C/025/005 Incoming

#4517

Alton Coal Development, LLC
463 North 100 West, Suite 1
Cedar City, Utah 84720
Phone (435) 867-5331 • Fax (435) 867-1192

March 3, 2014

Daron R. Haddock
Coal Program Manager
Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

RECEIVED
MAR 04 2014
DIV. OF OIL, GAS & MINING

Subject: **Response to Incidental Boundary Change and Highwall mining alternative, Task ID #4502, Coal Hollow Project, Kane County, Utah, C/025/0005**

Dear Mr. Haddock,

Alton Coal Development, LLC is providing this submittal to address deficiencies identified in Task ID #4502 for the previously submitted Incidental Boundary Change (IBC) to the Coal Hollow Mine (CHM) permit area. The IBC includes a new mineral lease of 85.88 acres adjacent to the CHM. There will be no surface disturbance within the IBC, approximately 38.95 acres will be undermined for the extraction of coal utilizing highwall mining technics. It appears that several of the regulations that are cited with a deficiency have little bearing to that deficiency. For those deficiencies, the best response was made based on the comments.

Please find enclosed 1 (one) redline copies of the revised text for review and 2 (two) clean copies of text and drawings for insertion into the MRP. Please do not hesitate to contact me if you have any questions 435-691-1551.

Sincerely

B. Kirk Nicholes
Environmental Specialist

General Contents

Permit Term

Section 116 of the MRP describes three phases of mining that began in 2010 and is anticipated to be completed in 2017. Section 116 states that there are 394 acres total to be disturbed during all three phases of mining. Phase 1 is listed as 269 acres disturbance. Phase 2 is 57 acres disturbance. Phase 3 is listed as 68 acres disturbance. The cover letter accompanying this submittal states that acreage listed in Section 116 is consistent with the three phases shown on Dwg 5-3 (bonded acreage).

In accordance with R645-301-121, to accurately reflect the bonded acreage, the following changes should be made to the plan: 1)Section 116 should state that Phase 1 is 289 acres and Phase 2 is 40 acres (as shown on Drawing B-2 of the Revised Reclamation Agreement Exhibit D, signed 12/13/13), and
2) Phase 3 will correspond to the remaining acreage shown on Drawing 5-3 Phase 3; and,
3) Phase 2 shown on Drawing 5-3 must reflect the same area drawn as Phase 2 on Drawing B-2 of the Revised Reclamation Agreement Exhibit D, (signed 12/13/13); and,
4) Drawing 5-3 must provide the bonded acreage figures in the legend for each phase of bonding.

pburton

Texts in Section 116 as well as Drawing 5-3 have been revised to reflect the required changes

Maps and Plans

The information is not adequate to meet the requirement of this section of the regulations. Prior to approval the following information must be provided in accordance with R645-301-140; Plate 3-7 needs to be revised to show the current phases of mining and the proposed highwall mining activities. The current plate is for a three year surface operation.

jhelfric

Plate 3-7 has been revised to show Phases rather than years, also a Plate 3-7A has been added that shows the proposed highwall mining activities.

Environmental Resource Information

Land Use Resource Information

The information is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with R645-301-411.140; ACD needs to include a commitment in Chapter 4, section 411.140 to conduct a presite survey of the proposed 500 foot disturbance associated with the trench and any additional disturbances associated with the development of proposed highwall mining activity.

jhelfric

As stated in Chapter 4, section 411.140 "A cultural resource inventory was conducted by Montgomery Archaeological Consultants Inc.(MOCA) in June 2005 for Alton Coal Development, LLC." This Class III inventory includes the proposed 500 foot disturbance associated with the trench. No further action is required.

Prime Farmland

In accordance with R645-301-121.100, Section 221 of the MRP must be revised to state that the NRCS has made a determination that 80 acres of the 85.88 acre IBC Dame lease are considered Farmlands of Statewide and Local Importance. A copy of the referenced letter should be included in Section 1 of Appendix 2-1 with the previous NRCS correspondence.

pburton

The referenced letter has been included to Section 1 of Appendix 2-1. This also necessitated change be made to text in Chapter 2 pages 2-1 & 2-2. These changes have been included in this submission.

Operation Plan

Fish and Wildlife Protection and Enhancement Plan

The impacts to wildlife from the extended mining activities are not adequately addressed in chapter three of the current Mining and Reclamation Plan, (MRP). Prior to approval the following information must be provided;

In accordance with R645-301-333.300. During the meeting on January 7, 2014 ACD agreed to provide a commitment to restore the wet meadow habitat, the location is shown on drawing 3-1(Meadow). The application needs to include a commitment to restore the wet meadow habitat in the 85.88 parcel in the event of habitat loss due to water diminution. This commitment has not been included in the application.

The Utah Supreme Court has determined that water replacement under the Surface Mining Control and Reclamation Act is not a permitting issue, but rather requires a showing of damage to the water source. Castle Valley Special Service District v. Utah Board of Oil, Gas and Mining, Case No. 950487, Utah Supreme Court, December 31, 1996. Therefore until damage to the water source has been shown no further action is required to the permit for restoring the wet meadow habitat.

In accordance with R645-301-322.200, .200, 342.100, 358.400 a narrative describing how springs SP-8, SP-14, SP-20, SP-22, SP-40 and wells C4, C2, C3, C5, and Y-61 that sustain the critical brood rearing habitat will be restored in the event of water diminution,

There is no evidence to support water diminution. The amendment currently contains an aggressive monitoring schedule for these springs and wells prior to, during and after highwall mining. The wells themselves are monitoring wells, and do not "sustain the critical brood rearing habitat." Further, the Utah Supreme Court has determined that water replacement under the Surface Mining Control and Reclamation Act is not a permitting issue, but rather requires a showing of damage to the water source. Castle Valley Special Service District v. Utah Board of Oil, Gas and Mining, Case No. 950487, Utah Supreme Court, December 31, 1996. No further action is required.

In accordance with R645-301-322.100 a table that includes a schedule to initiate compensatory mitigation of 343.52 acres for the addition of the 85.88 acre parcel by no later than August 1, 2014 and complete the mitigation within six months or by January 31st 2015.

Page 19 of the "Conservation Plan for Greater Sage-grouse in Utah, February 14, 2013" reads as follows:

6.1 Disturbance

Disturbance, as defined in Section 10.0, is any ground disturbing activity, event or action, natural or human-caused, which will either eliminate or render greater sage-grouse habitat unusable for the life-cycle of the bird, or human activities and presence which causes a negative response from birds within the SGMA. Disturbance based on ground disturbing activities can be temporary or permanent, while negative response disturbances can cause negative effects year-round, seasonally, or only at certain times of day.

6.1.1 Temporary ground disturbance is defined as any ground disturbing activity which lasts less than five years. Temporary disturbances do not need to be mitigated, if the reclamation or restoration work is effective within the five year period.

6.1.2 Permanent ground disturbance is defined as any ground disturbing activity which lasts five years or more.

Coal removal from the 85.88 acre parcel of the Dame IBC Lease will occur subsurface through the use of a highwall miner on the current Coal Hollow Mine, no disturbance will occur to the surface. As planned, highwall mining in the 85.88 acre parcel entails 90 highwall holes that will penetrate some, but not all of the 85.88 acres. Each hole will be completed in approximately one day with the total of 90 holes being completed within a two year period. As

defined in the "Conservation Plan for Greater Sage-grouse in Utah, February 14, 2013", the disturbances that will occur to 38.95 acres of the 85.88 acre parcel will be "temporary". As ACD has committed to complete 1700 acres of compensatory mitigation for "permanent" disturbance (far in excess of the 4:1 ratio required by the Conservation Plan for Greater Sage-grouse). Current "permanent" disturbance approved in the MRP is 396 acres. If the alternate highwall mining method is selected, "permanent" disturbance could be as low as 320 acres shown in this amendment.

In accordance with Chapter 3, Appendix 3-5 and R645-301-333.300 a commitment to monitor the vegetation and bird use in the 85.88 acre parcel for vegetation (annually) and bird use (monthly except for May, June and July).

Past bird monitoring has included the area of the new Dame Lease. Birds were documented during the June, July, and August surveys (sightings were in the area of ACD's water well down to and Swapp Ranch House. All other months that surveys where done in this area no grouse where observed. It seems questionable to restrict monitoring of this area 2 of the 3 months that the grouse utilize the area and require it the remainder of the year. Appendix 3-5 page 21 has been modified to include "All areas of the approved MRP permit boundary". Timing of bird use monitoring will follow the currant protocol in Appendix 3-5 established by a sage-grouse biologist, Dr Steven Petersen. Annual monitoring of a vegetation community that will not be disturbed makes little sense. No further action is required.

In accordance with R645-301-121.200 Chapter3, Page 3-7, the last sentence needs to include the word surface before disturbance.

The word "surface" has been added.

In accordance with R645-301-322.100 Chapter 3, Page 3-34 ACD needs to provide valid documentation that defines the amount of the 808 acres they have been given credit for by the Division and this sentence needs to be revised to reflect that,

The sentence has been revised to correctly reflect "885 acres". Also, reference to the letter from Director Baza addressed to Denise A. Dragoo, Esq. dated May 16, 2012 has been added to verify credit given by the Division.

In accordance with R645-301-322.100 Chapter 3, Page 3-34 ACD needs to provide written concurrence from the surface management agency, (BLM), verifying the completion of the lop and scatter pinyon/juniper removal from the 355 acre parcel,

A letter dated 2/28/2014 from Lisa Church of the Kanab Field Office, BLM has been added to Appendix 3-7 "2013 Sage-grouse Habitat Mitigation Project".

In accordance with R645-301-330Page 3-44, Sage-Grouse Work, Sentence #4 needs to be revised to read as follows The implementation of the highwall miner provides an additional method for recovering coal. This is because the disturbance associated with the development of the 500 foot disturbance associated with the trench (Figure 5-41) will be located in the middle of the lek and nesting and brood rearing areas for an extended period of time and perhaps indefinitely with the addition of underground mining.

This deficiency has no basis on the current amendment. It is without reason as to how a determination of the location of disturbance was derived from Figure 5-41 (a cross section of a typical highwall). The approved MRP shows the estimated schedule for final reclamation of all disturbances as 2017. The amendment currently under review shows the estimated schedule for final reclamation of all disturbances as 2017. No extensions have been proposed. The approved MRP as well as the amendment currently under review does not anticipate "underground mining". At this time, there has not been an amendment that proposes "underground mining".
No changes have been made to the amendment.

In accordance with R645-301-333.300 the application needs to include a monitoring plan for the noise levels in the proposed 85.88 parcel from the mining equipment that will be used to implement the proposed highwall mining activities.

jhelfric

Noise levels for mining equipment is regulated by the Federal Mine Health and Safety Administration and a monitoring plan for noise levels is currently in place.

Topsoil and Subsoil

R645-301-121.100 and R645-301-231.100, Please provide a version of Dwg 2-2 for the highwall mining scenario shown in Dwg5-10A.

pburton

Drawing 2-2A has been added to the amendment package.

Maps Affected Area

Two mining methods have been proposed. Under the surface mining method the affected area is shown on Dwg 5-2 disturbance sequence and 5-16 overburden removal map and the reclaimed area is shown on Dwg 5-38 reclamation sequence. For the highwall mining method, the pertinent maps are Dwg 5-2A, 5-16A, and Dwg 5-38A. To provide clarity, actual disturbance and reclamation should be provided in an as-built submitted with the annual report.

In addition, Drawings 5-2A, 5-16A, and 5-38A appear to align the highwall mine trench along the Section 30 and Section 29 boundary line; whereas the trench is shown centered in Section 30 on Drawing 5-10A and 5-10B. If the trench is constructed with trench floor as shown in Dwg. 5-10A and Dwg. 5-10B, then the Area disturbed by topsoil & overburden removal and reclamation will be slightly different than that shown on Dwg 5-2A, 5-16A and 5-38A.

Due to the above ambiguity, the following commitment will be required. In accordance with R645-301-521.162 and R645-301-121.100, Please state a commitment in the plan to provide an as-built of the reclamation sequence map (Dwg, 5-38 and/or 5-38A) filed with the annual report each year and include in the legend:
The acres of open pit and trench;
The acres backfilled;
The acres fully reclaimed (topsoiled and seeded);
Revisions to the reclamation timetable, if any.
The map should be accompanied by a C1C2 form to allow replacement of the existing Dwg. 5-38 or 5-38A in the MRP.

pburton

Changes were made in Chapter 5, Page 5-81 to update Drawing 5-38 or 5-38A at the time the Annual Report is due.

In accordance with R645-301-121.100, plates 5-16 and 5-16A must be in agreement on the area of overburden removed in the past year, 2013,

Appropriate changes were made.

In accordance with R645-301-121.200,please review and correct as necessary the year shown for overburden removal on the northeast corner of Section 30, because the area shown in pink will either have overburden removal 2016 (according to the legend) or in 2015 (according to the year written in the pink area).

Appropriate changes were made.

In accordance with R645-301-553, both plates 5-38 and 5-38A must illustrate compliance with the backfilling and grading rule for surface mining with regard to pits 9 and 10. Pit 9 was mined out in September of 2013 and pit 10 is shown on both Plate 5-10 and Plate 5-10A as being developed in 2014. Therefore, Dwg 5-38 and 5-38A must show reclamation of the pit 9 &10 area in 2014 and 2015 respectively.

Pits 1, 2, 5, 7, 9, & 10 are all under the under the Excess Spoils Pile. The majority of material to be placed in the Excess Spoils Pile will come from the mining of the eastern pits 11- 15. At this time pits 1, 2, 5, & 7 have been mined and backfilled at least up to approximate original contour and in some places above approximate original contour to begin forming the Excess Spoils Pile. Enough excess spoils have now been placed above the mined out Pit 1 and some of the re-contouring completed for final reclamation. Final reclamation cannot proceed above the remaining pits with in the foot print of the Excess Spoils Pile until excess spoils is placed from the mining of pits 10 – 15.

In accordance with R645-301-122.100, please review the active pit location shown on Dwg. 5-19, as it does not appear to reflect either reclamation scenario illustrated on Dwg 5-38 or 5-38A.

phess

Drawing 5-19 is one of three drawings show the greatest amount of disturbance anticipated at three different stages of mining for bonding purposes. The MRP contains two scenarios of traditional open pit mining. One scenario (the approved scenario) the private property is mined and reclaimed with no further mining. The second anticipates Alton Coal acquiring the Federal coal in the LBA. Drawing 5-19 depicts how mining would proceed prior to rolling out on to the Federal coal. This scenario, if approved, would be the greatest amount of disturbance in Phase 3 of mining and thus bonding for Phase 3 has been calculated based on the greatest amount disturbance anticipated.

The information is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with R645-301-322, -301-323, -301-331, -301-333, -301-341, -301-342- and 301-521
The redline text on page 3-57A, The Alternate highwall mining will reduce the practicable area to be reclaimed, does not describe how and when the highwall mining activity will be reclaimed. As previously stated the application does not include a description of or provide for the reclamation of the proposed highwall mining method.

The application needs to include at a minimum in accordance with R645-301-521:,
A narrative describing how the highwall mining disturbance will be reclaimed,
Where the material for backfilling and grading will come from,
A narrative describing the volume of different materials including topsoil that will be needed for reclamation of the highwall and the 500 foot disturbance associated with the trehch trench,
A revised time table for reclamation in accordance with R645-301-341.100,
And in accordance with R645-301-352 a commitment to meet with the Division each year in August to define the amount of reclamation to be completed for that calendar year.

jhelfric

Text has been added to Chapter 3, Section 341.100. In response to a prior deficiency by pburton a commitment has been made to update Drawings 5-38 and/or 5-38A as appropriate to refine the reclamation schedule annually.

Revegetation Timing

Clean copies of this amendment must be revised to include the wording changes made to Section 341.100 approved January 24, 2013 (Task4463, DO-13).

pburton

The approved text has been included in this submission.

Special Categories

Auger Mining

In accordance with R645-301-121.200 please update Dwg 5-10 to show the as-built size and location of pits 25-28.

pburton

A revised Drawing 5-10 has been included with this submission.

Auger Mining

R645-302.240: The language on Page 7-61 shall be updated stating "All holes except as provided in R645-302.245.230 will be sealed within 72 hours" and the follow language shall be removed:
"As specified in R645-302-240, all auger holes not discharging water containing acid- or toxic forming material will be sealed with an impervious noncombustible material as contemporaneously as possible with the augering operation, as approved by the Division."

khoffman

The following text was substituted to allow for requirements by two of many regulating agencies: "All holes except as provided in R645-302.245.230 will be sealed within 72 hours with the exception of the hole adjacent to the current hole being mined. In the approved "Ground Control Plan" for CHM, MSHA requires the adjacent hole remain open for monitoring of the web."

APPLICATION FOR COAL PERMIT PROCESSING

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

Permittee: Alton Coal Development, LLC
Mine: Coal Hollow **Permit Number:** C/025/0005
Title: Incidental Boundry Change, and addition of highwall mineing alternative Task ID #4502
Description, Include reason for application and timing required to implement:

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

☒ Yes ☐ No 1. Change in the size of the Permit Area? Acres: 85.88 Disturbed Area: ___ ☒ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# ____
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☒ Yes ☐ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # ____
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: ____
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes ☒ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☐ Yes ☒ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☐ Yes ☒ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

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

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

B. Kirk Nicholes
Print Name

B. Kirk Nicholes Env. Spec. 3/3/14
Sign Name, Position, Date

Subscribed and sworn to before me this 3 day of March, 2014

Marty Nicholes
Notary Public

My commission Expires: Sept 11, 2017
Attest: State of Utah } ss:
County of Iron

Notary Public
MARTY NICHOLES
Commission #670359
My Commission Expires
Sept 11, 2017
State of Utah

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining
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Form DOGM- C1 (Revised March 12, 2002)

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

Permittee: Alton Coal Development, LLC
Mine: Coal Hollow **Permit Number:** C/025/0005
Title: Incidental Boundry Change, and addition of highwall mineing alternative Task ID #4502

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	Volume 1, Chapter 1, Pages 5-13
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 1, Appendix 1-10
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 1, Drawing 1-1 to 1-6
☐ Add	☒ Replace	☐ Remove	Volume 1, TOC, Page 2
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 2, Pages 2-1, 2-2, 2-21 and 2-26
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 2, Drawing 2-1 and 2-2
☒ Add	☐ Replace	☐ Remove	Volume 1, Chapter 2, Appendix 2-3
☐ Add	☒ Replace	☐ Remove	Volume 2, Chapter 3, Pages 3-2,3-3,3-7,3-34,3-35,3-37,3-41,3-43,3-44,3-57A,3-85and 3-86
☐ Add	☒ Replace	☐ Remove	Volume 2, Chapter 3, Drawing 3-1 to 3-7
☐ Add	☒ Replace	☐ Remove	Volume 2, Chapter 4, Page 4-3, 4-4 and 4-10
☐ Add	☒ Replace	☐ Remove	Volume 3, Chapter 5, Table of Contents
☐ Add	☒ Replace	☐ Remove	Volume 3, Chapter 5, All text
☒ Add	☐ Replace	☐ Remove	Volume 3, Chapter 5, Appendix 5-8
☐ Add	☒ Replace	☐ Remove	Volume 3, Chapter 5, Drawing 5-1 to 5-3, 5-9,5-10, 5-16 to 5-19, 5-35, 5-65, 5-37 and 5-38
☒ Add	☐ Replace	☐ Remove	Volume 3, Chapter 5, Drawing 5-2A, 5-9A, 5-10A, 5-16A, 5-38A, & 5-41to 5-44
☐ Add	☒ Replace	☐ Remove	Volume 7, Chapter 7, Table of Contents, Page v
☐ Add	☒ Replace	☐ Remove	Volume 7, Chapter 7, Pages 7-1,7-2,7-4,7-9,7-12,7-14,7-17,7-22,7-23,7-25, 7-58and 7-61
☒ Add	☐ Replace	☐ Remove	Volume 8, Chapter 7, Appendix 7-14
☐ Add	☒ Replace	☐ Remove	Volume 8, Chapter 7, Table 7-4 to 7-7B
☐ Add	☒ Replace	☐ Remove	Volume 8, Chapter 7, Drawing 7-1 to 7-3, 7-7, 7-10, 7-12, 7-13, & 7-15
☐ Add	☒ Replace	☐ Remove	Volume 8, Chapter 8, All text
☐ Add	☒ Replace	☐ Remove	Volume 9, Confidential, Table of Contents
☐ Add	☒ Replace	☐ Remove	Volume 9, Confidential, Appendix 1-2 (cover sheet only)
☒ Add	☐ Replace	☐ Remove	Volume 9, Confidential, Appendix 1-2 Exhibit 5
☒ Add	☐ Replace	☐ Remove	Volume 2, Chapter 3, Appendix 3-7 add to back
☒ Add	☐ Replace	☐ Remove	Volume 1, Chapter2, Appendix 2-1, End of Section 1
☐ Add	☐ Replace	☐ Remove	
☐ 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

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MAR 04 2014
DIV. OF OIL, GAS & MINING

Sleepy Hollow Mineral Investors, LLC — Manager of SH Coal Investment, LLC
August 2, 2010 (begin date)
Sleepy Hollow Mineral Investors, LLC
Charles Ungurean — Manager
August 2, 2010 (begin date)
Thomas Ungurean — Manager
August 2, 2010 (begin date)

112.500 Legal or Equitable Owner of the Surface and Mineral Properties

The legal and equitable owners of the properties to be affected by this mining operation during the duration of the permit period along with legal descriptions are included in this section. Surface and coal ownership are also shown on Drawings 1-3 and 1-4. The following table is a summary of the ownership within the Permit boundary.

Permit Area Ownership (Acres)**				
	Fee	Federal	State	Total
Surface	~~635~~721	0	0	~~635~~721
Coal*	~~435~~521	200	0	~~635~~721
Total				
Note*: Federal minerals located within the Permit area are not planned for mining as part of this application. These areas have been included as part of the LBA application described in 112.800. Note**: Acreages are approximate based on legal descriptions				

The legal description for lands included within the Permit Boundary is provided below for each surface owner.

SURFACE OWNERSHIP:

Owner/Lessor:

C. Burton Pugh
533 N 650 E
Lindon, Utah 84042-1567
801-785-6220

Lessee:

Alton Coal Development, LLC

Legal Description (C. Burton Pugh Property):

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 30: All of Section Lot #1 (NW¼ NW¼); NE¼ NW¼ ; N½ NE¼ ; ALSO: BEGINNING 3.50 chains West of the East Quarter corner of Said Section 30, and running South 34° 34' West 22.64 chains to the 1/16 section line; thence West 2.64 chains to the Southwest corner of NE¼ SE¼ of Said Section 30; thence North 40.00 chains; thence East 20.00

chains; thence South 14.69 chains; thence southwesterly to the point of beginning.

....containing 217.64 acres, more or less.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 29: BEGINNING at the Northwest corner of Said Section 29, and running thence South 34.69 chains; thence North 33°22' East 35.50 chains; thence North 40° West 0.58 chains; thence North 37°30' East 12.30 chains; thence West 22.23 chains to the point of beginning.

....containing 36.04 acres, more or less.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 19: SW¼SE¼, E½SE¼, SE¼NE¼

....containing 160.0 acres, more or less

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 20: SW¼

....containing 160.0 acres, more or less

COAL OWNERSHIP:

Owner/Lessor:	*Lessee:*
C. Burton Pugh 533 N 650 E Lindon, Utah 84042-1567 801-785-6220	Alton Coal Development, LLC
Roger M. Pugh 140 South 100 West Kanab, UT 84741	
Mark and Margaret Moyers 9397 Avanyu Drive Pleasant Grove, UT 84062	

SURFACE OWNERSHIP:

Owner/Lessor:	*Lessee:*
Alecia Swapp Dame Trust Through Richard Dame, Trustee 1620 Georgia Ave.	Alton Coal Development, LLC

Boulder City, NV 89005
702-293-4773

Legal Description (Alecia Dame Swapp Trust):

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 30: BEGINNING at a point 5.31 chains North of the E¼ corner of Said Section 30, and running thence South 45.31 chains; thence West 20.00 chains; thence North 20.00 chains; thence East 2.64 chains; thence North 34° 34' East 22.64 chains to the 1/16 section line; thence North 33° 22' East to the point of beginning.

....containing 61.96 acres, more or less.

The following description is an addition to the original permit and constitutes an Incidental Boundary Change(IBC) as shown on Drawing 1-1. Coal contained in the IBC will be mined by highwall mining, no surface mining may take place on the leased premises.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 29: BEGINNING at the Northeast Corner of the Northwest Quarter of Section 29, Township 39 South, Range 5 West, Salt lake Base and Meridian and running thence South 14.97 chains; thence West 73 degrees North, 12.41 chains; thence South 36 degrees 45 minutes West to the Quarter Section Line of Section 29, Township 39 South, Range 5 West, Salt Lake Base and Meridian; thence South 36 degrees 45 minutes West 15.61 chains; thence South 5.20 chains to the center section line of Section 29, Township 29 South, Range 5 West, Salt lake Base and meridian; thence South 20.0 chains; thence West 10.96 chains to the west section line of Section 29, Township 39 South, Range 5 West, Salt lake Base meridian; thence North 20.0 chains to the Quarter Section Corner of Section 29, Township 39 South, Range 5 West, Salt Lake Base and meridian; thence North 25.31 chains; thence North 33 degrees 22 minutes East 35.50 chains; thence in a Northwesterly direction 2 rods; thence North 37 degrees 30 minutes East 12.30 chains to the North Section Line of Section 29, Township 39 South, Range 5 West, Salt Lake Base meridian; thence East 17.77 chains to the point of beginning.

....containing 85.88 acres, more or less.

COAL OWNERSHIP:

Owner/Lessor:	*Lessee:*
Alecia Swapp Dame Trust Through Richard Dame, Trustee 1620 Georgia Ave.	Alton Coal Development, LLC

Boulder City, NV 89005
702-293-4773

112.600 Owners of Record of Property Contiguous to Proposed Permit Area

Owners of surface properties contiguous to the proposed permit area are shown on Drawing 1-3 and the name and address of each such owner is as follows:

Department of the Interior, Bureau of Land Management
District and Regional Office
Salt Lake City, Utah

Darlynn and Arlene Sorensen
Orderville, Utah
435-648-2462

112.700 MSHA Numbers

The MSHA Mine Identification Number for the Coal Hollow Project is 42-02519.

112.800 Interest in Contiguous Lands

The applicant has interest in lands contiguous to the permit area. A Lease by Application (LBA) is currently being processed by the United States Department of the Interior, Bureau of Land Management, Salt Lake City, Utah.
Alton Coal Development, LLC, the sole party in interest, submitted the LBA application in September, 2004. The LBA is contiguous to the permit area and contains approximately 3,581 acres. See Drawing 1-2 for LBA delineation.

In addition to the LBA application, Alton Coal Development, LLC also has property leased from C. Burton Pugh located east of the permit boundary. This property which is contiguous to the permit area, is part of a land tract (9-5-20-2) owned by Mr. Pugh that is split across the permit boundary and is located in Section 20, Township 30 South, Range 5 West. This entire tract was leased prior to the final determination of the Permit Boundary (9/10/04). The area leased from Mr. Pugh outside the Permit Boundary are not planned for development except for approximately 43 acres located in the SW¼, NW¼ Section 20 which is included as part of the LBA application. The 43 acres would possibly be developed for surface coal mining operations if the LBA mining rights are successfully acquired. Land tracts leased by Alton Coal Development, LLC within and contiguous to the permit area are identified on Drawing 1-3.

112.900 Certification of Submitted Information

After Alton Coal Development, LLC is notified that the application is approved, but before the permit is issued, Alton Coal will update, correct or indicate that no change has occurred in the information submitted under R645-301-112.100 through .800.

113 VIOLATION INFORMATION

Neither the applicant, affiliates, members or managers or persons controlled by or under common control with the applicant (including Charles Ungurean and Thomas Ungurean, as confirmed by the Applicant/Violator System (AVS) search, dated ~~October 8, 2010~~December 23, 2013) has: (i) had a federal or state mining permit suspended or revoked in the last five years; (ii) nor forfeited a mining bond or similar security deposited in lieu of a bond. ~~With the exception of Charles Ungurean and Thomas Ungurean, n~~Neither the applicant, affiliates, members or managers or persons controlled by or under common control with the applicant has received a violation during the last three year period. Compliance information on Ungurean's operations and the Coal Hollow Mine is attached at Appendix 1-10.

114 RIGHT OF ENTRY INFORMATION

Applicant bases its right to enter and begin coal mining activities in the permit area and the consent of the surface owner to extract coal by surface mining methods upon the following documents:

Lessor: C. Burton Pugh — *Lessee:* Alton Coal Development, LLC

Surface and Mineral Lease, dated 9/10/04; originally recorded 5/25/06

Lessor: Roger M. Pugh — *Lessee:* Alton Coal Development, LLC

Mineral Lease, dated 9/11/08; recorded 9/11/08

Lessor: Margaret and Mark Moyers — *Lessee:* Alton Coal Development, LLC

Mineral Lease, dated 6/26/08; recorded 7/21/08

Lessor: Alecia Swapp Dame Trust — *Lessee:* Alton Coal Development, LLC

Surface and Mineral Lease, dated 4/29/05; recorded 5/17/06

Mineral Lease, dated 10/23/13; recorded 10/23/13

Copies of these lease assignments are included in Appendix 1-2 located in the Volume ~~7~~9, Confidential binder.

115 STATUS OF UNSUITABILITY CLAIMS

115.100 The permit area is not within an area or under study as an area designated as unsuitable for mining under R645-103-400, nor has any petitions been filed with

the UDOGM under R645-103-420 that could affect the proposed permit area. The Coal Hollow Project is located on private lands adjacent to federal lands, which after careful consideration were declared suitable for mining in 1980 by then Secretary of Interior Andrus. Secretary's Decision, Petition to Designate Certain Federal Lands In Southern Utah Unsuitable for Surface Coal Mining, OSM Ref No. 79-5-001, dated December 16, 1980, copy attached at Appendix 1-3.

This petition was filed under the provisions of section 522(c) of the federal Surface Mining Control and Reclamation Act ("SMCRA"). OSM Notice, Receipt of a Complete Petition for Designation of Lands as Unsuitable for Surface Coal Mining Operations, 45 fed. Reg. 3398, Jan. 17, 1980, attached at Appendix 1-3.

Those federal lands in the Petition area found suitable for mining include lands adjacent to the private lands which the Project has included in a federal lease by application and located in Kane County, Utah within Township 39 South, Ranges 5 and 6 West, SLM. Secretarial Decision at Paragraph 4. The Secretarial Decision was based on an extensive Administrative Record, including the Petition filed under Section 533 of SMCRA, 30 U.S.C. Section 1272, public hearings, a combined petition evaluation document and environmental impact statement published in two volumes on November 26, 1980 as, "Southern Utah Petition Evaluation Document" and the "Southern Utah Petition Evaluation Document - Comments and Responses." The Secretarial Decision was further supported by a 52 page Statement of Reasons, dated January 13, 1981, attached at Appendix 1-3.

The Secretarial Decision was upheld by the federal court in *Utah International, Inc. v. Watt*, 553 F. Supp. 872 (D. Utah 1982).

115.300 Coal mining and reclamation activities at the Coal Hollow Project are not planned within 300 feet, measured horizontally, of an occupied dwelling or 100 feet of a public road. Drawing 1-5 shows the proximity of the Swapp Ranch to the planned operations. With the alternate highwall method, coal will be recovered by highwall mining beneath the Swapp Ranch. Engineering has been completed and incorporated into the plan such that subsidence does not occur to the surface.

116 PERMIT TERM

116.100 There are 3 mining phases associated with this permit term. The first phase of mining ~~is anticipated to start July 1, 2008~~began on November 10, 2010. ~~Each mining phase has a 1 year term.~~ Phase 3 is anticipated to conclude in year ~~2012~~2017.

Acres of disturbance per Mining Phase

Phase 1 ~~286~~ 289 acres

Phase 2 ~~109~~ 40 acres

Phase 3 ~~38~~ 89 acres

116.200 Permit Term

The Coal Hollow Mine Project is proposed for a 5-year term under the Permanent Regulatory Program for 5 years

117 INSURANCE, PROOF OF PUBLICATION

Proof of publication pursuant to R645-303-322 is included in Appendix 1-5.

117.100 Certificate of Liability Insurance

A copy of the Certificate of Liability Insurance is found in Appendix 1-4.

118 PERMIT FILING FEE

A copy of this permit is on file with the Utah Division of Oil, Gas and Mining (UDOGM), P.O. Box 145801, Salt lake City, Utah 84114-5801. A filing fee of $5.00 accompanied permit submittal.

120 PERMIT APPLICATION FORMAT AND CONTENTS

This permit application contains information and will comply with R645-301-120. A notarized statement attesting to the accuracy of this information is set forth at Appendix 1-6.

130 REPORTING OF TECHNICAL DATA

All technical data submitted in the permit application will be accompanied by the name or organization responsible for the collection and analysis of data, dates of collection and descriptions of methodology used. Technical analyses will be planned by or under the direction of a qualified professional in the subject to be analyzed.

The following assisted or were consulted in the preparation of this permit application:

State of Utah, Department of Natural Resources
Division of Oil, Gas and Mining
Salt Lake City, Utah

Department of the Interior, Bureau of Land Management
District and Regional Office
Kanab and Salt Lake City, Utah

United States Geological Survey, Utah Region
Salt Lake City, Utah

United States Department of Agriculture
Natural Resources Conservation Service

Salt Lake City, Richfield and Cedar City, Utah

State of Utah, Department of Natural Resources
Division of Wildlife Resources (DWR)
Salt Lake City, Price and Cedar City, Utah

Dr. Patrick D. Collins
Mt. Nebo Scientific Research & Consulting
Springville, UT

Erik Petersen, P.G.
Petersen Hydrologic, LLC
Lehi, UT

John T. Boyd Company
James Boyd
Mining & Geological Consulting
Canonsburg, PA

John T. Boyd Company
Rich Bate
Mining & Geological Consulting
Denver, CO

Keith Montgomery
Montgomery Archaeological
Moab, UT
Dr. Stephen Petersen
Philomath, OR

Larry Hayden-Wing
Hayden-Wing Associates, LLC
Laramie, WY

Mark Page
Water Rights Consultant
Price, UT

D.A. Smith Drilling
Loma, CO

Kane County
76 North Main
Kanab, UT

Dr. James E. Nelson
Brigham Young University
Provo, UT

Talon Resources, Inc
Huntington, UT

C. Burton Pugh
Lindon, UT

Richard Dame
Boulder City, NV

University of Miami
Miami, FL

Geochron Laboratories
Cambridge, MA

Energy Labs
Billings, MT

Taylor Geo-Engineering
Alan O. Taylor
Lehi, UT

Long Resource Consultants
Robert E. Long
Morgan, UT

JBR Environmental, Inc.
Dawn Whaley
Sandy, UT

Bruce Chesler
Escalante, UT

Heaton Livestock
PO Box 100773
Alton, UT

A.H. Hamblin
Paleontogical Consulting
Cedar City, UT

Patricia Stavish
Montgomery Archeological
Moab, UT

Mike Shurtz, C.E.T
AGEC
Cedar City, UT

Byron Caton
SGS North America, Inc
Denver, CO

Inter-Mountain Laboratories
Karen Secor
1673 Terra Avenue
Sheridan, WY

Glenn Grossman
Will Spitzenberg, P.E.
Boss Engineering
Pleasant Grove, UT

Tom Campbell
TerraTek
Salt Lake City, UT

140 DRAWING AND PLANS

The Drawing and plans in the Mining and Reclamation Plan are submitted consistent with the requirement of R645-301-140.

150 COMPLETENESS

Alton Coal Development, LLC represents that the information contained in the Coal Hollow Mining and Reclamation Plan permit application to be complete and correct.

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APPENDICES

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2-2	Soils Analysis
2-3	2014 Soil Survey Report

DRAWINGS

2-1	Soil Survey Map
2-2	Topsoil Handling Sequence and Stockpile Map

R645-301-200. SOILS

210. INTRODUCTION

211. Soil Removal

In this section, the Alton Coal Project will present a description of the pre-mining soil resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be separately removed and segregated from other materials.

212. Soil Redistribution

After removal, topsoil will be immediately redistributed in accordance with R645-301-242 and stockpiled pending redistribution under R645-301-234. For details refer to Section 5 of Appendix 2-1.

220. ENVIRONMENTAL DESCRIPTION

221. Prime Farmland Investigation

The Natural Resource Conservation Service conducted a prime farmland assessment in October 2006 and determined that "No Prime Farmland or Soils of Statewide Importance were found within the study area (Coal Hollow Mine area), per criteria outlined in the National Survey Handbook Part 622 and Exhibit UT603-1, respectively (C. Meier, 2006)." The assessment stated that the soils "..could classify as Soils of Statewide Importance, if irrigated.."

"An available and reliable source of moisture to sustain crops common to the area is the primary limiting factor that excludes the observed soils from classifying as Prime Farmland or SSI (C. Meier, 2006)."

"In addition to a lack of a reliable source of water, soils did not classify as Prime Farmland due to high pH, high electrical conductivity, excessive erosion potential on steep slopes and slow permeability (C. Meier, 2006)."

On January 28, 2014, the Natural Resource Conservation Service provided a prime farmland assessment for the Dame Lease IBC. It was determined that "About 80 acres of the area of interest meets the definition of "Statewide Important Farmland, if irrigated" . It is in map unit "1103- Sili-Sidshow- Gypsic Haplustepts complex, 2 to 15 percent slopes" .

A copy of the NRCS Prime Farmland Determination for both the 2006 (Coal Hollow Mine) and the 2014 (Dame Lease IBC) is included in Section 1 of Appendix 2-1.

222. Soil Survey

An order 2 soils survey has been completed in 2007 at the Coal Hollow Project. Appendix 2-1 contains a report that provides the details for this survey. Utilizing existing soils data, the soil map units were extended to include the Dame Lease IBC. Appendix 2-3 contains a report

that provides details for this survey. The survey area is on private lands leased by Alton Coal Development (ACD) and adjacent lands. ~~This~~ These soil surveys ~~was~~ were prepared so that ACD could: 1) identify suitable sources of subsoil and topsoil; 2) determine topsoil and subsoil salvage depths and quantities; and, 3) develop a post mining reclamation plan using salvaged soil materials. ~~This~~ These soil surveys cover approximately ~~630~~ 716 acres.

222.100. Soils Map

A map with soil map unit delineations is shown on Drawing 2-1.

222.200. Soil Identification

Soils in the Coal Hollow project soil survey area have been grouped into thirteen soil map units based on taxonomic classification, depth to parent material, and slope. The composition of these map units is described in table 2-1. Detailed descriptions of each soil map unit are included in Appendix 2-1. The soil survey map is Drawing 2-1.

Table 2-1. Soil map unit composition for the Coal Hollow project area.

Map Unit	Pct	Soil Type[1]	Taxonomic Classification[2]	Modal Pedon[3]
1		**A Family – Wapiti Family complex, 3 to 8 percent slopes**		
	65	A Family	fine, mixed, superactive, mesic Aridic Calciustept	1
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	32
	10	D	fine, mixed, superactive, mesic Aridic Calciustoll	33
	5	Manzanst Family	fine, mixed, superactive, mesic Aridic Haplustalf	48
	5	N Family	fine, mixed, superactive, frigid Aquic Calciustoll	26
2		**M Family - Calendar Family – D Family complex, 3 to 8 percent slopes**		
	60	M Family	fine, mixed, superactive, mesic Aridic Calciustepts	3
	25	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	4
	15	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	2
3		**Cibeque Family – Wapiti Familiy complex, 3 to 8 percent slopes**		
	60	Cibeque Family	fine-loamy, mixed, superactive, mesic Aridic Calciustept	6
	30	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	31
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
	5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	
4		**Jonale Family - Graystone Cobbly Substratum Family - Wapiti Family complex, 3 to 8 percent slopes**		
	50	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	17
	25	Graystone cobbly substratum Family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	39
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	19
	5	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	

222.400 Present and Potential Productivity of Existing Soils

Soils in the Coal Hollow project area support big sagebrush, grasses (native and introduced species), pinyon pine, Utah juniper, and Gambel oak. Detailed descriptions of the present and potential productivity of the soils are detailed in Chapter 3, Section 321.200.

223. Soil Characterization

This soil survey was made in accordance with the guidelines for an order 2 soil survey as detailed in the Soil Survey manual (USDA 1993). Soils were classified using the Keys to Soil Taxonomy, Ninth Edition (USDA 2003). Soils for the New Dame Lease IBC were classified using the Keys to Soil Taxonomy, Eleventh Edition (NRCS 2010). Representative soil samples were submitted for laboratory analysis of the parameters outlined by the Utah Division of Oil Gas and Mining's *Guidelines for Management of Topsoil and Overburden* (2005).

224. Substitute Topsoil

Based on the 2006-2007 order 2 soil survey, sufficient quantities of suitable topsoil and subsoil are available for reclamation within the project area. The Coal Hollow Project does not plan to use substitute material for topsoil at the time of reclamation. However, if in the future the Coal Hollow mine plan proposes to use selected overburden materials as a supplement or substitute for topsoil, an application will be provided to the DOGM that includes results of analyses, trials, and tests as described under R645-301-232.100 through R645-301-232.600, R645-301-234, R645-301-242, and R645-301-243. DOGM may also require the results of field-site trials or greenhouse tests as required under R645-301-233.

230. Operation Plan

231. General Requirements

231.100. Methods for Removing and Storing Subsoil and Topsoil

The methods for removing and storing topsoil, subsoil, and other materials will be to first remove the woody plants from the area and place them in piles for later placement in pit backfills. Next, dozers or scrapers will remove the topsoil layer to a depth determined by the soil survey. The topsoil will be stockpiled and protected from wind and water erosion. Stockpiles that will be in place for less than 1 year will be coated with a tackifier at the manufacturer's suggested rate for dust control applications. Those stockpiles that will be in place for at least one year will be seeded and covered with mulch during the appropriate season. Side slopes of stockpiles will be sloped to 3h:1v: The suitable subsoil will then be removed and stockpiled separately from the topsoil. The depth of topsoil and subsoil salvage will be determined by the aforementioned soil survey and in the field during mining by the Coal Hollow environmental technician in consultation with a certified professional soil scientist. Stockpiling of topsoil and subsoil will only occur when direct placement (or live hauling) is not operationally practical. Drawing 2-2 shows planned topsoil stockpiles and topsoil removal plans.

234.240. (d) They will not be moved until required for redistribution unless approved by the UDOGM. Anticipated storage time for each stockpile is shown on Drawing 2-2.

234.300. Long-Term Disturbance & Stockpiling

When long-term disturbed areas will result from facilities and preparation plants and when stockpiling of materials removed under 8645-301-232.100 would be detrimental to the quality or quantity of those materials, DOGM may approve the temporary distribution of the soil materials removed to an approved site within the permit area to enhance the current use of that site until later when needed for reclamation, provided that the following conditions occur.

234.310. Such action will not permanently diminish the capability of the topsoil of the host site.

234.320. The material will be retained in a condition more suitable for redistribution than if stockpiled.

240. Reclamation Plan (General Requirements)

A detailed Order 2 soil survey has been completed in 2006 and 2007 and extended to include the New Dame Lease IBC in 2014. This information provides detail for onsite soil suitability, salvage depths, and volumes available for reclamation of the mine site. Dozers or Scrapers will replace the subsoil and topsoil. The topsoil is estimated to average 8 inches and the subsoil will be approximately 39 inches in thickness. The total profile of topsoil and subsoil is estimated to average 48 inches.

242. Soil Redistribution

242.100. Topsoil materials removed under R645-301-232.100, R645-301-232.200, and R645-301-232.300 and stored under R645-30I-234 will be redistributed in a manner that meets the following conditions.

242.110. (a) The material achieves an approximately uniform, stable thickness consistent with the approved postmining land use, contours, and surface-water drainage systems. All slopes will be appropriately graded and leveled prior to placement of topsoil and subsoil layers. Soil layer thicknesses will be regularly checked using a high precision GPS system and spot checking by the ACD environmental technician.

242.120. (b) Reduced material handling of the soil resource prevents excess compaction. Material handling will be minimized by direct hauling and placing materials when operationally practical rather than stockpiling. Materials will be spread by a dozer or scrapers and spread only as much as necessary to obtain the required uniform thickness. Traffic from rubber tired equipment across topsoil and subsoil will be minimized.

320. ENVIRONMENTAL DESCRIPTION

321. VEGETATION INFORMATION

321.100. Vegetation Mapping and Plant Community Data in the Permit Area
The first vegetation map prepared for the Coal Hollow Project delineated the plant communities that existed within the permit area. The plant communities for the permit area on this early map were drafted on a USGS quadrangle map using information from an existing vegetation map that was prepared from previous work in the area. The earlier work was accomplished in the late-1980s.

A new flight was conducted for the Coal Hollow Project in 2006 that provided aerial photography and more detailed information than had previously been available. This aerial photography and photogrammetric mapping has been used in preparation of many updated maps of the project area, including a revised vegetation map where the plant communities were delineated on the new aerial photographs. Also, new quantitative data were recorded in 2006 in some of the first plant communities proposed for disturbance along with reference areas that would *not* be disturbed. This next version of the vegetation map for the Coal Hollow project also provided sample locations of these recently studied areas. This map was submitted to DOGM in the last MRP submittal (*dated May 25, 2007*) along with the first vegetation quadrangle map, because it continued to provide support for some of the older vegetation data also submitted in the MRP at that time.

Like the earlier vegetation mapping information, and because the area has been studied previously, existing quantitative data sets were also available for the plant communities of the Coal Hollow Project area. These data were recorded in the late-1980s. The aforementioned earlier quadrangle vegetation map corresponded to this early vegetation information. The early datasets were included in the MRP provided to DOGM (*submittal date: May 25, 2007*). Although this information was valuable at that time because it provided initial baseline data for that time period, plans to re-sample the same plant communities to update the existing data were made. Consequently, new quantitative sampling was accomplished later in 2007 to provide updated information about the plant communities within the permit area. The updated data have been summarized and included in this MRP. Therefore, with the 2006 and 2007 quantitative data for the plant communities submitted in the MRP, the dataset for those plant communities proposed for disturbance in the current mine plan for the entire permit area is complete. **Therefore, the older vegetation datasets and maps created using information from the late- 1980s were replaced by the updated datasets and maps in the MRP**.

Reference areas chosen to represent future revegetation success standards were also chosen and sampled during the same sample periods in 2006 and 2007 as those proposed for disturbance by the mining operations. The meadow reference area and the Dame Meadow Sample Area (another potential reference area was included into the permit boundary in 2014. Although coal is to be removed from this area by undermining

only and the surface will not be disturbed, the meadow reference area will be relocated during the 2014 growing season to a representative area due south of the permit boundary that does not contain coal and will not be disturbed by mining operations.

Acreage of each plant community and map symbols shown on the revised Vegetation Map *(Drawing 3-1, dated 12/26/07)* for the Coal Hollow Project permit and adjacent areas are shown below.

Vegetation Communities of the Coal Hollow Permit Area			
MAP SYMBOL (see *Vegetation Map*, Drawing 3-1)	PLANT COMMUNITY	TOTAL ACREAGE	PERCENT OF TOTAL
S/G	Sagebrush/Grass	212.00	33.64
P	Pasture Land	192.00	30.48
P-J	Pinyon-Juniper	114.00	18.10
M	Meadow	69.00	10.95
OB	Oak Brush	40.00	6.35
RB/SB	Rabbitbrush/Sagebrush (Disturbed; previously Sagebrush/Grass)	3.00	0.48
	Total*	**630.00**	100.00

Color photographs of the plant communities within the Coal Hollow Project permit area are shown in **PHOTOGRAPHS** section near the end of this chapter.

The above plant communities exist within the boundaries of the Coal Hollow Project permit area and will be disturbed by the coal mining and related activities. Consequently, quantitative and qualitative data were recorded by sampling the plant communities in 2006 and 2007. For general, wide-angle views of the plant communities in the permit area, refer to Photographs 3-1, 3-2, 3-3 and 3-4.

[**NOTE**: The rabbitbrush/sagebrush community was not sampled for baseline data information. This small area represented less that one-half of one percent of the permit area. Moreover, it was a *previously disturbed* sagebrush/grass community. Therefore, standards of revegetation success at final reclamation will be the same as those outlined for the *undisturbed* sagebrush/grass plant communities described in this document].

The total living cover of the pinyon-juniper community was 43.00%, of which 25.00% was from understory and 18.00% was from overstory species [Table 3-14 (A)]. The understory composition by lifeform in this community was comprised of 95.88 % woody species [Table 3- 14 (B)]. Woody species density was measured at 2,657 individuals per acre (Table 3-15).

Pinyon-Juniper Reference Area

A reference area, or an area chosen to represent future revegetation success standards, was chosen and sampled in another pinyon-juniper plant community (see Photograph 3-10). This reference area will *not* be disturbed by the mining operations so it could be used for data comparisons following final reclamation at the mine site. The pinyon-juniper reference area was located near the *north* proposed disturbed pinyon-juniper community (see *Vegetation Map*, *Drawing 3-1*).

Like the above proposed disturbed community, the overstory cover of the reference area was dominated by Utah juniper followed by pinyon pine. Understory was also dominated by black sagebrush, Utah juniper and pinyon pine (Table 3-16). Again forbs were not present in the quadrats; grasses present were slender wheatgrass and squirreltail (*Elymus elymoides*).

The total living cover of the pinyon-juniper reference area was estimated at 39.00%, 11.50% of it was composed of overstory and 27.50% was understory cover [Table 3-17 (A)]. The composition of the understory in the pinyon-juniper reference area was calculated as 89.56% trees and shrubs and 10.44% grasses [Table 3-17 (B)]. Woody species density was dominated by black sagebrush and Utah juniper, but the total of all species was 4,215 individuals per acre (Table 3-18).

Proposed Disturbed Pasture Land Community

The areas called "pasture lands" in the text and maps of this document were plant communities that have been disturbed previously to artificially increase herbaceous cover and productivity for domestic livestock. Prior to pasture lands, these communities were probably native sagebrush/grass plant communities similar to those sampled and described in the 2006 report (*Vegetation of the Sagebrush/Grass & Meadow Areas: 2006*). Although differences occur between pastures due to grazing practices and species planted, representative pastures were sampled for this report (see Photographs 3-11 and 3-12). The sample areas were located near the center of the permit area (see *Vegetation Map, Drawing 3-1*). Again, different locations within this community were sampled, a *north* and a *south* area; and the data were combined for the summary tables in this report. The proposed disturbed pasture land (*north*) was an area proposed for disturbance by ~~operations~~ open pit mining during the first year of mining activities. The proposed disturbed pasture land (*south*) was an area proposed for disturbance by ~~operations~~ open pit mining in the second year of mining activities. The alternate Highwall mining would reduce the proposed surface disturbance whenever this type of mining is used.

• In 2007 the team has continued studies of the sage-grouse with biologists from DWR, the BLM, Southern Utah University (SUU), and the Coal Hollow Project by capturing, taking blood samples, and placing radio transmitters on several birds from March through May.

• In April 2007, two helicopter flights, arranged by Coal Hollow Project, were conducted to search for satellite leks of the sage-grouse.

• In May 2007, another raptor survey by helicopter was conducted by DWR that included the permit area and adjacent areas.

• In September 2007, sensitive plant species surveys were conducted during quantitative sampling of additional proposed disturbed and reference areas for mining years one through three of the project.

• In September 2007, additional quantitative sampling was conducted in meadow areas outside the permit area to be used as a companion study with other areas.

• In 2007, an excavator was used to remove over 10,000 invading juniper trees from the conservation area to reduce potential perching sites for raptors that can reduce the sage-grouse populations.

• Private land owners from Alton have been working to reestablish a migratory corridor between Hoyts Ranch and Alton by clearing juniper and Gambel oak and reseeding open areas with a seed mix consisting of perennial grasses and forbs. Preliminary monitoring results in 2009 indicate that the sage-grouse are beginning to use this corridor. This project was completed in 2011 consisting of 885 acres. Verification was documented in a letter from Director Baza addressed to Denise A. Dragoo, Esq dated May 16, 2012.

• To date, an ongoing monitoring program for radio-collared sage-grouse has been conducted with collaborations with DWR, the BLM, SUU and ACD.

• In 2012 habitat improvement work for sage-grouse was completed on 146 acres to the east of the property that included lop and scatter of pinyon/juniper and chemical treatment of Rabbitbrush.

• In 2012, two helicopter flights, arranged by Coal Hollow Mine, were conducted to search for satellite leks of the sage-grouse.

• Cronquist's phacelia (*Phacelia cronquistiana*; BLM sensitive) was identified as having potential to occur in the area of the mine. Surveys of potential habitats for this species were conducted in June 2012, and no individuals were found.

• In 2013 habitat improvement work for sage-grouse was completed on 355 acres adjoining the west boundary of the Coal Hollow mine that included lop and scatter of pinyon/juniper.

322.200. Site-Specific Resource Information

A review of the Utah Heritage Program database for sensitive species in the proposed mine site and adjacent areas has been accomplished. Field maps with locations of these species have been prepared and have been used for additional surveys and will continue to be used for future biological studies.

Due to the sensitivity of these species, specific location information is considered confidential and has not been submitted in this application. However, review of this information by the regulatory authorities can be arranged.

322.210. Threatened, Endangered, and Candidate Plant and Animal Species

Table 3-35 shows a list of the plant and animal species that are federally listed as threatened, endangered, or candidates for this designation for Kane County, Utah.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah

SCIENTIFIC NAME	COMMON NAME	STATUS*	NOTES SPECIFIC TO PROJECT AREA
PLANTS			
Asclepias welshii	Welsh's Milkweed	T	Welsh's milkweed, occurs in Kane County, Utah, as well as in immediately adjacent Coconino County, Arizona. This plant grows on dunes derived from Navajo Sandstone. This formation and habitat is not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine
Cycladenia humilis var. jonesii	Jones Cycladenia	T	Jones' cycladenia,is a Federally listed threatened plant found only in the canyonlands of the Colorado Plateau in Emery County, Garfield County, Grand County, and Kane County, Utah (also found in adjacent Coconino County, Arizona). This plant occurs in gypsiferous soils that are derived from the Summerville, Cutler, and Chinle formations; they are shallow, fine textured, and intermixed with rock fragments. These formations and habitats are not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine.
Lesquerella tumulosa	Kodachrome Bladderpod	E	Kodachrome bladderpod, is a federally listed endangered plant that is an endemic found only in Kane County, Utah. This species is found on shallow soils that are fine textured, intermixed with shale fragments, and derived from the Winsor Member of the Carmel Formation, where it grows on bare shale knolls and slopes in scattered pinyon-juniper communities. These formations and habitats are not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine.
Pediocactus sileri	Siler Pincushion Cactus	T	This plant is federally listed as threatened. It occurs in Kane and Washington counties in Utah, plus adjacent Coconino and Mohave counties in Arizona The cactus is usually found on the white, occasionally red, gypsiferous and calcareous sandy or clay soils derived from the various members of the Moenkopi Formation, but it is sometimes found on the Kaibab Formation. Siler pincushion cactus occurs in warm desert shrub, sagebrush-grass, and at its upper limits, in pinyon-juniper communities, at lower elevations that area present in the Alton area. Additionally, these formations and habitats are not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine.
ANIMALS			
Cicindela limbata albissima	Coral Pink Sand Dunes Tiger Beetle	C Removed from candidate species list in 2013	The only known populations in the world for this species are located at the Coral Pink Sand Dunes in the extreme southwest corner of Kane County, Utah. The species occupies dune habitat, which is not found in the Alton area. There should be no impacts to this species as a result of Alton Coal Mine.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah			
Strix occidentalis lucida	Mexican Spotted Owl	T	In Utah the Mexican spotted owl is rare, but when it does occur it is sometimes in various forest types, but more commonly in steep rocky canyons, nesting in caves or cliffs of steep walled canyons. This habitat does not occur in the permit area, but does occur in the Dixie National Forest to the east and west of the Alton area. DWR has conducted raptor surveys for all potential raptor species in the project area and did not find habitat for the Mexican spotted owl. There should be no impacts to this species as a result of Alton Coal Mine.
Centrocercus urophasianus	Greater Sage-grouse	C	Sage-Grouse were abundant in pioneer times, but sagebrush eradication and intensive use of lands by domestic livestock have reduced their numbers. Sage-Grouse range is declining in Utah in both quantity and quality. Sage-Grouse range has declined 50 percent from historical times. Greater Sage-Grouse are native to Utah and are listed as a sensitive species by the DWR. A Sage-grouse conservation plan has been implemented to offset potential impacts to this species as a result of Alton Coal Mine.
T=Threatened, E=Endangered C=Candidate, Exp=Experimental			

In summary, based on the information provided above and studies conducted to-date, no threatened or endangered species have been located in the permit area.

323. MAPS AND AERIAL PHOTOGRAPHS

323.100. Reference Area Maps

Several vegetation maps have been prepared for the Coal Hollow Project. A revised vegetation map has been prepared that includes all vegetation sample areas, plus other updated map information [Vegetation Map, Drawing 3-1, (12/26/07)]. The new map replaces the previous vegetation maps. This new map includes reference areas, or plant communities sampled that are similar to those that have been proposed for disturbance by mining activities. These reference areas will be compared to those areas proposed for disturbance during the initial studies for the mine site and will consequently be used as revegetation success standards at the time of final reclamation of mined areas. reclamation is planned immediately after portions of the land are mined (see Chapter 5).

323.200. Sample Area Maps

Elevations, locations of monitoring stations, proposed disturbed areas, reference areas, and other areas used to gather data for fish and wildlife, and any special habitat features, have been delineated on the aforementioned new vegetation map. Due to the Dame Incidental Boundary Change, the Meadow area reference will be relocated to an area that will have no potential impacts from mining. This relocation will occur during the growing season of 2014 in consultation with DOGM.

323.300. Protection and Enhancement of Fish & Wildlife Maps

Each facility to be used to protect and enhance fish and wildlife and related environmental values have been represented on the new maps.

323.400. Plant Communities Map

An initial vegetation map was prepared that delineated the plant communities that existed within the Coal Hollow Project permit area. This **first** map was prepared by delineating the plant communities from an existing vegetation map to a permit quadrangle map (see Section 321.100 for more details). However, a new flight was conducted in 2006 that provided aerial photography with more detailed information to be used to update many maps of the project area. Consequently, a **second** vegetation map was prepared using the new aerial photography (along with groundtruthing), and submitted along with the first map to DOGM (MRP submittal dated May 25, 2007). Finally, a **third** vegetation map was prepared to reflect information and to show new sample areas within the plant communities of the permit and adjacent areas [see *Vegetation Map, Drawing 3-1, (12/26/07)*]. This map **replaced** the first and second maps and was submitted to DOGM (MRP submittal dated January 15, 2008.

332. **SUBSIDENCE**

Because mining in the Coal Hollow Project area will be a surface operation, either open pit or highwall mining, and subsidence is usually associated more with underground mining, it is not considered a factor for the Coal Hollow Project. The alternate Highwall mining is designed such that subsidence does not occur to the surface with nonyieldable webs and barriers.

However, current elevation of the existing topography may be slightly altered in the mining and reclamation operations with open pit mining. The alternate Highwall mining will have only the disturbance associated with the trench for placement of the highwall miner and will have no impact on the surface above the highwall panels

Reclamation has been planned to minimize the impact to the renewable resources identified in this section by promptly reclaiming each mine segment contemporaneously by controlling erosion and re-seeding with a mixture of native plant species that will re-establish the plant communities to vegetative cover that will be diverse, effective, permanent, and consistent with the postmining land use. More details regarding postmining land and topography have been provided in Chapter 4 and Chapter 5 of this document, respectively.

The mine plan is not expected to negatively impact the plants and wildlife in the Coal Hollow Project area. Onsite revegetation research and sage-grouse mitigation plans have been designed. Details of this work have been made available to DOGM specialists for their comments and participation in the process.

333. PROCEDURES TO MINIMIZE ADVERSE IMPACTS TO FISH & WILDLIFE

Section Preface

In addition to the language in the main body of the MRP regarding sensitive species, three appendices (Appendix 3-1, Appendix 3-3 and Appendix 3-5) we prepared separately and have been included to address the sage-grouse in the Alton area. Each of these appendices was submitted in different submittals to the State of Utah, Division of Oil, Gas & Mining (DOGM). After each submittal, they were reviewed by the DOGM and other agencies, which provided comments. Accordingly, the comments were addressed and the next sage-grouse appendix was then written. In other words, the appendices were written in chronological order and each subsequent appendix was a result of comments from the previous one. Therefore, the last appendix written (Appendix 3-5) explains ACD's final mitigation plan for the sage-grouse in the Alton area. However, the previous Appendices (Appendix 3-1 and 3-3) remain in the MRP because they continue to provide valuable information regarding the natural history, previous work and process of addressing the sage-grouse issues in the Alton area.

Sage-Grouse Work

The Coal Hollow Project will minimize disturbances and adverse impacts to fish and wildlife and related environmental values during coal mining and reclamation operations. The project will comply with the Endangered Species Act of 1973 during coal mining and reclamation operations. The location and operation of haul and access roads and support facilities will be placed to avoid or minimize impacts on important fish and wildlife species or other species protected by state or federal law. The implementation of the highwall miner provides an additional method of recovering the coal resource while minimizing disturbance to the surface and associated wildlife species. Enhancement of such resources will be achieved, where practicable. An example is provided below for sage-grouse habitat.

After consultation with appropriate agencies and biologists regarding habitats and sensitive species, the sage-grouse and its habitat were of greatest concern in the area. There has been a decreasing trend in the populations of this species since 1964 (see Appendix 3.1 and Appendix 3-3 for more details). There was a general consensus among the biologists and agencies consulted that due to the marginal habitat in the

340. **RECLAMATION PLAN**

341. **REVEGETATION**

This document contains the revegetation plan for final reclamation of all lands disturbed by coal mining and reclamation operations, except water areas and the surface of roads approved as part of the postmining land use, as required in R645-301-353 *through* R645-301-357. It also shows how the Coal Hollow Project will comply with the biological protection performance standards of the State Program.

341.100. Reclamation Timetable

A detailed schedule and timetable for the completion of each major step in the mine plan has been included in Chapter 5 of the MRP and on Drawing 5-38 or 5-38 A for the highwall miner. Briefly, the mine will conduct operations in one area (segment) at a time. Initial mine development will involve removal and storage of topsoil from mine infrastructure locations. Facilities for equipment maintenance/warehouse, coal handling, and offices will be constructed. During the development and initial mining period, facilities temporary in nature may be used until permanent facilities can be built. Construction of sedimentation ponds, diversion ditches, and mine roads accessing the initial mining areas will also be ongoing.

Mining will employ typical open pit methods using truck/loader type equipment to remove overburden and recover the coal. Mining will advance across the property in successive cuts approximately 250 ft. in width and 800 to 1,300 ft. long (generally equal to the width of the property less property barriers). Layout of these pits can be viewed on Drawing 5-10. In practice, these overburden lifts are mined in a stairstep fashion ahead of the coal removal operation to provide adequate working room for the equipment and stable advancing slopes. Once mining is complete, excavated overburden (spoil) from a successive cut is used to backfill the excavation. General cross sections of this process can be viewed on Drawings 5-11 and 5-12. For the highwall miner method, mining of the trench will be in successive cuts approximately 150 ft. in width and 550 to 600 ft. long. Layout of these trenchs can be viewed on Drawing 5-10A and 5-10B. Otherwise, mining and reclamation will proceed as described for the typical open pit method.

Prior to beginning mining, the area will be cleared of vegetation, and the topsoil will be recovered and either stockpiled or live hauled to regraded areas. Overburden will then be removed using large hydraulic excavator(s) or front end loaders and off-road trucks which will haul the spoil and place it in parts of the pit where the coal has been removed, or in the excess spoil area shown on Drawings 5-3, 5-35 and 5-36. Overburden is removed in successively deeper benches until the coal seam is exposed. Some overburden in lower lifts may be moved by direct dozing into the mined out pit by large bulldozers.

Once the coal is removed, the pit will be backfilled by spoil from adjacent mine pits. Once the pit is backfilled to the planned final surface contour, suitable topsoil and subsoil will be replaced, and the area reseeded. Revegetation work will proceed seasonally as appropriate for planting. The mine plan has been engineered to disturb the smallest practicable area at any one time. The Alternate highwall mining will reduce the practicable area to be reclaimed. With prompt establishment and maintenance of vegetation, immediate stabilization of disturbed areas will minimize surface erosion. Details of the plan has been included in Chapter 5, Section 540 of this document.

341.200. Reclamation Description

The Coal Hollow Project will be reclaimed and revegetated to meet the appropriate postmining land use. Most areas will be reclaimed to the native plant communities that existed prior to mining conditions. Other areas will be reclaimed to enhance habitat for sage-grouse or other wildlife species. Finally, in those areas where the landowner requests a change in the plant community to increase productivity for domestic livestock, they will be reclaimed accordingly.

341.210. Seed Mixtures

Revegetation seed mixtures for each plant community disturbed by mining activities in the Coal Hollow Project area are given in this section. Table 3-36 shows the plant communities that may eventually be disturbed by mining operations at the Coal Hollow Project area.

Table 3-36: Vegetation Communities of the Coal Hollow Permit Area Proposed for Disturbance

MAP SYMBOL (see *Vegetation Map*, Drawing 3-1)	PLANT COMMUNITY
S/G	Sagebrush/Grass
P	Pasture Land
P-J	Pinyon-Juniper
M	Meadow
OB	Oak Brush
RB/SB	Rabbitbrush/Sagebrush (Disturbed; previously Sagebrush/Grass)

Seed mixtures for each disturbance type are shown on Tables 3-37 *through* 3-42. These rates have been based on drill seeding methods described in this document. When broadcast seeding is employed these rates will be doubled.

Table 3-37: Revegetation Seed Mixture for the Sagebrush/Grass Community at

358.300. Removal of a Threatened & Endangered Species

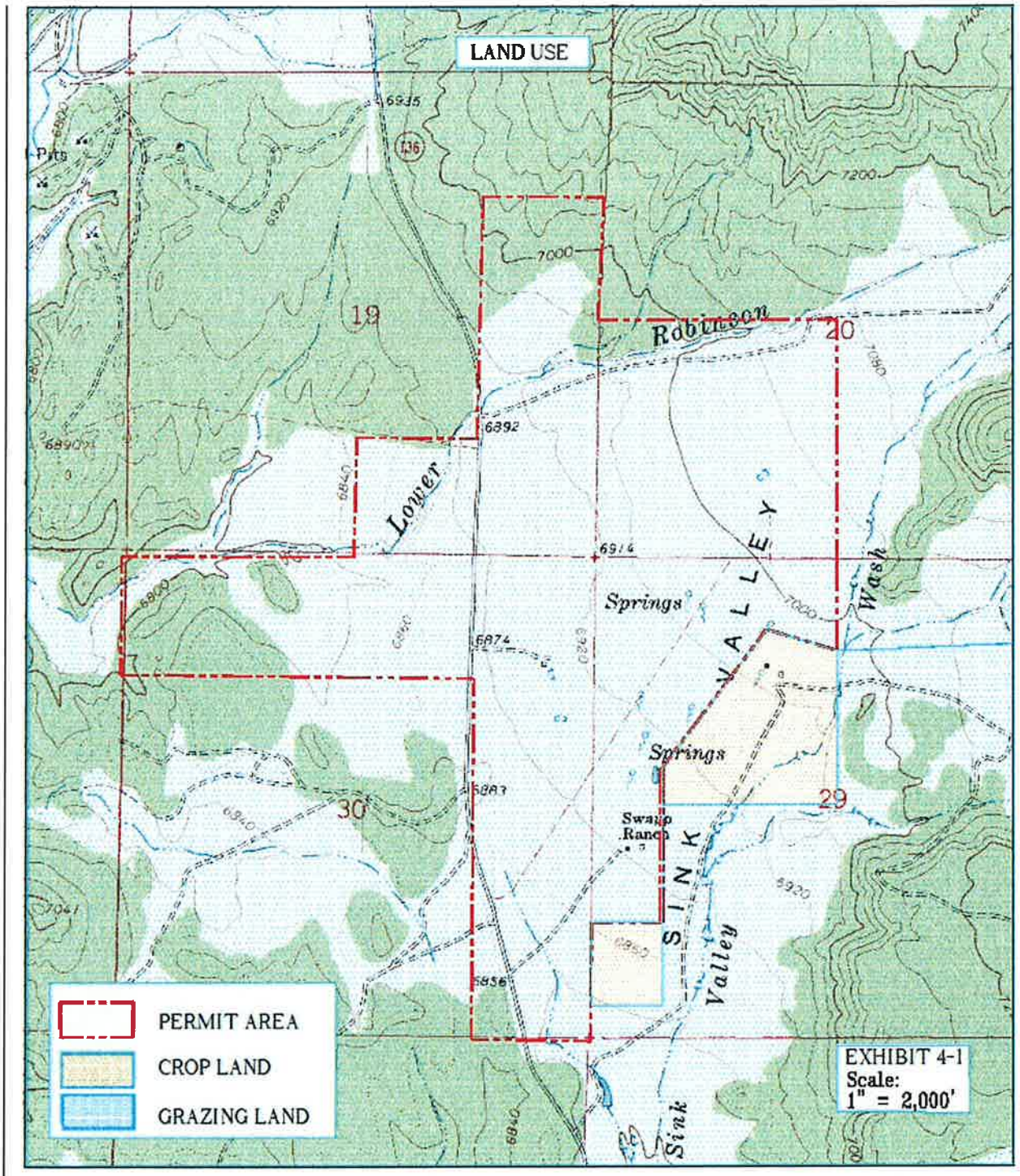
No regulations in the R645 Rules authorizes the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973 or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq.

358.400. Riparian & Wetland Areas

There are some riparian and wetland areas associated with springs and seeps in the Coal Hollow permit area (including the 85.88-acre Dame Lease IBC area) (see Chapter 7). The habitat in the vicinity of springs SP-8, SP-14, SP-20, SP-22, and SP-40, and wells C4, C2, C3, C5, and Y-61 will be protected through the use of highwall mining techniques in the 85.88-acre Dame Lease IBC. Unlike coal mining using conventional mine pit surface mining techniques (utilized elsewhere at the Coal Hollow Mine), mining using highwall mining techniques does not result in disturbance to the land surface above coal extraction areas (the coal is extracted through a series of excavated horizontal holes, with sufficient coal left in place between holes to fully support the overlying land surface). The highwall mining plan for the 85.88-acre Dame Lease IBC, including the spacing and dimensions of the excavated holes, has been engineered to prevent subsidence of the land surface. The highwall mining will occur in the Smirl coal seam, which is separated from overlying shallow alluvial groundwater systems by a thickness of soft, low-permeability Tropic Shale bedrock. The presence of the Tropic Shale bedrock between the coal seam and the overlying alluvium minimizes the potential for downward migration of alluvial groundwaters into the excavated coal holes. Accordingly, impacts to water quantity in the overlying and adjacent shallow alluvial groundwater systems are not anticipated (Appendix 7-14). Similarly, as no surface disturbance is anticipated over highwall mined areas, impacts to water quality in the overlying alluvial groundwater systems are not anticipated. For these reasons, impacts to ecosystems in and around the monitoring sites mentioned above are not anticipated and the habitat will be protected.

In the event that diminution of discharge rates from seeps and springs does occur as a consequence of mining and reclamation activities, any lost water will be replaced according to all applicable Utah State laws and regulations using the water replacement source specified in R645-301-727. The quantity and quality of replacement water detailed in R645-301-727 will be suitable for the existing premining uses and approved postmining land uses.

Additionally, the coal mining and reclamation operations at the Coal Hollow Project will avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife (see Section 333, Procedures to Minimize Adverse Impacts to Fish & Wildlife in this document).



Acreage of crop land under production:

Sorensen:	90 acres (approximate)
Johnson:	None currently
Dame:	None currently
Pugh:	None currently

411.110 Surface Land Status/Mine Plan Area

Ownership of the surface rights within and contiguous to the mine plan and permit area is shown on Drawing 1-3. The surface within the permit area is privately owned and leased by Alton Coal Development, LLC. The contiguous lands, outside the permit area, are administered by Bureau of Land Management, along with other private owners, as reflected on Drawing 1-3.

Alton Coal Development believes that the mining of the permit area will enhance the post-mining use of the land. Some gullies and rills will be eliminated. Drainages will be enhanced allowing a better use of land. Wildlife habitat will benefit from the planting and reclamation of lands for that purpose. Reclamation will be constructed to the final landform shown on Drawings 5-35 and 5-36. The alternative highwall mining will reduce surface disturbance. Mining disturbance to the surface will be reduced along with reclamation needs. Surface areas that will not be affected by any mining will remain in the existing pre-mining state.

411.120 Land Capability

The Coal Hollow Project Area has several land uses ranging from wildlife habitat to pasture land. Current vegetative cover and productivity of the plant communities in the permit area are shown in Chapter 3 (321.100 *through* 321.200). Soil resources information of the permit area is provided in Chapter 2 (222.100 *through* 222.400). Topography of the area is described in several chapters, but specifically in Chapter 6. Current hydrologic conditions of the permit and adjacent areas to the project are provided in Chapter 7.

411.130 Existing Land Uses/Land Use Classifications

Kane County has zoned the area within the permit boundaries and surrounding area as Agriculture.

411.140 Cultural and Historic Resource Information

A cultural resource inventory was conducted by Montgomery Archaeological Consultants Inc. (MOAC) in June 2005 for Alton Coal Development, LLC. The project area is located in the Sink Valley area in the Alton Amphitheater. This survey covers the entire permit area, approximately 433 acres, all of which are on private property. The additional 85.88 acres of surface, Dame Property (plot 9-5-29-2), added as part of this permit will not be impacted by operations and will not be affected by mining. See Drawing 1-3.

The inventory resulted in the documentation of one previously recorded historic/prehistoric site, five previously recorded prehistoric sites, and nine new prehistoric sites. Five eligible sites will be affected by mining operations. These five locations will require a data recovery treatment plan.

Appendix 4-1, Cultural resource inventory of Alton Coal Developments Sink Valley-Alton Amphitheater Project Area, Kane County, Utah, reflects maps, photographs, and results of the inventory.

413.300. Criteria for Alternative Postmining Land Uses

Other than improvements to the existing land described above, the land will be returned to its pre-mining conditions.

420 AIR QUALITY

421 CLEAN AIR ACT

Coal mining and reclamation operations will be conducted in compliance with the requirements for the Clean Air Act and Any other applicable Utah or Federal statutes and regulations containing air quality standards.

422 UTAH BUREAU OF AIR QUALITY

Alton Coal Development, LLC has retained JBR Environmental Consultants to prepare a Notice of Intent (NOI) for a new source at the Coal Hollow Project. The original NOI was submitted to the Utah Division of Air Quality (UDAQ) on May 8, 2007. This NOI provided an initial assessment of air emissions for the project based on the MRP prior to being determined Administratively Complete. JBR coordinated preparation of the original NOI with Tom Bradley and Jon Black of the UDAQ. In September 2008, JBR began development of a revised NOI to include air dispersion modeling. This air dispersion modeling was coordinated with Dave Prey of UDAQ. A conference call was conducted with representatives of UDAQ, JBR and Alton Coal on December 8th, 2008 to discuss modeling inputs, background emissions and preliminary modeling results. The revised NOI was submitted on April 20, 2009 . UDAQ responded to the NOI on June 23, 2009 by asking for additional information. ~~Alton Coal and JBR are currently in the process of providing the information Specific control measures proposed in the NOI are included in t~~The Fugitive Dust Control Plan ~~which~~ is provided as Appendix 4-5. ~~Upon approval of the NOI,~~Alton Coal was issued by the Executive Secretary of the Utah Air Quality Board ~~will issue an~~ Approval Order DAQE-AN0140470002-10 for a new source on November 10, 2010. After consultation Jon Black, an NOI dated August 22, 2013 was submitted to UDAQ, Alton Coal requested addition of a highwall miner to list of mobile equipment in use at the Coal Hollow Mine.

423.100- 200 AIR POLLUTION CONTROL PLAN

Production rates at the Coal Hollow Mine are expected to exceed 1,000,000 tons of coal per year. Appendix 4-5 provides a Fugitive Dust Control Plan (FDCP). This plan includes controls and monitoring measures that will be taken to minimize air pollution related specifically to fugitive dust.

424 PLAN FOR FUGITIVE DUST CONTROL PRACTICES

Proposed mining will exceed 1,000,000 tons annually. A Fugitive Dust Control Plan is provided as Appendix 4-5.

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R645-301-500

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CHAPTER 5

R645-301-500. ENGINEERING

510. INTRODUCTION.

The engineering section of the Mining and Reclamation Plan (MRP) is divided into the operation plan, reclamation plan, design criteria, and performance standards. 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.

511. GENERAL REQUIREMENTS

511.100 - 511.300. Contents

The operation and reclamation permit application includes descriptions of the coal mining and reclamation operations with attendant Drawings, plans, and cross sections. and its potential impacts to the environment as well as methods and calculations utilized to achieve compliance with design criteria.

All this information can be viewed in this section, Drawings 5-1 through 5-~~39~~ 44 and Appendices 5-1 through 5-~~5~~7.

512. CERTIFICATIONS

512.100. Cross Sections and Drawings.

All cross sections and Drawings required under applicable portions of sections 512.100 through 512.150 have been prepared by, or under the direction of, and certified by: a qualified, registered, professional engineer; a professional geologist; or a qualified, registered, professional land surveyor, with assistance from experts in related fields such as hydrology, geology and landscape architecture.

Compliance with this section has been completed and certifications are available on all cross sections and Drawings.

512.200. Plans and Engineering Designs.

All plans for excess spoil, durable rock fills, coal mine waste, impoundments, primary roads and variances from approximate original contour will be certified by a qualified registered professional engineer.

520. OPERATION PLAN.

521. GENERAL.

The proposed Coal Hollow Mine is located approximately 2.5 miles south of Alton, Utah. In order to maximize the use and conservation of the coal resource, coal will be recovered using large hydraulic excavators, ~~highwall miner or~~ , front end loaders ~~,and~~ off-road trucks, and highwall miner. Mined coal will be hauled to a central coal area for crushing and placement into a stockpile. Coal from the stockpile will be transferred into a bin and loaded into over the road trucks for transport.

The plan, with Drawings, cross sections, narrative, descriptions, and calculations indicates how the relevant requirements will be met. The lands subject to coal mining and reclamation operations over the estimated life of the operations are identified and briefly described. All appropriate information is located in the subsequent sections and Drawings 5-1 through 5-~~39~~ 44 and Appendices 5-1 through 5-~~57~~. Topsoil piles and removal sequencing is shown on Drawing 2-2.

521.100. Cross Sections and Drawings.

The application includes cross sections, Drawings and plans showing all the relevant information required by the Division. Appropriate information is provided in Drawings and cross sections 5-1 through 5-~~39~~44.

521.110. Previously Mined Areas.

Historically, there has been some underground mining of coal within the Alton Amphitheater. The following underground mines are known to have historically existed within the Amphitheater:

- Seaman Mine
- Smirl Mine
- Alton Mine
- Johnson Mine
- Silver Mine

There are not any known mines that existed or currently exist within the permit area or the adjacent area as defined in R645-100-200. There is also not any active coal mining operations in the area.

521.120. Existing Surface and Subsurface Facilities and Features.

521.121. Buildings

The location of all buildings in and within 1,000 feet of the proposed permit area, with identification of the current use of the buildings is shown on Drawings 1-5 and 1-6.

521.122. Surface and Subsurface Man-Made Features

The only known surface and subsurface manmade features that exist within the permit area are:

- County Road 136 (location shown on Drawing 5-3)
- Water pipeline to Pond 20-1 (location shown on Drawing 7-7)

521.123. Public Roads

One Class B public road, Kane County Road 136 (K3900) is located in or within 100 feet of the proposed permit area and is shown on Drawing 5-3. This road will be temporarily relocated outside the permit area until mining is complete and then reconstructed. In addition, Kane County has recently made a claim on the two-track road located adjacent to Lower Robinson Creek which is also located within the permit boundary. This road has mostly been closed to the public since it crosses private land and ACD has worked with Kane County to develop an access agreement which includes access through the permit area by mine personnel escort only. This agreement is included as Appendix 1-8 in Chapter 1. The County has named this Class D public road K3993.

The details for reestablishing road K3900 is shown on Drawings 5-22E, 5-22F and 5-22H. The details related to reestablishing K3993 following mining is shown on Drawing 5-22C.

521.124. Existing areas of spoil, waste, coal development waste, and noncoal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities.

There ~~is one~~are three impoundment~~st~~ currently located within the permit area which ~~is~~ are Pond 20-1, Pond 29-3 and Pond 29-5 shown on Drawing 7-7. The area of ~~this~~ these impoundment ~~is~~ are approximately 3,400 , 10,500 and 6963square feet respectively.

There no other areas of existing spoils, waste, coal development waste, and noncoal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities within the permit area.

521.125. Ponds and Other Impoundments

The MRP does not contemplate construction of any permanent water impoundments; coal processing waste banks and coal processing waste dams or embankments. The planned location of each sedimentation pond is shown on Drawing 5-3.

521.130. Landowners and Right of Entry and Public Interest Drawings.

All boundaries of lands and the names of present owners of record of both surface and subsurface within the Mine Permit Area are shown on Drawing 1-3 (Surface) and Drawing 1-4 (Subsurface).

521.132. Permit Boundary

The boundaries of land within the proposed permit area are shown on all applicable Drawings.

521.133. Public Roads

No mining or reclamation operations are planned within 100 ft. of a public road. However mine vehicles may cross the right-of-way of Kane County Road #136 for a short period early in the operation's life. Appropriate measures, including signage and mine operating practices and training will be implemented to protect the public.

521.133.2 Relocating a Public Road:

The design of any relocated road will be approved by Kane County authorities, or such other authorities as have jurisdiction. Appropriate measures will be taken to prevent entrance into the mining area via the pre-existing road, and appropriate signage and barriers will be installed to protect the public.

521.140. Mine Drawings and Permit Area Drawings.

521.141 The boundaries of all areas proposed to be affected over the estimated total life of the coal mining and reclamation operations, with a description of size, sequence and timing of the mining, the coal mining and reclamation operations to be conducted, the lands to be affected throughout the operation, and changes in facilities or features to be caused by the proposed operations;

These items are depicted on Drawings 5-1 through 5-~~38~~44.

Two options are provided for final reclamation of the permit area. The Preferred option is shown on Drawings 5-35 and 5-36. The anticipated time schedule for this option is shown on Drawing 5-38. This option includes mining operations transitioning into the adjacent federal coal reserves. In the case that these reserves are not acquired by ACD, an alternative plan is provided in Drawing 5-37 and 5-37A which requires rehandling much of the fill above original contour to fill in the final pits.

If a circumstance occurs where mining of the permit area is complete and ACD has acquired the federal lease but permit approval has not yet been acquired to continue mining in the federal coal reserves; ACD requests that the Division consider a temporary cessation of operations at that time rather than requiring implementation of the alternate reclamation scenario. This temporary cessation could be granted for a sufficient period of time to allow ACD to acquire approval for transitioning mining operations into the adjacent federal coal reserves. The Division does have the authority to grant such an allowance based on R645-301-515.300. Should the alternative reclamation scenario be implemented prematurely, reclamation along the western side and south end of the permit area will either be excavated to recover coal or these coal reserves beneath and adjacent to the reclamation will be unrecoverable. Also, an additional excess spoil structure will have be constructed for the boxcut for the federal reserves. A detailed description of the two reclamation scenarios and how each scenario would apply is provided in Section 528.200 Overburden and 553 Backfilling and Grading of this Chapter.

If ACD does not acquire the federal coal lease by the time that the final pit is complete, ACD will then immediately transition the reclamation plan to the alternative scenario.

Additionally, two options are provided for surface mining of the permit area. The Preferred option is shown on Drawings 5-2, 5-9, 5-10, and 5-16. The anticipated time schedule for this option is shown on Drawing 5-38. This option shows coal recovery through traditional open pit operations with coal being recovered by hydraulic excavators or loader and off-road trucks. In the case that ACD acquires a highwall mining system, an optional plan is provided in Drawing 5-2A, 5-9A, 5-10A and 5-16A. The estimated time schedule for this option is shown on Drawing 5-38A. This option shows coal recovery through traditional open pit operations with coal being recovered by a highwall mining system, loader and off-road trucks. Under this option surface disturbance will be considerably less.

The optional plan is provided with the anticipation that a highwall mining system will be employed. The stage at which it begins will be determined by the arrival date of the highwall miner and conditions favorable to highwall mining.

521.143 The proposed disposal sites for placing excess spoil generated at surface areas affected by surface operations and facilities for the purposes COAL MINING and RECLAMATION ACTIVITIES according to:

- *R645-301-211: The applicant will present a description of the premining soil resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be separately removed and segregated from other material.*

  The soil resources for the proposed excess spoil disposal area are described in Appendix 2-1. A plan has been developed for removal of topsoil and suitable

521.150. Land Surface Configuration Drawings.

Surface contours representing the existing land surface configuration of the proposed permit area are shown on Drawing 5-1 and the post mining land configuration is shown on 5-35. Cross sections with both these landforms are shown on Drawing 5-36.

521.160. Maps and Cross sections of the Proposed Features for the Proposed Permit Area. These maps and cross sections will clearly show:

521.161 Buildings, utility corridors, and facilities to be used:

These items are shown on Drawings 5-3 through 5-8C.

521.162 The area of land to be affected within the proposed permit area, according to the sequence of mining and reclamation:

A yearly and overall disturbance sequence for the permit area is provided on Drawing 5-2 for open pit mining and on Drawing 5-2A for the alternative method of highwall mining.

521.163 Each area of land for which a performance bond or other equivalent guarantee will be posted under R645-301-512;

The area of land that will have a performance bond posted is shown on Drawing 5-3.

521.164 Each coal storage, cleaning and loading area. The map will be prepared and certified according to R645-301-512;

These facilities can be viewed on Drawings 5-3 through 5-5.

521.165 Each topsoil, spoil, coal preparation waste, underground development waste, and noncoal waste storage area. The maps will be prepared and certified according to R645-301-512;

Topsoil storage areas and handling can be viewed on Drawing 2-2. Spoil placement and the excess spoil structure can be viewed on Drawings 5-3, 5-17, 5-18, 5-19, 5-35 and 5-36.

521.166 Each source of waste and each waste disposal area relating to coal processing or pollution control;

Only sizing of the coal is proposed. This process will not produce any waste.

521.167 Each explosive storage and handling facility;

Need for these facilities are not anticipated at this time. Should these facilities become necessary, appropriate drawings will be provided to the Division.

522. **COAL RECOVERY.**

The MRP is designed to maximize recovery of the coal resource within technological, safety and legal limitations. Coal will be recovered from the Smirl Seam which ranges in thickness from 13.5 to 18.5 feet averaging approximately 16 feet in the planned mining area. The Smirl Seam is the only surface mineable seam in the permit area. Isopach maps of the coal thickness and strip ratio can be viewed on Drawings 5-13 and 5-14

Some coal along the boundaries of the mine area will not be recovered in conjunction with the proposed operation. This includes coal underlying the pit highwalls and areas where drainage or sedimentation control structures (diversions, ditches, ponds, etc) are located. The mine is designed to minimize such losses by locating haulage ramps in the spoil rather than on the pit wall, by oversteepening the coal face at the pit edges, and by minimizing the use of out of pit ancillary roads. Coal which is left in place in these areas may be recovered in the future when adjacent property rights are secured. Current plans are for a planned maximum mining depth of approximately 200 ft. and a strip ratio of 10:1; however, the ultimate mining depth will depend on cost related factors.

A detailed mine plan has been developed for the proposed permit area and the following table along with Drawing 5-9 summarize the coal extraction for the permit area for open pit mining.

Description	Extraction Status	Average Coal Thickness (ft)	Average Strip Ratio* (yd^3/Ton)	Quantity (**Ton)
Total Coal within Permit Boundary	N/A	16.3	7.7	~~9,159,000~~ 12,092,000
High Strip Ratio Area (NE corner of permit area)	Not Mined	16.~~5~~0	13.5	~~2,764,000~~ 4,268,000
Coal under highwalls and sedimentation structures	Not Mined	17.2	4.8	~~1,582,000~~ 3,011,000
Coal under Robinson Creek Diversion	Not Mined	15.5	3.9	172,000
Recoverable Coal	Mined	16.3	6.4	4,641,000

*All strip ratios are bank cubic yards of overburden to tons of coal
**All coal tons are based on a 95% recovery factor

A detailed mine plan has been developed for the proposed permit area and the following table along with Drawing 5-9A summarize the coal extraction for the permit area for the alternate option, highwall mining:

Description	Extraction Status	Average Coal Thickness (ft)	Average Strip Ratio* (yd^3/Ton)	Quantity (**Ton)
Total Coal within Permit Boundary	N/A	16.3	7.7	12,092,000
High Strip Ratio Area (NE	Not Mined	16.0	13.5	4,268,000

corner of permit area)				
Coal under highwalls and sedimentation structures	Not Mined	17.2	4.8	900,000
Coal under Robinson Creek Diversion	Not Mined	15.5	3.9	172,000
Recoverable Coal	Mined	16.3	6.4	4,471,000

*All strip ratios are bank cubic yards of overburden to tons of coal
**All coal tons are based on a 95% recovery factor for ~~conventional surface~~ open pit mining and 45% for highwall mining

Once approval is received to progress with mining on the adjacent federal coal reserves, an additional 57% of the coal under the highwalls will be recovered as part of the progression into these adjacent reserves.

With ~~the preferred option~~open pit mining, ~~T~~the application of highly flexible, open pit truck/shovel techniques will minimize losses of coal due to pit geometry or spoil support requirements, allowing the maximum possible exposure of the coal resource. The full seam section will be loaded primarily using large hydraulic backhoes. The backhoes, which can work from the top of the seam, provide the ability to efficiently and cleanly excavate the lower part of the coal seam without disturbing the pit floor. This, along with the machine's high degree of bucket horizon control will minimize floor losses. The backhoes can also work safely from the top of the seam to oversteepen the loading face along the pit walls, thus recovering the maximum amount of coal.

Where pit geometry or operational factors preclude the use of backhoes for loading, a large rubber tire front end loader will be used. These machines provide similar horizon control, can operate on the floor of the pit or on an intermediate bench, and can recover coal from confined areas such as the ends of the pits.

With the alternative option, the application of a highwall mining system will be employed to recover coal from the exposed face. In this method of mining, an unmanned cutter module is driven underground and operated in front of the highwall. The highwall mining machine stands on the pit floor or on a bench, directly in front of the exposed seam and makes long parallel rectangular drives into the coal seam. A remote-operated cutter module is pushed into the seam by a string of push beams (unmanned coal-conveying elements) that transport the mined coal back to the entry of the drive onto a stockpile.

Rear dump haul trucks, loaded by the backhoes or front end loader, will be used to move the coal from the pit via inpit roads and the primary haulroad to the crusher and stockpile. The trucks will be equipped with "combo" beds suitable for hauling both coal and overburden, and configured to minimize coal spillage.

A net recovery of 95% (including the effects of in-pit coal losses and out-of-seam dilution) of the coal exposed in the open pit is anticipated. A net recovery of 45% of the coal mined by the alternative highwall system is anticipated. Normal coal losses are expected due to cleaning of the top of the seam, loading losses at the seam floor, and coal oxidation near the outcrop.

No coal washing is contemplated at this time, thus there will be no coal processing losses.

Maps and cross sections providing detailed information related to coal recovery activities can be viewed on Drawings 5-9 through 5-14.

523. MINING METHOD(s).

The Coal Hollow Mine will be a surface coal mining operation using open pit mining methods to produce up to 2 million tons of coal per year. Primary mining equipment will include hydraulic excavators, a highwall miner and end-dump mining trucks. The coal will be crushed at the mine site, and hauled to market in over-the-road coal trucks.

The mine is planned to produce approximately 4.64 million tons of coal over a life of approximately 6 years for the preferred option and approximately 4.2 million tons of coal over a life of approximately 7 years for the alternate option. The estimated production schedule is summarized below for the two options:

Preferred option		
		Tons Produced
Year		(000)
1		542
2		505
3		750
4		1,000
5		1,000
6		844
Total		4,641

Alternative option		
		Tons Produced
Year		(000)
1		542
2		505
3		567
4		792
5		789
6		802
7		153
Total		4,150

Initial mine development will involve removal and storage of topsoil from mine infrastructure locations. Facilities for equipment maintenance/warehouse, coal handling, and offices will be constructed. During the development and initial mining period,

facilities temporary in nature may be used until permanent facilities can be built. Construction of sedimentation ponds, diversion ditches, and mine roads accessing the initial mining areas will also be ongoing.

Mining will employ typical open pit methods using truck/loader type equipment to remove overburden and recover the coal. Mining will advance across the property in successive cuts approximately 250 ft. in width and 800 to 1,300 ft. long (generally equal to the width of the property less property barriers). Layout of these pits can be viewed on Drawing 5-10. The overburden will be removed in layers or lifts approximately 20 to 40 feet deep. In practice, these overburden lifts are mined in a stairstep fashion ahead of the coal removal operation to provide adequate working room for the equipment and stable advancing slopes. Once mining is complete, excavated overburden (spoil) from a successive cut is used to backfill the excavation. General cross sections of this process can be viewed on Drawings 5-11 and 5-12.

Prior to beginning mining, the area will be cleared of vegetation, and the topsoil will be recovered and either stockpiled or live hauled to regraded areas. It is not anticipated that blasting of the overburden will be necessary based on drilling data. Should this process become necessary, this is the phase where it would be implemented. Overburden will then be removed using large hydