.82	100

TABLE 4

Runoff Summary Undisturbed Watersheds (Not Draining to Ponds)					
Watershed	10 yr. / 6 hr. Peak Flow - cfs	25 yr. / 6 hr. Peak Flow - cfs	100 yr. / 6 hr. Peak Flow - cfs	10 yr. / 24 hr. Peak Flow - cfs	10 yr. / 24 hr. Volume - ac.ft.
UA-1	7.99	13.69	30.52	35.07	7.17
UA-7	0.05	0.12	0.29	0.36	0.03

TABLE 5

Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Undisturbed Watersheds draining to Pond #1				
UA-2	0.40	0.58	1.12	0.09
UA-3	0.62	0.89	1.70	0.13
UA-4	3.00	4.48	9.00	0.74
UA-5a	0.04	0.12	0.46	0.03
UA-5b	0.06	0.15	0.55	0.05
UA-6a	0.14	0.20	0.39	0.03
UA-6b	0.12	0.18	0.33	0.02
Disturbed Watersheds				
DA-1	0.64	0.82	1.29	0.11
DA-2	0.16	0.20	0.32	0.03
DA-3	0.13	0.17	0.26	0.02
DA-4	0.26	0.34	0.53	0.04
DA-5	1.48	1.90	3.00	0.24
DA-6a	0.09	0.12	0.18	0.01
DA-6b	0.26	0.34	0.53	0.04
DA-7	0.12	0.15	0.23	0.02
DA-8	0.21	0.27	0.43	0.03
DA-9	0.16	0.20	0.32	0.03
DA-10	0.07	0.09	0.14	0.01
DA-11	0.13	0.17	0.26	0.02
DA-12	2.16	2.79	4.46	0.37
DA-13a	0.66	0.85	1.35	0.11
DA-13b	1.04	1.34	2.12	0.37
DA-14a	0.29	0.38	0.60	0.56
DA-14b	0.31	0.40	0.64	0.05
DA-15a	0.79	1.02	1.60	0.13
DA-15b	1.56	2.01	3.20	0.26
DA-16	0.12	0.15	0.23	0.02
TS-1	0.96	1.24	1.95	0.05
POND 1	19.66	24.81	39.74	3.19

TABLE 5 (Continued)

Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Disturbed Watersheds				
Fan Portal	0.21	0.27	0.40	0.43
DA-17	0.58	0.74	1.17	0.09
DA-18	0.25	0.32	0.50	0.04
DA-19	0.27	0.35	0.56	0.05
POND 2	1.10	1.41	1.17	0.26

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
UC-1	Culvert	UA-1, Fan Portal, Sediment Pond Overflow
DD-1	Ditch	DA-1, UA-2, UA-3
DC-1	Culvert	DD-1
DD-2	Ditch	DC-1, DA-2, UA-6a, UA-6b
DC-2	Culvert	DD-2
DD-3	Ditch	DA-3
DC-3	Culvert	DD-3
DD-4	Ditch	DA-4, DC-2, DC-3
DC-4	Culvert	DD-4
DD-5a	Ditch	DA-5
DD-5b	Ditch	DD-5a
DD-6	Ditch	DA-6a
DC-5	Culvert	DD-5b, DD-6, Mine Water
DC-6	Culvert	DC-4, DC-5, DA-6b
DC-7	Culvert	DC-6, DA-7
DC-8	Culvert	DC-7, DA-8
DC-9	Culvert	DC-8, DA-9
DD-7	Ditch	DC-9, DA-10, DA-11
DC-10	Culvert	DD-7
DD-8	Ditch	DC-7, DA-12
DC-11	Culvert	DD-8
DD-9	Ditch	DC-11, DA-13b

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-12a	Culvert	DD-9
DC-12b	Culvert	DC-12a
DC-12c	Culvert	DC-12b
DC-12d	Culvert	DC-12c
DD-10	Ditch	DA-14a
DD-11a	Ditch	DA-15a
DD-11b	Ditch	DA-15b
DD-12	Ditch	DD-11a, DD-11b
DD-13	Ditch	DA-16
DD-14	Ditch	DD-12, DD-13, UA-5a
DD-15	Ditch	DD-14, DA-13a, DA-14b, UA-5b
DD-16	Ditch	DC-12d, DD-10, DD-15
DD-17	Ditch	DA-18
DC-13	Culvert	DA-17
DC-14	Culvert	DA-18, DA-19

TABLE 7

Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	25yr. /6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
UC-1*	Culvert	33.07	38.77	60.15	55.60
DD-1	Ditch	1.66	0.66	4.11	- -
DC-1	Culvert	1.66	1.49	4.11	- -
DD-2	Ditch	2.08	1.81	5.15	- -
DC-2	Culvert	2.08	1.81	5.15	- -
DD-3	Ditch	0.13	0.14	0.26	- -
DC-3	Culvert	0.13	0.14	0.26	- -
DD-4	Ditch	2.47	2.44	5.94	- -
DC-4	Culvert	2.47	2.44	5.94	- -
DD-5a	Ditch	1.48	0.18	3.00	- -
DD-5b	Ditch	1.48	0.18	3.00	- -
DD-6	Ditch	0.09	3.46	0.18	- -
DC-5	Culvert	6.07	3.61	7.68	- -
DC-6	Culvert	8.94	3.89	14.15	- -
DC-7	Culvert	9.06	0.11	14.38	- -
DC-8	Culvert	9.27	0.11	14.81	- -
DC-9	Culvert	9.43	0.11	15.13	- -
DD-7	Ditch	9.63	0.11	15.53	- -
DC-10	Culvert	9.63	0.11	19.99	- -
DD-8	Ditch	11.79	4.00	19.99	- -
DC-11	Culvert	11.79	2.06	22.11	- -
DD-9	Ditch	12.83	1.52	22.11	- -
DC-12a	Culvert	12.83	3.58	22.11	- -
DC-12b	Culvert	12.83	3.12	22.11	- -
DC-12c	Culvert	12.83	3.12	22.11	- -

TABLE 7

Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	25yr. /6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
DC-12d	Culvert	12.83	0.12	22.11	- -
DD-10	Ditch	0.29	3.71	0.60	- -
DD-11a	Ditch	0.79	0.05	1.60	- -
DD-11b	Ditch	1.56	0.05	3.20	- -
DD-12	Ditch	2.35	1.68	4.80	- -
DD-13	Ditch	0.12	1.68	0.23	- -
DD-14	Ditch	2.51	0.62	5.49	- -
DD-15	Ditch	3.54	1.56	8.03	- -
DD-16	Ditch	16.66	2.18	30.74	- -
DD-17	Ditch	0.25	3.86	0.50	- -
DC-13	Culvert	0.27	4.50	0.56	- -
DC-14	Culvert	0.52	4.74	1.73	- -
POND 1	Pond	19.66	24.81	39.74	- -
POND 2	Pond	1.10	1.41	1.17	- -

* UC-1flow values includes sum of peak flows for UA-1 from Table 4 and 25yr-6hr Sediment Pond 1 peak flow of 24.81 cfs & Fan Portal flow from Table 5- 0.27cfs.

TABLE 8						
Disturbed Ditch Design Summary						
Ditch	DD-1	DD-2	DD-3	DD-4	DD-5a	DD-5b
Slope (%)	12.82	11.64	1.11	13.85	3.33	54.54
Length (ft.)	621	337	180	299	390	126
Manning’s No.	0.035	0.035	0.03	0.035	0.03	0.04
Side Slope (H:V)	3:1	3:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	2.00	2.00	0.00	2.00	2.00	2.00
Peak Flow 10/6 (cfs)	1.66	2.08	0.13	2.47	1.48	1.48
Peak Flow 10/24 (cfs)	4.11	5.15	0.26	5.94	3.00	3.00
Flow Depth (ft.) 10/6	0.17	0.19	0.24	0.21	0.21	0.11
Flow Depth (ft.) 10/24	0.27	0.32	0.31	0.35	0.32	0.17
Flow Area (ft.^{2}) 10/6	0.41	0.49	0.11	0.51	0.52	0.25
Flow Area (ft.^{2}) 10/24	0.77	0.93	0.18	0.93	0.84	0.40
Velocity (fps) 10/6	4.03	4.22	1.17	4.86	2.84	5.93
Velocity (fps) 10/24	5.35	5.55	1.39	6.39	3.55	7.58
Rip-Rap Req’d (Y/N)	N	N	N	N	N	Y
Rip-Rap D_{50}	-	-	-	-	-	3"
Note: Slope/Lengths from Plate 7-2.						

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-6	DD-7	DD-8	DD-9	DD-10	DD-11a	DD-11b
Slope (%)	4.74	7.28	2.22	3.10	6.00	0.97	0.51
Length (ft.)	212	151	142	265	417	206	394
Manning's No.	0.03	0.035	0.03	0.035	0.03	0.03	0.03
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	0.00	2.00	2.00	2.00	0.00	0.00	2.00
Peak Flow 10/6 (cfs)	0.09	9.63	11.79	12.83	0.29	0.79	1.56
Peak Flow 10/24 (cfs)	0.18	15.53	19.99	22.11	0.60	1.60	3.20
Flow Depth (ft.) 10/6	0.14	0.52	0.74	0.77	0.23	0.48	0.37
Flow Depth (ft.) 10/24	0.63	0.66	0.97	1.01	0.31	0.62	0.55
Flow Area ($ft.^2$) 10/6	0.04	1.56	2.58	2.72	0.11	0.45	1.03
Flow Area ($ft.^2$) 10/24	0.07	2.21	3.80	3.47	0.19	0.77	1.72
Velocity (fps) 10/6	2.18	6.16	4.56	4.71	2.68	1.74	1.52
Velocity (fps) 10/24	2.59	7.04	5.26	5.45	3.22	2.08	1.87
Rip-Rap Req'd (Y/N)	N	Y	N	N	N	N	N
Rip-Rap D_{50}	-	3"	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-12	DD-13	DD-14	DD-15	DD-16	DD-17	
Slope (%)	30.86	5.63	10.67	6.50	2.29	7.85	
Length (ft.)	85	160	330	710	260	434	
Manning's No.	0.04	0.03	0.032	0.03	0.03	0.03	
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	
*Bottom Width (ft.)	0.0	2.0	2.0	2.0	4.0	0.0	
Peak Flow 10/6 (cfs)	2.35	0.12	2.51	3.54	16.66	0.25	
Peak Flow 10/24 (cfs)	4.80	0.23	5.49	8.03	30.74	0.50	
Flow Depth (ft.) 10/6	0.17	0.17	0.21	0.30	0.66	0.21	
Flow Depth (ft.) 10/24	0.26	0.22	0.33	0.47	0.92	0.27	
Flow Area (ft.^{2}) 10/6	0.41	0.06	0.52	0.77	3.51	0.09	
Flow Area (ft.^{2}) 10/24	0.66	0.10	0.89	1.38	5.39	0.14	
Velocity (fps) 10/6	5.74	2.03	4.84	4.57	4.75	2.94	
Velocity (fps) 10/24	7.26	2.39	6.18	5.84	5.70	3.49	
Rip-Rap Req'd (Y/N)	Y	N	N	N	N	N	
Rip-Rap D_{50}	3"	-	-	-	-	-	
Note: Slope/Lengths from Plate 7-2.							

TABLE 9

Disturbed Culvert Design Summary						
Culvert	DC-1	DC-2	DC-3	DC-4	DC-5	DC-6
Slope (%)	11.67	10.00	53.85	9.19	4.38	28.97
Length (ft.)	60	60	65	274	250	107
Manning's No.	0.024	0.024	0.024	0.024	0.024	0.024
Peak Flow 10/6 (cfs)	1.66	2.08	0.13	2.47	6.07	8.94
Peak Flow 10/24 (cfs)	2.85	3.37	0.21	0.17	0.17	0.17
Diam. Proposed (ft.)	1.5	1.5	1.5	2.0	2.0	2.0
Velocity (fps) 10/6	6.72	6.79	5.32	6.86	6.80	14.50
Rip-Rap D_{50}	3"	3"	3"	3"	3"-	-*
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster Program)						

* Discharge is into manhole - no riprap needed

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-7	DC-8	DC-9	DC-10	DC-11	DC-12a
Slope (%)	5.84	5.35	8.06	3.33	4.00	0.71
Length (ft.)	155	168	186	60	25	140
Manning's No.	0.024	0.024	0.024	0.024	0.024	0.015
Peak Flow 10/6 (cfs)	9.06	9.27	9.43	9.63	11.79	12.83
Peak Flow 10/24 (cfs)	14.38	14.81	15.13	15.53	19.99	22.11
Diam. Proposed (ft.)	2.0	2.0	2.0	2.0	2.0	2.5
Velocity (fps) 10/6	9.18	8.41	8.41	5.94	7.20	5.15
Rip-Rap D_{50}	3"	3"	3"	3"	3"	-*
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster Program)						

* Discharge is into manhole - no riprap needed

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-12b**	DC-12c**	DC-12d	DC-13	DC-14	SP2-1*
Slope (%)	1.32	2.54	-0.12	29.10	11.2	0.50
Length (ft.)	76	354	9	60	25	165
Manning's No.	0.015	0.015	0.015	0.024	0.024	0.024
Peak Flow 10/6 (cfs)	12.83	12.83	12.83	0.27	0.52	-
Peak Flow 10/24 (cfs)	22.11	22.11	22.11	0.56	1.06	2.72*
Diam. Proposed (ft.)	2.0	2.0	2.5	1.5	1.5	1.50
Velocity (fps) 10/6	8.80	10.65	4.74	2.72	5.80	2.45
Rip-Rap D_{50}	3"	3"	-	-	3"	-
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster Program)						

* SP2-1 Peak Flow is a 25/6 event
** Discharge is into a manhole - no riprap required

TABLE 10

Undisturbed Culvert Design Summary		
Culvert	UC-1	
Min. Slope (%)**	0.50	
Length (ft.)	480	
Manning’s No.	0.025	
Peak Flow 10/6 (cfs)*	33.07	
Peak Flow 100/6 (cfs)*	55.60	
Diam. Proposed (ft.)	5.00	
Velocity (fps) 100/6	5.22	

* Note: Peak flow values include 25 year-6 hour flow from Sediment Pond 1 (see Tables 4 and 7).
** Pipe slope from Plate 7-6a.

References:

Hawkins, R.H. and K.A. Marshall. 1979. Storm Hydrograph Program. Final Report to the Utah Division of Oil, Gas and Mining. Utah State University. Logan, Utah.

DESIGN OF SEDIMENT CONTROL STRUCTURES

Design Specifications:

Tables:

Figures:

3.1 Design and Construction Specifications for Sedimentation Pond

- All construction of sedimentation ponds will be performed under the direction of a qualified, registered professional engineer.

- The sediment pond #1 will be located in an existing low area where the Right Fork of Lila Canyon passes beneath the existing road. The existing road fill and culvert will be removed, and the pond embankment (road fill) will be reconstructed and compacted. The existing culvert will be replaced with UC-1 which will extend approximately 400' up the Right Fork of Lila Canyon. This culvert will be equipped with an inlet section and trash rack, and will allow undisturbed runoff and treated access road drainage to pass beneath the sediment pond. The majority of the pond will be in an existing channel area, and is therefore considered incised. The pond will be equipped with a culvert riser principal spillway with an oil skimmer, a decant, and a second culvert riser emergency spillway with an oil skimmer. Both spillways will discharge to the oversized (60") CMP culvert running beneath the pond.

- The area of pond constructed shall be examined for topsoil, and where present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.

- In areas where fill is to be placed for the pond impoundment structures, natural ground shall be removed to at least 12" below the base of the structure.

- Native materials shall be used where practical. Fill will be placed in lifts not to exceed 6" and compacted prior to placement of next lift. Compaction of all fill materials shall be at least 95%.

- Rip-rap or other protection (culverts, concrete, etc.) will be placed at all pond inlets to prevent scouring. Rip-rap will consist of substantial, angular (non-slaking) rock material of adequate size.

- Decanting of the pond, as required, will be accomplished by use of a decant pipe with an inverted inlet as shown on Plates 7-6a and 7-6b. Samples will be collected prior to decanting of the pond. If the quality of the water meets the requirements of the U.P.D.E.S. Permit, decanting will proceed. Discharge samples will be collected as per the approved U.P.D.E.S. Discharge Permit.

- Slopes of the embankments shall not be steeper than 2h:1v, inside or outside, with a total of the inslope and outslope not less than 5h:1v, except where areas of the pond are incised.

- External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability.

- Top width of the embankment shall be not less than (H+35)/5, where H = Height of Dam in feet from the upstream toe.

3.2 Sediment Yield

The Universal Soil Equation (USLE) was used to estimate sediment yield from disturbed areas. All soil loss from this area was assumed to be delivered to, and deposited in the sedimentation pond.

Erosion rate (A) in tons-per-acre-per-year is determined using the USLE as follows:

$$A = (R)\,(K)\,(LS)\,(CP)$$

Where the variables R, K, LS, and CP are defined as follows:

Variable "R" is the rainfall factor which can be estimated from $R = 27P^{2.2}$; where P is the 2-year, 6-hour precipitation value. P for the Lila Canyon area is 0.75" as shown in Figure 5.4, page 315, Barfield, et.al. 1983. Therefore, the estimated value of "R" for this area is 14.34.

Variable "K" is the soil erodibility factor. For disturbed areas, the "K" value is conservatively estimated to be 0.5. For disturbed runoff, but uncompacted and ungraded areas, "K" is estimated at 0.320. "K" is estimated to be 0.035 for undisturbed areas.

Variable "LS" is the length-slope factor. This figure was determined by applying the slope length and percentage for each sub-drainage area to the chart in Figure 5.15, p. 334, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983.

Variable "CP" is the control practice factor, which can be divided into a cover and practice factor. Values were determined from Appendix 5A, Barfield, et.al., 1983.

Site	CP Factor
Compacted Areas	1.20
Disturbed/Uncompacted Areas	0.20
Undisturbed Areas	0.15

The sediment volume is based on a density of 100 pounds per cubic foot of sediment.

SEDIMENT YIELD CALCULATIONS - USLE - Drainages to Sediment Ponds

Drainage	R	K	Area (ac)	Slope Length (Ft)	Slope (%)	LS	CP	A (T/ac)	Yield (ac-ft)
Draining to Sediment Pond 1									
DA-1	14.34	0.500	1.25	610	12.95	4.99	1.20	42.93	0.0246
DA-2	14.34	0.500	0.30	330	14.24	4.26	1.20	36.67	0.0051
DA-3	14.34	0.500	0.25	240	4.17	0.59	1.20	5.09	0.0006
DA-4	14.34	0.500	0.5	295	17.29	5.50	1.20	47.29	0.0109
DA-5	14.34	0.500	2.87	580	17.76	8.05	1.20	69.26	0.0913
DA-6a	14.34	0.500	0.17	150	18.67	4.44	1.20	38.20	0.0030
DA-6b	14.34	0.500	0.50	315	19.37	6.83	1.20	58.79	0.0135
DA-7	14.34	0.500	0.22	170	19.41	5.04	1.20	43.36	0.0044
DA-8	14.34	0.500	0.41	400	12.50	3.82	1.20	32.90	0.0062
DA-9	14.34	0.500	0.30	290	11.03	2.69	1.20	23.14	0.0032
DA-10	14.34	0.500	0.13	250	14.00	3.61	1.20	31.06	0.0019
DA-11	14.34	0.500	0.25	230	8.70	1.68	1.20	14.50	0.0017
DA-12	14.34	0.500	4.38	875	9.71	3.86	1.20	33.22	0.0668
DA-13a	14.34	0.500	1.29	480	12.29	4.08	1.20	35.12	0.0208
DA-13b	14.34	0.500	2.05	470	6.81	1.71	1.20	14.75	0.0139
DA-14a	14.34	0.500	0.59	630	6.83	1.99	1.20	17.13	0.0046
DA-14b	14.34	0.500	0.63	720	5.97	1.79	1.20	15.36	0.0044
DA-15a	14.34	0.500	1.55	650	13.38	5.42	1.20	46.66	0.0332
DA-15b	14.34	0.500	3.11	710	10.00	3.63	1.20	31.24	0.0446
DA-16	14.34	0.500	0.22	200	12.00	2.54	1.20	21.84	0.0022
UA-2	14.34	0.500	1.63	1360	73.53	110.75	0.15	119.11	0.0891
UA-3	14.34	0.500	2.40	660	62.12	62.05	0.15	66.73	0.0735
UA-4	14.34	0.500	14.08	1950	30.51	36.93	0.15	38.64	0.2498
UA-5a	14.34	0.500	1.05	340	15.88	5.15	0.15	5.53	0.0027
UA-5b	14.34	0.500	1.63	600	11.33	4.03	0.15	4.33	0.0032
UA-6a	14.34	0.500	0.54	230	34.78	15.27	0.15	16.42	0.0041
UA-6b	14.34	0.500	0.46	90	33.33	8.92	0.15	9.59	0.0020
TS-01*	14.34	0.500	1.87	660	17.10	8.08	0.20	11.58	0.0099
POND 1	14.34	0.500	1.92	340	3.68	0.59	1.20	5.11	0.0045
TOTAL									0.7957
Draining to Sediment Pond 2									
DA-17	14.34	0.500	1.12	240	4.58	0.66	1.20	5.68	0.0029
DA-18	14.34	0.500	0.48	370	10.00	2.62	1.20	22.55	0.0050
DA-19	14.34	0.500	0.55	710	8.87	3.05	1.20	26.22	0.0066
POND 2	14.34	0.500	0.47	45	12.82	1.33	1.20	11.48	0.0025
TOTAL									0.0269

* Disturbed Runoff / Uncompacted Area
** Paved Areas

3.3 Sediment Pond Volume

The volumes shown in Tables 11a and 11b are from the volumes calculated from the precipitation, runoff and sediment yield for a 10 year-24 hour precipitation event. The volumes were calculated based on the disturbed areas (and contributing undisturbed areas) runoff values, developed using the design parameters described in this section.

TABLE 11a

Sediment Pond #1 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (3.17 ac-ft, from Table 5, 10yr/24hr Vol) =	3.17 ac-ft [(1)]
3. Sediment Storage Volume USLE 0.7957 ac-ft./yr. x 3.5 yrs. =	2.87 ac-ft
4. Total Required Pond Volume 3.17 + 2.87 =	6.04 ac-ft
5. Peak Flow (25 yr. - 6 hr. event) =	24.81 cfs [(2)]
6. Pond Design Volume @ Principle Spillway = (See Table 12a)	13.04 ac-ft
7. Mine water storage [(3)]	7.00 ac-ft

(1) This includes flow from UA-5 within mine boundary. There is a possibility that this undisturbed area may be needed if the surface facilities were to be expanded.

(2) This is to allow for flow from UA-5. There is a possibility that UA-5 may be needed if the surface facilities were to be expanded.

(3) difference in storage between the top of the require storm water storage and the spillway elevation

TABLE 12a

Sediment Pond #1 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (cu. ft.)	Acc. Volume (ac. ft.)	Remarks
5839	26870	0	0.00	Bottom of Pond
5830	28640	27755	0.64	
5831	30480	29560	1.32	Sediment Storage - 2.87 ac-ft
5842	32320	31400	2.04	
5843	34210	33265	2.80	Sediment Cleanout Level 5843.6
5844	36140	35175	3.61	Decant 5844.6 - 4.21 ac-ft
5845	38110	37125	4.46	Runoff Storage - 3.17 ac-ft
5846	40120	39115	5.36	
5847	42160	41140	6.30	Runoff + Sed Storage - 6.04 ac-ft
5848	44260	43210	7.29	
5849	46390	45325	8.33	
5850	48550	47470	9.42	Mine Water Storage - 7.00 ac-ft
5851	50970	49760	10.57	
5852	53490	52230	11.77	
5853	55010	54250	13.01	Principal Spillway - 5853
5854	56590	55800	14.29	Emergency Spillway - 5854
5855	58380	57485	15.61	Top of Embankment

TABLE 11b

Sediment Pond #2 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (from Table 5, 10yr/24hr) =	0.31 ac-ft.
3. Sediment Storage Volume USLE 0.0269 ac-ft./yr. x 3 yrs. =	0.08 ac-ft
4. Total Required Pond Volume 0.31 + 0.08 =	0.39 ac-ft
5. Peak Flow (25 yr. - 6 hr. event)* =	1.41 cfs
6. Pond Design Volume @ Principle Spillway = (See Table 12b)	1.36 ac-ft
* Peak Flow values from Table 5, sum of all contributing watersheds.	

TABLE 12b

Sediment Pond #2 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (cu. ft.)	Acc. Volume (ac. ft.)	Remarks
5845	0	0	0	Bottom of Pond 5845.0
5846	312	156	0.00	
5847	6935	3623.5	0.08	Sediment Cleanout Level 5847.0
5848	8045	7490	0.26	Decant 5847.9
5849	8650	8348	0.45	
5850	9270	8960	0.65	Principal Spillway 5849.61
5851	9910	9590	0.87	
5852	10560	10235	1.11	Emergency Spillway 5851.25
5853	11230	10895	1.36	
5854	11920	11575	1.62	
5855	12890	12406	1.91	
5855.5	14120	6753	2.06	Top of Embankment

TABLE 13a

Sediment Pond #1 Stage/Discharge Data			
Head above Spillway(ft.)	Q (cfs) Weir Controlled	Q (cfs) Orfice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	2.53	15.22	95.68
0.4	7.15	21.53	96.23
0.6	13.14	26.36	96.77
0.8	20.23	30.44	97.31
1.0	28.27	34.04	97.85
1.2	37.17	37.28	98.38
1.4	46.84	40.27	98.91
1.6	57.22	43.05	98.91
1.8	68.28	45.66	99.44
2.0	79.97	48.13	99.97

Note: 1- 25 year - 6 hour flow = 24.81 cfs.
2- Flow will be weir controlled at a head of 0.91' over riser inlet.

Weir Controlled

$Q = CLH^{1.5}$; where: C= 3.0, L= Circumference of Riser = 9.4248', R=1.5'

Orfice Controlled

$Q = C'a\,(2gH)^{0.5}$; where: C= 0.6, a= Area of Riser = 7.0686 ft^2, R=1.5', g= 32.2 ft/sec^2

Pipe Flow Controlled

$$Q = \frac{a\,(2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$$; where

a = Area of Pipe = 7.07 ft^2, R = 1.5'
H' = Head = H + 14.5 (Riser) + 0.35 (Slope) + 0.6*4 (barrel height)
Ke = 1.0
Kb = 0.5
Kc = 0.043
L = 70'

TABLE 13b

Sediment Pond #2 Stage/Discharge Data			
Head above Spillway (ft.)	Q (cfs) Weir Controlled	Q (cfs) Orfice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	0.84	1.69	5.81
0.4	2.38	2.39	5.88
0.6	4.38	2.93	5.95
0.8	6.74	3.38	6.02
1.0	9.42	3.78	6.09
1.2	12.39	4.14	6.16
1.4	15.61	4.47	6.22
1.6	19.07	4.78	6.29
1.8	22.76	5.07	6.36
2.0	26.66	5.35	6.42

Note: 1- 25 year - 6 hour flow =1.41 cfs.
2- Flow will be Weir controlled at a head of 0.36' over riser inlet.

Weir Controlled

$Q = CLH^{1.5}$; where: C= 3.0, L= Circumference of Riser =3.14', R=0.5'

Orfice Controlled

$Q = C'a\ (2gH)^{0.5}$; where: C= 0.6, a= Area of Riser = 0.79 ft^2, R=0.5', g= 32.2 ft/sec^2

Pipe Flow Controlled

$$Q = \frac{a\ (2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$$

; where
a = Area of Pipe = 0.79 ft^2, R = 0.5'
H' = Head = H + 6.0 (Riser) + 0.8 (Slope) + 0.6*2 (barrel height)
Ke = 1.0
Kb = 0.5
Kc = 0.043
L = 160'

3.4 Sediment Pond Summary

a) The sedimentation ponds have been designed to contain the disturbed area (and contributing undisturbed area) runoff from a 10 year-24 hour precipitation event, along with multiple years of sediment storage capacity. Runoff to the ponds will be directed by various ditches and culverts as described in the plan.

b) The required volume for Sediment Pond #1 is calculated at 6.04 acre feet, including 3.5 years of sediment storage. The proposed sediment pond size will have a volume of approximately 13.01 acre feet (at the principal spillway), which is more than adequate. The extra storage 7 acre-foot in Pond 1 will be used for optional mine water handling. The required volume for Sediment Pond #2 is calculated at 0.39 acre feet, including 3 years of sediment storage. The proposed sediment pond size will have a volume of approximately 0.57 acre feet (at the principal spillway), which is more than adequate.

c) The ponds will meet a theoretical detention time of 24 hours. Both are equipped with a decant, a culvert principal spillway and a culvert emergency spillway. Any discharge from the ponds will be in accordance with the approved UPDES Permit.

d) The pond inlets will be protected from erosion, and the spillways will discharge into the natural drainages in a controlled manner.

e) The ponds are temporary, and will be removed upon final reclamation of the property.

f) The ponds will be constructed according to the regulations and under supervision of a Registered, Professional Engineer.

DESIGN OF DRAINAGE CONTROL STRUCTURES FOR RECLAMATION

Reclamation Hydrology:

Tables:

Figures:

Reclamation Hydrology

4.1 General

Upon completion of operations at the Lila Canyon Minesite, the portals will be sealed and backfilled and all structures will be removed except for the sediment ponds, bypass culvert UC-1, reclamation ditches and temporary sediment controls such as silt fences or straw bales.

Any refuse or mine development waste previously deposited under the approved plan will also be left in place. Concrete will be buried beneath at least 2' of non-toxic, non-acid material. Any potentially toxic or acid-forming material buried on site will be covered with a minimum of 4' of material.

The sediment ponds, and all remaining drainage controls will be removed upon completion of Phase II Bond Release.

4.2 Reclamation Area Drainage Control

During the initial phase of reclamation, all drainage controls will be removed with the exception of the two sediment ponds, bypass culvert UC-1, reclaimed ditches RD-1 and RD-2 and temporary sediment controls such as straw bales or silt fences installed in the undisturbed drainages.

As undisturbed drainage culverts are removed, a minimum of two straw bale or silt fence barriers will be installed downstream of each location for sediment control purposes.

Disturbed areas will be regraded and reclaimed ditches RD-1 and RD-2 will be installed to collect the runoff from the site area and direct it to the outlet structures (see Plate 7-7).

When the vegetation and sediment contribution levels meet requirements for Phase II Bond Release, a series of at least three straw bale or silt fence barriers will be placed downstream of the sediment pond outlets. All upstream sediment controls will be removed. Reclaimed ditches RD-1 and RD-2 will also be removed, regraded and reseeded. Culvert UC-1 will be cut off at the location of the principal pond spillway.

The portion of culvert UC-1 remaining beneath the road will be left as a permanent drainage control. The culvert will be equipped with an inlet section and rip-rapped headwall. The culvert is adequately sized to safely pass runoff from a 100 year - 6 hour event, as shown in Table 10. To ensure that state of the art technology is incorporated, the final reclamation plans for the sedimentation pond areas will be submitted prior to commencement of final reclamation of this area.

The remainder of culvert UC-1 will be removed, and the natural channel restored through the sediment pond #1 area. The sediment pond structures will also be removed, the pond areas regraded as necessary and reseeded. The pond #1 embankment will remain as a permanent feature, since the existing (and proposed future) road through the area passes over the embankment.

Following the successful establishment of vegetation and when effluent standards are met, the sediment ponds will be removed. The same methodologies relative to recontouring, top soil application and seeding will be utilized in grading and revegetating the pond areas as outlined in Chapters 2, 5, and Appendix 5-8.

The pond embankment will be narrowed to facilitate the even character of the Lila Canyon Road. The 60 inch bypass culvert (UC-1) will be removed to within six feet of the road embankment. A newly formed channel will be constructed at an approximate four percent grade to intercept the inlet of the culvert at its intersection of the road. The road embankment and associated new channel will be armored by the Operator with an underlayment of filter gravel, with D_{50} -30 inch rip-rap. The new area of disturbance including the newly formed channel will have top soil spread in and around the rip-rap. The Operator will use the same seeding and mulching methods described in Appendix 5-8 will be used on this area as well. See Figure 4 for a detailed design.

TABLE 14

Final Reclamation Drainage Areas Contributing to Structures	
Channel	Contributing Watershed/Structure
RD-1	RW-1
RD-2	RW-2
UC-1	UA-1, UA-4, RD-1

TABLE 15

Final Reclamation Drainage Structure Flow Summary	
Channel	*100/6 Flow (cfs)
RD-1	13.26
RD-2	10.89
UC-1	**72.62

* CN = 83.
** Combined flow for watersheds UA-1, UA-4, and RW-2.

TABLE 16

Final Reclamation Reclamation Structure Design Parameters					
Channel	Bottom Width (ft.)	Side Slope H:V	Slope %	Reclaimed Depth (ft.)	Manning's No.
RD-1	3	2:1	5.00	1.5	0.035
RD-2	3	2:1	10.00	1.5	0.035
UC-1	60" Diam.	-	0.90*	60" Diam.	0.025

* Pipe slope for Plate 7-6

TABLE 17

Final Reclamation Reclamation Structure Flow Calculations			
Channel	RD-1	RD-2	UC-1
100 year - 6 hour event (in.)	1.90	1.90	1.90
Peak Flow (cfs)	13.26	10.89	72.62
Velocity (fps)	5.44	6.52	6.74
Required Area (ft.^{2})	2.44	1.67	10.80
Flow Depth (ft.)	0.58	0.43	2.69

Alternate Sediment Control for Fan Site and Topsoil Storage Area

5.1 ASCA Areas

Sediment Control at the slope below water treatment area, and topsoil storage area sites will be accomplished with a combination of one or more of the following: berms, silt fences, and straw bales.

The ventilation breakouts are just punch outs and will have insignificant disturbance associated with them. (Plate 5-2) However, they are addressed as ASCA's and are addressed here even though there will be only insignificant surface disturbance. The ASCA's will be seeded upon final reclamation.

The topsoil collected from the topsoil storage area sites will be located downslope from the sites and will be used in the construction of the berm. The berm will be constructed a minimum of two feet high and have 2:1 side slopes. The berm will control the flow from a 10 year-24 hour precipitation event. Silt fence will be selectively placed to help control run-off. The berm will be stabilized with vegetation to prevent erosion. As much as practical, the vegetation techniques used on the main topsoil pile will be utilized on the fan topsoil berm.

The outside of the berm will be protected with a silt fence or gravel. The gravel, if used, would help augment the revegetation. Construction details of the silt fence/filter fence are shown if Figure 5.

The outslope of the portal access road, outslope of the water treatment pad, and ventilation break outs will have a silt fence located along the disturbed area boundary to treat the runoff from the slope. While some portions of this area will be disturbed as a result of the fill material placed for the pad and road construction, the major portion of this area is expected to remain undisturbed. As an added protection, the portions of the area that are disturbed by the fill placement will be covered with a erosion control mat to minimize the erosion from this slope and that area seeded to aid in the establishment of a vegetative cover.

Due to lack of final engineering details, the exact location of the berms, silt fences, and subsequent erosion techniques will be determined in field with the approval of UDOGM. The final determination will be made prior to the start of topsoil removal.

Run-off Calculations

5.2 Ventilation Break Outs

Insignificant surface disturbance.

5.3 Topsoil Storage Area

Acreage:	2.61 acres
Design Storm:10 year/24 hour:	1.90"
CN:	90
S:	1.111

$$Q = \frac{(P-0.25S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.22 acre feet

5.4 Water Treatment Area

Acreage:	0.37 acres
Design Storm:10 year/24 hour:	1.90"
CN:	90
S:	1.111

$$Q = \frac{(P-0.2S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.03 acre feet

Lila Canyon Mine
Watershed Peakflow Calculations

Lila Canyon Mine
Ditch And Culvert Calculations

Table 3.4/3.5
INTERIM AND FINAL RECLAMATION SEED MIX
Recommended Seed Mix for Lila Canyon Mine

Species	Latin Name	Seeds/lb	# Seeds per Acre Planted	%Mix Planted	Seeding Rate Lbs / acre	Seeds / ft²
Grasses						
Needle And Thread	Stipa Comata	115,000	230,432	5	2.00	5.3
Indian Ricegrass	Achnatherum humenoides	141,000	282,269	6	2.00	6.5
Basin Wild Rye	Leymus cinereus	130,000	129,373	3	1.00	3.0
Galleta	Hilaria jamesii	314,500	313,632	6	1.00	7.2
Bluebunch Wheatgrass	Pseudoroegneria spicata	140,000	139,392	3	1.00	3.2
Slender Wheatgrass	Elymus trachycaulus	159,000	317,988	6	2.00	7.3
Blue Gamma	Bouteloua gracilis	825,000	827,640	17	1.00	19.0
Subtotal						51.4
Forbs						
Blue Flax	Linum lewisii	293,000	294,030	6	1.00	6.8
Palmer Penstemon	Penstemon palmeri	610,000	152,460	3	0.25	3.5
Globemallow	Sphaeralcea ambigua	500,000	250,470	5	0.50	5.8
Indian Paintbrush	Castilleja linariaefolia	4,915,000	479,160	10	0.10	11.0
Fringed Sage	Artemisia frigida	4,536,000	435,600	9	0.10	10.0
Subtotal						37.0
Shrubs						
Wyoming Big Sage	Artemisia tridentata	2,576,000	653,400	13	0.25	15.0
Green Rabbitbrush	Chrysothamnus nauseosus	400,000	41,382	1	0.10	1.0
Fourwing Saltbush	Atriplex canenscens	52,000	43,560	1	0.84	1.0
Winterfat	Ceratoides lanata	56,700	56,628	1	1.00	1.3
Shadscale	Antriplex confertifolia	64,900	64,904	1	1.00	1.5
Cliffrose	Cowania mexicana	64,600	64,469	1	1.00	1.5
Black Sage	Artemisia nova	907,200	230,868	5	0.25	5.3
Subtotal						26.5
TOTAL PER ACRE		16,799,900	5,007,658	100	16.39	115

TOPSOIL MOVEMENT & CONSTRUCTION RECORD

UTAHAMERICAN ENERGY

LILA CANYON MINE

December 2008-June 2015

Report Updated June 2015

Prepared by

J. T. Paluso, P. E.

EIS ENVIRONMENTAL & ENGINEERING CONSULTING
31 North Main, Helper, Utah 84526

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Scope of Work

EIS Environmental & Engineering Consulting (EIS) was hired by UtahAmerican Energy, Inc (UEI) to monitor the removal of topsoil from the Lila Canyon Mine for Phase I construction activities.

Phase I consisted of the following activities:

- Construct stormwater detention ponds. These ponds are needed to contain all runoff coming from disturbed areas.

- Construct portal access road. Due to the length of time required to construct the underground rock slopes, it was necessary to construct the portal access road during Phase I of the construction activities.

- Remove topsoil from the west portion of the coal stockpile area. This area was needed to provide storage space for material generated during the construction of the underground rock slopes.

- Remove topsoil from the warehouse pad area. This area was also needed to provide storage space for material generated from the rock slope construction work.

- Construct employee parking and temporary bathhouse area. This area was needed to provide parking space and bathhouse facilities for the crews developing the rock slopes.

During Phase I activities the follow amounts of topsoil were generated from the various locations:

LOCATION	**LOADS**	**VOLUME (Yd^3)**
Employee Parking Lot	378	12,110
Portal Road	238	7,622
Storm Water Detention Pond	154	4,943
Small Detention Pond	61	1,940
Coal Stockpile	269	8,601
Warehouse Pad	137	4,385
Topsoil Area	Push with Dozer	646
TOTAL		**40,247 Yd^3**

LILA CANYON MINE
TOPSOIL & CONSTRUCTION ACTIVITY RECORD

December 24, 2008 (Mel Coonrod & Matt Serfustini)

The following activities were observed during this visit:

1. Fill material was being removed from the stormwater detention pond. Some topsoil still remains to be removed from the pond area.
2. Work on portal access road was proceeding.
3. Topsoil was being removed from employee parking area.
4. Topsoil had been removed from west end of coal pile area.

PHOTOGRAPHS

LOOKING SOUTH TOWARDS TOPSOIL STORAGE AREA

MATERIAL REMOVED FROM TOPSOIL STORAGE SITE

PORTAL ACCESS ROAD TOPSOIL NORTH OF COAL STOCKPILE, PHOTO TAKEN LOOKING EAST

SOIL PROFILE ON PORTAL ACCESS ROAD LOOKING NORTH, TAKEN ADJACENT TO PRIOR PHOTOGRAPH

TOPSOIL REMOVAL SOUTH END OF EMPLOYEE PARKING LOT LOOKING SOUTH EAST

SOUTH OF LOADOUT STATION LOOKING NORTH

SOUTH OF LOADOUT STATION LOOKING SOUTH

SOIL PROFILE AT THE SAME LOCATION AS THE TWO PREVIOUS PHOTOGRAPHS

BOULDER REMOVAL SOUTH OF LOADOUT STATION LOOKING NORTH

EMPLOYEE PARKING AREA LOOKING SOUTH

December 30, 2008(Tom Paluso)

The following activities were observed during my site visit:

1. Fill material was being removed from portal access road. Contractor was working on side slopes on the portal access road.
2. Topsoil was being removed from employee parking area and delivered to the topsoil storage area.
3. Contractor was breaking large rocks on west end of coal storage pile. The large rocks were being reduced to make it easier to obtain necessary compaction with fill material being deposited in this area.

PHOTOGRAPHS

TOPSOIL REMOVAL FROM EMPLOYEE PARKING AREA

LOOKING SOUTHWEST OVER PROJECT AREA

<u>January 7, 2009 (Tom Paluso)</u>

The following activities were observed during site visit:

1. Contractor was transporting topsoil from office area to topsoil site.
2. Portal access road grade was being lowered northeast of employee's parking area.
3. Hydraulic hoes were working on portal area.

The stormwater detention pond still has approximately 15 percent of the topsoil to be removed. This material is located in the southeast corner of the pond. According to Shane Campbell this material was intentionally left to provide work during bad weather conditions. Shane also mentioned that topsoil removal at the warehouse site should probably start on January 15 or 16.

PHOTOGRAPHS

TOPSOIL REMOVAL FROM OFFICE AREA

BOULDERS BEING SEPARATED FROM TOPSOIL MATERIAL

LOWER PORTAL ACCESS ROAD GRADE

FILL MATERIAL BEING REMOVED FROM PORTAL ACCESS ROAD

HYDRAULIC BACKHOES WORKING ON PORTAL AREA

<u>January 15, 2009 (Tom Paluso)</u>

The following activities were observed during site visit:

1. Large boulders are being crushed to make gravel for this project.
2. Boulders are being stockpiled at future coal stockpile site. These boulders will be crushed into gravel.
3. Work on the portal area is still in progress.

PHOTOGRAPHS

BOULDERS BEING CRUSHED INTO GRAVEL

CRUSHED GRAVEL PILE

BOULDERS BEING STOCKPILED FOR CRUSHING

<u>January 28, 2009 (Tom Paluso)</u>

The following activities were observed during site visit:

1. Removing material from north end of parking lot.
2. Removing topsoil from stacking tube area.
3. Employee parking lot grading.

PHOTOGRAPHS

PARKING LOT MATERIAL REMOVAL

FINAL GRADING WEST END OF EMPLOYEE PARKING AREA


EMPLOYEE PARKING LOOKING NORTH WITH CRUSHED GRAVEL PILE


BOULDER REMOVAL FROM STACKING TUBE AREA LOOKING EAST

TOPSOIL REMOVAL FROM STACKING TUBE AREA LOOKING NORTH

STACKING TUBE AREA LOOKING EAST TOWARDS PORTALS

EAST OF STACKING TUBE LOOKING WEST

<u>January 29, 2009 (Tom Paluso)</u>

The following activities were observed during site visit:

1. Removing material from north end of parking lot.
2. Removing topsoil from stacking tube area.
3. Employee parking lot grading.

PHOTOGRAPHS

TOPSOIL PROFILE BY STACKING TUBE AREA

CLOSE-UP OF TOPSOIL PROFILE

February 6, 2009 (Tom Paluso)

The following activities were observed during site visit:

1. Removing topsoil from shop-warehouse area.
2. Completing work around silo area.

PHOTOGRAPHS

LOOKING SOUTHEAST FROM SILO AREA, TOPSOIL IS BEING COLLECTED

COLLECTING BOULDERS AND VEGETATION

LOOKING NORTHEAST FROM SILO AREA, TOPSOIL HAS BEEN REMOVED

February 18, 2009 (Tom Paluso)

The following activities were observed during site visit:

1. Removing topsoil from small Stormwater Detention Pond.
2. Removing remaining topsoil from large Stormwater Detention Pond.
3. Working on final grade for Portal Access Road

PHOTOGRAPHS

SIGN LOCATED BY CONSTRUCTION OFFICE & NEAR SMALL STORMWATER DETENTION POND

COLLECTING TOPSOIL AT SMALL STORMWATER RETENTION POND (SRP)

COLLECTING TOPSOIL AT SMALL SRP

REMOVING BOULDER FROM SMALL SRP

NORTHEAST SOIL PROFILE

SOUTHEAST SOIL PROFILE

REMOVE REMAINING MATERIAL FROM LARGE STORMWATER RETENTION POND (SRP)

WEST END LARGE SRP

FINAL WORK ON PORTAL ROAD

TOPSOIL PILE LOOKING NORTHEAST

TOPSOIL PILE LOOKING SOUTH EAST

FOR TOPSOIL TRACKING PURPOSES, PHASE I OPERATIONS ENDS HERE

September 30, 2009 (Tom Paluso)

Lila Canyon Mine is in the process of installing a temporary coal conveyor belt that will be used to remove coal from the mine while the permanent conveyor belt is installed. According to Jay Marshall, this temporary conveyor belt may be used for up to five years while the permanent system is completed.

The construction of this temporary conveyor belt will require concrete supports for bent installations. Topsoil removal at this point is necessary to provide access for equipment required for bent construction. During this phase of topsoil removal 9,324 cubic yards of topsoil was salvaged.

REMOVAL OF TOPSOIL NEAR PORTAL

SOIL PROFILE

TOPSOIL BEING DELIVERED TO TOPSOIL PILE

<u>April 28, 2010 (Tom Paluso)</u>

Scamp Excavation was removing topsoil from the warehouse pad and temporary coal pad. During this section of topsoil removal, 3,772 cubic yards of topsoil was salvaged.

TOPSOIL REMOVAL NEAR PORTAL ROAD

CLOSEUP VIEW OF TOPSOIL MATERIAL

DISTRIBUTION OF TOPSOIL AT TOPSOIL STORAGE AREA

May 26, 2010 (Tom Paluso)

Nielson Construction is removing topsoil from the substation pad area. Approximately 2,100 cubic yards of topsoil was salvaged from this area.

TOPSOIL PROFILE


SUBSTATION PAD LOOKING TOWARDS PORTAL


TOPSOIL PILE AT SUBSTATION SITE

VEGETATION REMOVED FROM TOPSOIL AT SUBSTATION SITE

July 15, 2010 (Tom Paluso)

Scamp Excavation salvaging topsoil at stockpile pad and warehouse pad. Both of these pads are being enlarged to accommodate next phase of construction activities. A total of 6,930 cubic yards of topsoil was salvaged during this section of topsoil removal.

WAREHOUSE PAD BELOW PORTALS

VEGETATION SEPARATION AT SITE

TOPSOIL PLACED AT TOPSOIL PILE

TOPSOIL AT TOPSOIL PILE

June 23, 2014 (Tom Paluso)

Scamp Excavation removed topsoil from the Portal Borrow Area. This area is adjacent to portal road. The area on which the topsoil was removed was approximately 120’ x 100’. A total of 333 cubic yards were removed and placed in the topsoil pile. Refer to the pictures below.

TOPSOIL REMOVAL PORTAL BORROW AREA (JULY 23, 2014)


LOOKING TOWARDS LILA CANYON


SOIL PROFILE AT TOP OF CUT

August 20, 2014 (Tom Paluso)

Scamp Excavation from August 20 through August 22, 2014, removed topsoil from the south end of the Upper Pad Area and the Middle Pad Area. A total of 1040 cubic yards were removed from these two areas. The pH of the soil was 7.1. The Upper Pad Area is approximately 500’ long.

On August 25- 26, topsoil removal was moved to the Truck Loop Area. The Truck Loop Area is north and adjacent to the Access Road going to the portals. A total of 720 cubic yards were removed and sent to the topsoil pile.

UPPER PAD AREA LOOKING SOUTH WEST

UPPER PAD AREA LOOKING SOUTHEAST

TRUCK LOOP AREA LOOKING TOWARDS PORTAL

TRUCK LOOP AREA CLOSER TO PORTALS

<u>March 30, 2015 (Tom Paluso</u>

Topsoil removal on the Future Parking Lot and Material Storage area was started on March 30, 2015. This area is located between the material storage yard and the west sediment pond. Removal of the large boulders and stockpiling of the topsoil was handled by foreman Mike Allred. This work continued until April 23, 2015, when Scamp Excavation hauled the topsoil and placed it into the topsoil storage area. A total of 32 truckloads or 1280 cubic yards of topsoil was moved to the topsoil storage area.

An access road leading to the west sediment pond, previously had topsoil removed. This road provided access to the west sediment pond from the material storage yard. This road was inside of this topsoil removal project.

LOOKING EAST AT STORAGE AREA FROM WEST SEDIMENT POND

LOOKING WEST FROM STORAGE YARD

LOOKING NORTH

ROCK PILE

LOOKING NORTH WEST OF MATERIAL STORAGE YARD

LOKING WEST AFTER TOPSOIL HAS BEEN REMOVED

TOTAL TOPSOIL REMOVAL TABLE AS OF JUNE 2015

LOCATION	LOADS	VOLUME (Yd^3)
Employee Parking Lot	378	12,110
Portal Road	238	7,622
Storm Water Detention Pond	154	4,943
Small Detention Pond	61	1,940
Coal Stockpile/Warehouse pads	793*	33,012
Topsoil Area	Push with Dozer	646
Substation Area	*	2,100
Portal Borrow Area	*	333
Upper & Middle Pod	26	1,040
Truck Loop Area	18	720
Future Truck Loop/Storage Yd.	32	1280
TOTAL		**65,746**

*** Total Truck Count Not Reported**

APPENDIX 1

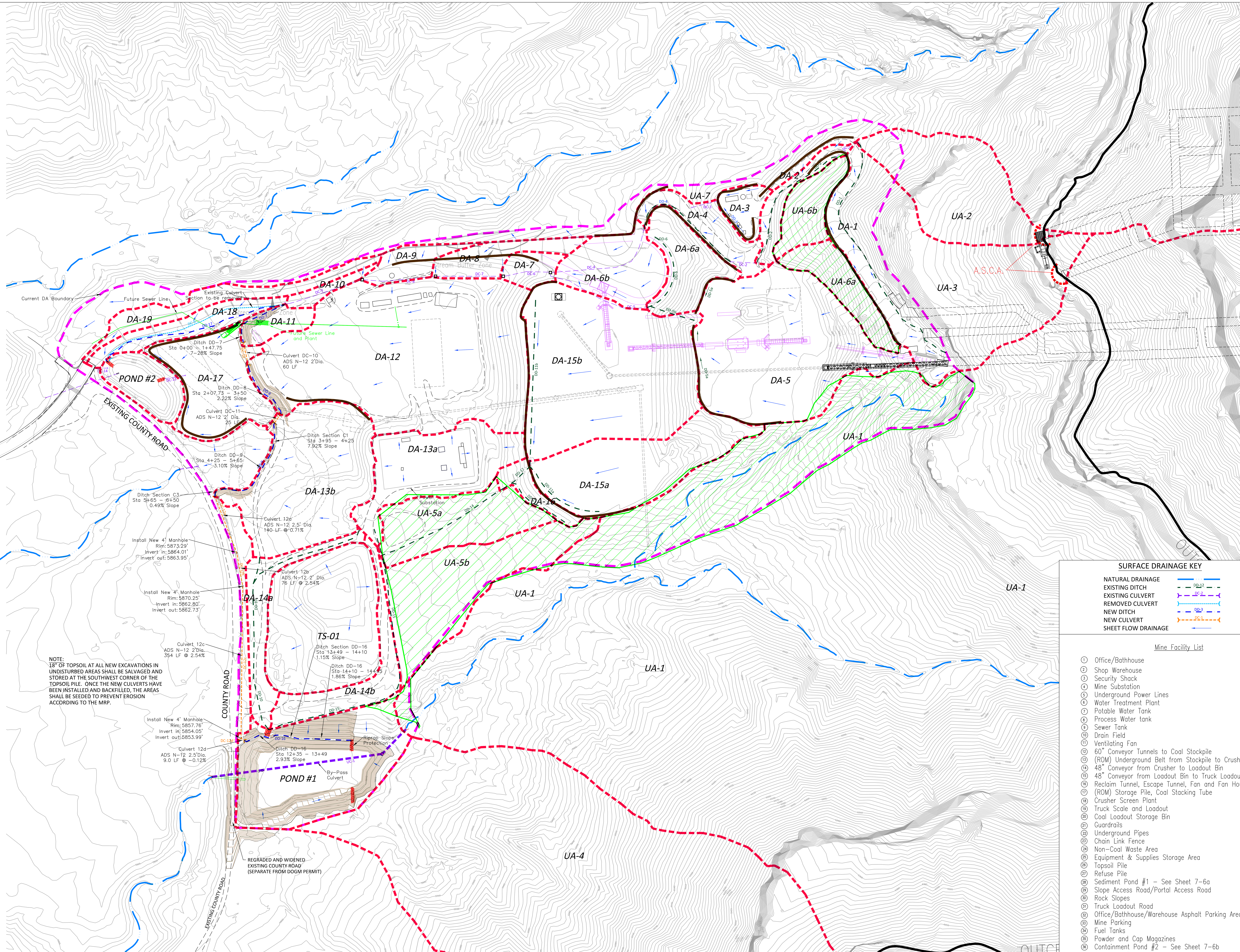
TOPSOIL REMOVAL MAP

TOTAL PERMIT AREA	42.6 ACRES
UNDISTURBED AREA	8.7 ACRES
TOTAL DISTURBED AREA	33.9 ACRES
AREA DISTURBED TO DATE	31.88 ACRES
AREA STILL TO BE DISTURBED	2.02 ACRES

TOPSOIL REMOVAL TABLE

LOCATION	LOADS	VOLUME (cubic yards)
Employee Parking Lot	378	12,110
Portal Road	238	7,622
Storm Water Detention Pond	154	4,943
Small Detention Pond	61	1,940
Coal Stockpile/Warehouse Pad	793*	33,012
Substation	*	2,100
Portal Borrow Area	*	333
Topsoil Area	Push with Dozer	646
Upper and Middle Pad	26	1,040
Temporary Truck Loop Area	18	720
Future Truck Loop Area	*	1,280
Total Cubic Yards:		65,746

Notes:
* Total truck count not reported.



SURFACE DRAINAGE KEY

- NATURAL DRAINAGE
- EXISTING DITCH
- EXISTING CULVERT
- REMOVED CULVERT
- NEW DITCH
- NEW CULVERT
- SHEET FLOW DRAINAGE

Mine Facility List

1. Office/Bathhouse
2. Shop Warehouse
3. Security Shack
4. Mine Substation
5. Underground Power Lines
6. Water Treatment Plant
7. Potable Water Tank
8. Process Water tank
9. Sewer Tank
10. Drain Field
11. Ventilating Fan
12. 60" Conveyor Tunnels to Coal Stockpile
13. (ROM) Underground Belt from Stockpile to Crusher
14. 48" Conveyor from Crusher to Loadout Bin
15. 48" Conveyor from Loadout Bin to Truck Loadout
16. Reclaim Tunnel, Escape Tunnel, Fan and Fan House
17. (ROM) Storage Pile, Coal Stacking Tube
18. Crusher Screen Plant
19. Truck Scale and Loadout
20. Coal Loadout Storage Bin
21. Guardrails
22. Underground Pipes
23. Chain Link Fence
24. Non-Coal Waste Area
25. Equipment & Supplies Storage Area
26. Topsoil Pile
27. Refuse Pile
28. Sediment Pond #1 - See Sheet 7-6a
29. Slope Access Road/Portal Access Road
30. Rock Slopes
31. Truck Loadout Road
32. Office/Bathhouse/Warehouse Asphalt Parking Area
33. Mine Parking
34. Fuel Tanks
35. Powder and Cap Magazines
36. Containment Pond #2 - See Sheet 7-6b
37. Grounding Field

NOTE: "UNDISTURBED" DENOTES DRAINAGE AND IS NOT APPLICABLE TO SOILS.

OFF-SITE FOOTPRINT:

UA-2
UA-6a&b
UA-1
UA-4

1" = 2000'

R 14 E, T 16 S

LEGEND:

UNDISTURBED WITHIN THE DISTURBED AREA
DISTURBED AREA BOUNDARY
NATURAL DRAINAGE
6' HIGH CHAIN LINK FENCE
INCIDENTAL ROCK DISTRIBUTION
STREAM BUFFER ZONE SIGNS
STRUCTURAL FILL
TEMP. REFUSE PILE (COAL MINE WASTE)
TOPSOIL BERM
Stream Buffer Zone
Berm
WS Bound

NOTES:
(1) REFER TO PLATE 5-7A&B FOR CROSS-SECTIONS.

REVISION DATE:

DATE	BY	DATE	BY
JAN 2008	RJM	Aug. 2014	PJJ
APR 2008	TJS	Dec. 2015	PJJ
JUL 2008	TJS	Feb. 2016	PJJ
JUN 2009	TJS	March 2016	PJJ
JAN 2010	TJS		
Dec 2010	RJM		
Nov. 2013	PJJ		

REGISTERED PROFESSIONAL ENGINEER
#6449561
David W. Hibbs
UTAH

LILA CANYON MINE

DISTURBED AREA HYDROLOGY AND WATERSHED MAP

DATE: January 2008
SCALE: AS SHOWN
DESIGNED BY: R. Jay Marshall
PLATE #: 7-2

LILA CANYON MINE
PROPOSED SEDIMENT CONTROL
DATE: JUNE 1998
SCALE: AS SHOWN
DESIGNED BY: BLACKHAWK ENG.
PLATE #: 7-5
I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.
UTAH REGISTERED PROFESSIONAL ENGINEER #6449561 David W. Hibbs
REVISION DATE:
OCT 1998 | NOV 2003 RJM | JAN. 2012 PJJ
JAN 1999 WJ | JAN 2005 RJM | NOV. 2013 PJJ
MAR 2000 WJ | APR 2008 TJS | OCT. 2014 TJS
SEP 2000 BHE | JUL 2008 TJS | DEC. 2015 TJS
JAN 2001 BHE | JUN 2009 TJS | MARCH 2016 PJJ
MAR 2001 BHE | JAN 2010 TJS
NOV 2002 BJ | Dec 2010 RJM | RJM
NOTE: UNDISTURBED DENOTES DRAINAGE AND IS NOT APPLICABLE TO SOILS.
R 14 E, T 16 S
LEGEND:
UNDISTURBED WITHIN THE DISTURBED AREA
DISTURBED AREA BOUNDARY:
NATURAL DRAINAGE:
Stream Buffer Zone
STREAM BUFFER ZONE SIGNS
Berm
WS Bound
NOTES:
(1) REFER TO PLATES 5-7A&B FOR CROSS-SECTIONS.
(2) REFER TO PLATES 7-6A&B FOR POND DETAILS.
SURFACE DRAINAGE KEY
NATURAL DRAINAGE
EXISTING DITCH
EXISTING CULVERT
REMOVED CULVERT
NEW DITCH
NEW CULVERT
SHEET FLOW DRAINAGE
NOTE:
18" OF TOPSOIL AT ALL NEW EXCAVATIONS IN UNDISTURBED AREAS SHALL BE SALVAGED AND STORED AT THE SOUTHWEST CORNER OF THE TOPSOIL PILE. ONCE THE NEW CULVERTS HAVE BEEN INSTALLED AND BACKFILLED, THE AREAS SHALL BE SEEDED TO PREVENT EROSION ACCORDING TO THE MRP.
REGRADED AND WIDENED EXISTING COUNTY ROAD (SEPARATE FROM DOGM PERMIT)
COUNTY ROAD
EXISTING COUNTY ROAD
OUTCROP
A.S.C.A.
POND #1
POND #2
TS-01
Current DA Boundary
Future Sewer Line
Existing Culvert Section to be removed
Substation
DA-1
DA-2
DA-3
DA-4
DA-5
DA-6a
DA-6b
DA-7
DA-8
DA-9
DA-10
DA-11
DA-12
DA-13a
DA-13b
DA-14a
DA-14b
DA-15a
DA-15b
DA-16
DA-17
DA-18
DA-19
UA-1
UA-2
UA-3
UA-4
UA-5a
UA-5b
UA-6a
UA-6b
UA-7
Ditch DD-7 Sta 0+00 - 1+47.75 7-28% Slope
Culvert DC-10 ADS N-12 2' Dia. 60 LF
Ditch DD-8 Sta 2+07.73 - 3+50 2.22% Slope
Culvert DC-11 ADS N-12 2' Dia. 25 LF
Ditch Section C1 Sta 3+95 - 4+25 7.92% Slope
Ditch DD-9 Sta 4+25 - 5+65 3.10% Slope
Ditch Section C3 Sta 5+65 - 6+50 0.49% Slope
Culvert 12a ADS N-12 2.5' Dia. 140 LF @ 0.71%
Install New 4' Manhole Rim:5873.29' Invert in:5864.01' Invert out:5863.95'
Culvert 12b ADS N-12 2' Dia. 76 LF @ 2.54%
Install New 4' Manhole Rim:5870.25' Invert in:5862.80' Invert out:5862.73'
Culvert 12c ADS N-12 2' Dia. 354 LF @ 2.54%
Ditch Section DD-16 Sta 13+49 - 14+10 1.15% Slope
Ditch DD-16 Sta 14+10 - 14+9? 1.86% Slope
Install New 4' Manhole Rim:5857.76' Invert in:5854.05' Invert out:5853.99'
Culvert 12d ADS N-12 2.5' Dia. 9.0 LF @ -0.12%
Ditch DD-16 Sta 12+35 - 13+49 2.93% Slope
Riprap Slope Protection
By-Pass Culvert

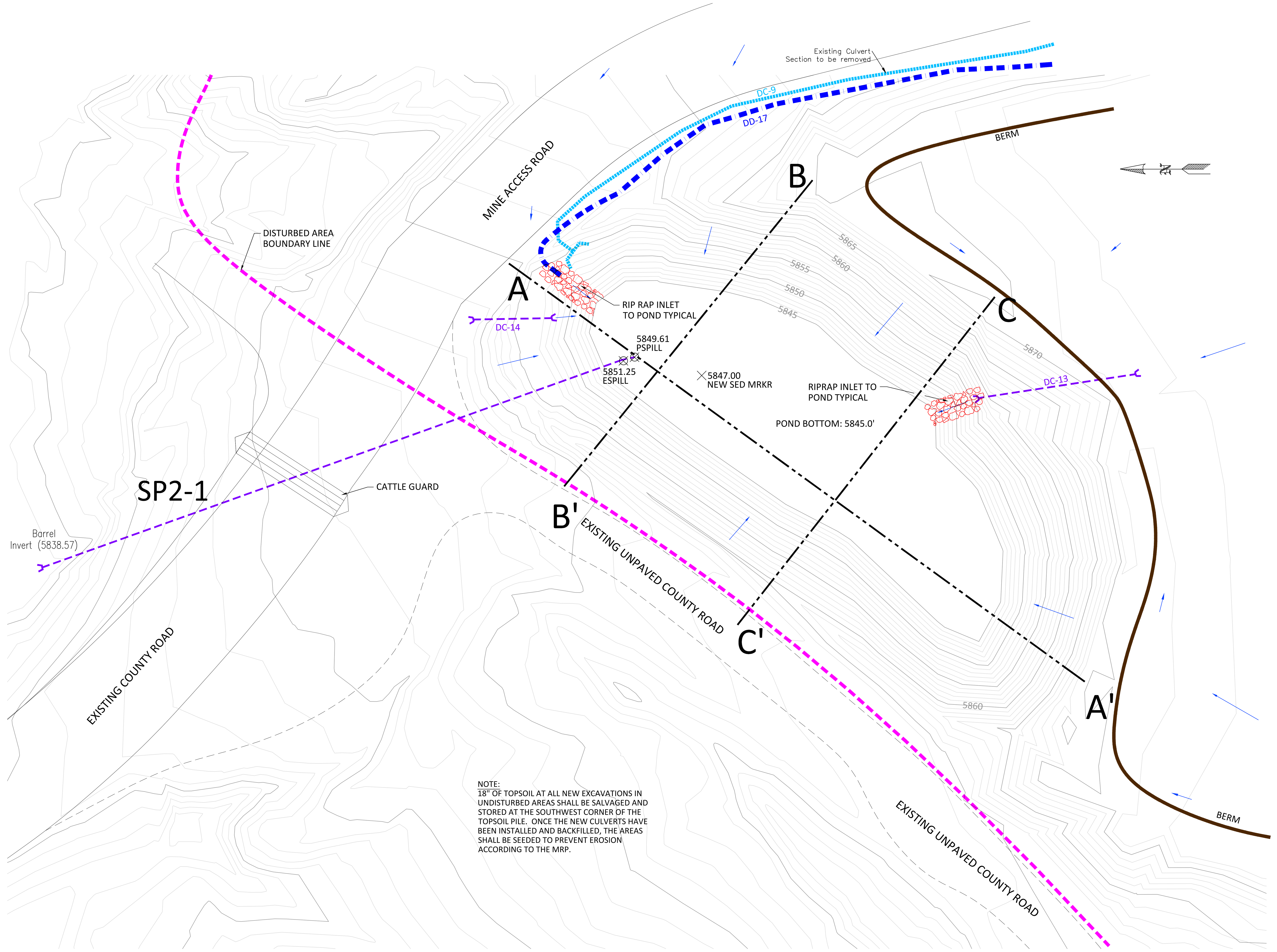
NOTE:
18" OF TOPSOIL AT ALL NEW EXCAVATIONS IN UNDISTURBED AREAS SHALL BE SALVAGED AND STORED AT THE SOUTHWEST CORNER OF THE TOPSOIL PILE. ONCE THE NEW CULVERTS HAVE BEEN INSTALLED AND BACKFILLED, THE AREAS SHALL BE SEEDED TO PREVENT EROSION ACCORDING TO THE MRP.
DECANT VALVE HANDLE
48" CMP OIL SKIMMER
48" CPM OIL SKIMMER
PRINCIPAL SPILLWAY LEVEL (5853.0)
EMERGENCY SPILLWAY LEVEL (5854.0)
30" CMP RISER
DECANT VALVE
1 1/2" PIPE W/ ELBOW
DECANT LEVEL (5844.6)
MAXIMUM SEDIMENT LEVEL (5843.6)
60" CULVERT UC-1
CULVERT CROWN (5834.39)
CULVERT INVERT (5829.39)
DETAIL A
D
D'
C
C'
B
B'
A
A'
PROPOSED SURFACE:
EXISTING SURFACE:
RECLAIMED SURFACE:
TS-1
UA-5
UA-1
UA-4
DC-12c
DC-12d
DD-10
DD-15
DD-16
UC-1
EXISTING COUNTY ROAD
DRAINAGE BERM
RIP RAP INLET TO POND TYPICAL
FL. 5858.44
TOP SLOPE = 5862.8
60" Culvert Slope: 0.348ft/ft Length: 81.04LF
DRAINAGE BOUNDARY
TOP HEADWALL = 5838.85
FL = 5828.35
CULVERT DISCHARGE APRON
60" Culvert Slope: 0.007ft/ft Length: 112.43LF
BOTTOM OF POND (5839.0')
RIP RAP INLET TO POND TYPICAL
60" Culvert Slope: 0.003ft/ft Length: 286.07LF
Culvert Upstream of ROW Will Be Removed During Reclamation
SEE DETAIL A
EMERGENCY SPILLWAY = 5854.0
PRINCIPAL SPILLWAY = 5853.0
CROWN = 5834.39
FL = 5829.39
SEDIMENT MARKER
RIP RAP INLET TO POND
60" CLEAN-OUT
TOP RIM = 5848.08
CROWN = 5835.24
FL = 5830.24
Existing Culvert Within RS-2477 ROW Will Be Replaced by The County And Will Remain After Reclamation
POND #1
RIP RAP INLET TO POND TYPICAL
REGRADED AND WIDENED EXISTING COUNTY ROAD (SEPARATE FROM DOGM PERMIT)
COUNTY ROAD CONTINUES TO THE SOUTH
POND #1
POND VOLUME
Principle Spillway .... 13.01 ac.ft.
Emergency Spillway .... 14.29 ac.ft.
SEDIMENT LEVEL
Clean Out Level .... 5843.6'
PRINCIPLE ELEVATIONS
Pond Bottom .... 5839.0'
Decant Elevation .... 5844.6'
Principle Spillway .... 5853.0'
Emergency Spillway .... 5854.0'
Top of Dam .... 5855.0'
NATURAL DRAINAGE
EXISTING DITCH
EXISTING CULVERT
NEW DITCH
NEW CULVERT
SHEET FLOW DRAINAGE
EXISTING COUNTY ROAD EMBANKMENT 1.11H:1V
ROAD EMBANKMENT (5855.0)
DETAIL A
PRINCIPLE SPILLWAY (5853.0)
EMERGENCY SPILLWAY (5854.0)
TOP OF EMBANKMENT
THEORETICAL POND SLOPE BASED ON REQUIRED DAM WIDTH OF 10' 1.94H:1V
60" CMP. CULVERT
BOTTOM OF POND (5839.0)
SEDIMENT MARKER - CLEANOUT 5843.6
BOTTOM OF CHANNEL
CULVERT UC-1 DETAIL
LILA CANYON MINE
PROPOSED SEDIMENT POND #1
HYDROLOGIC DESIGN
APRIL 2008
7-6a
AS SHOWN
UTAH REGISTERED PROFESSIONAL ENGINEER
#6149561
David W. Hibbs
REVISION DATE:
Apr. 2008 TJS
Apr. 2009 TJS
Jul. 2015 TJS
Oct. 2015 TJS
Feb. 2016 PJJ
March 2016 PJJ
R 14 E, T 16 S
N
LEGEND:
DRAINAGE AREA BOUNDARY:
FENCE LINE:
PROPOSED CONTOURS:
EXISTING CONTOURS:
RECLAIMED CONTOURS:
DISTURBED AREA BOUNDARY:
UNDISTURBED AREA BOUNDARY:

POND #2

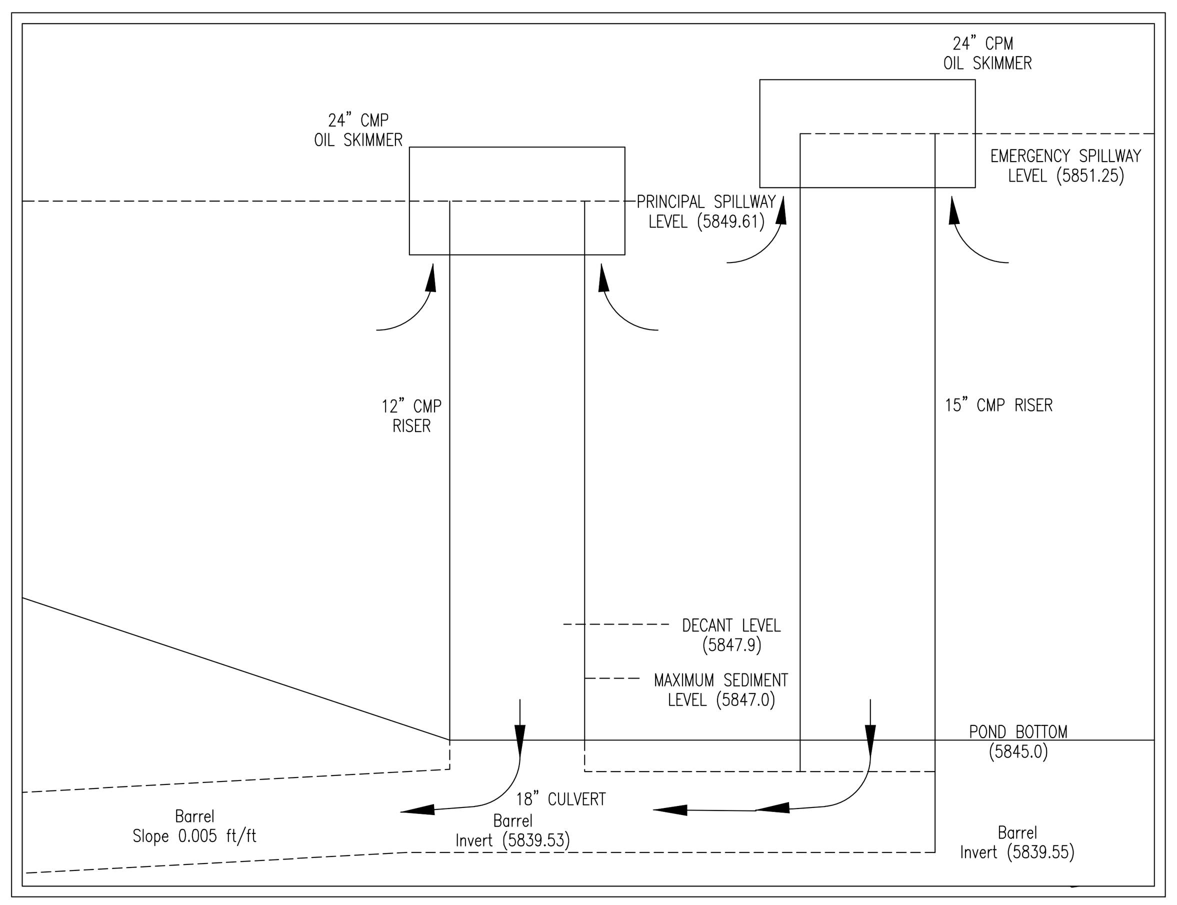
POND VOLUME
- Principle Spillway .... 0.57 ac.ft.
- Emergency Spillway .... 0.93 ac.ft.

SEDIMENT LEVEL
- Clean Out Level .... 5847.0'

PRINCIPLE ELEVATIONS
- Pond Bottom .... 5845.0'
- Decant Elevation .... 5847.9'
- Principle Spillway .... 5849.61'
- Emergency Spillway .... 5851.25'



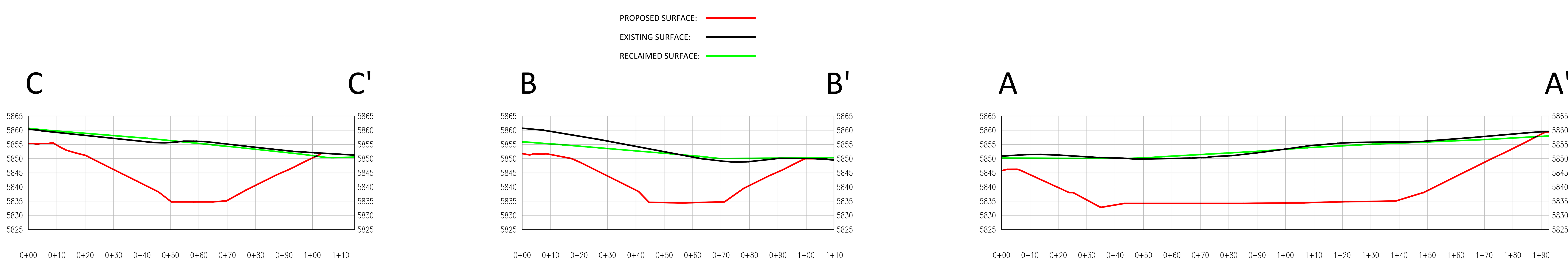
NOTE:
18" OF TOPSOIL AT ALL NEW EXCAVATIONS IN UNDISTURBED AREAS SHALL BE SALVAGED AND STORED AT THE SOUTHWEST CORNER OF THE TOPSOIL PILE. ONCE THE NEW CULVERTS HAVE BEEN INSTALLED AND BACKFILLED, THE AREAS SHALL BE SEEDED TO PREVENT EROSION ACCORDING TO THE MRP.



DETAIL A

SURFACE DRAINAGE KEY

- EXISTING DITCH
- EXISTING CULVERT
- REMOVED CULVERT
- NEW DITCH
- SHEET FLOW DRAINAGE



LILA CANYON MINE

PROPOSED SEDIMENT POND #2

HYDROLOGIC DESIGN

APRIL 2008

AS SHOWN

7-6b

UTAH REGISTERED PROFESSIONAL ENGINEER #6449561 David W. Hibbs

DATE:	BY:	DATE:	BY:
Apr 2008	TJS		
Jun 2009	TJS		
Dec. 2015	PJJ		
Feb. 2016	PJJ		
March 2016	PJJ		

REVISION DATE:

0 10 20 40 FEET

R 14 E, T 16 S

LEGEND:
- INDEX CONTOURS (5' INTERVALS):
- INTERMEDIATE CONTOURS (1' INTERVALS):
- RECLAIMED CONTOURS:
- DISTURBED AREA BOUNDARY:
- CULVERT: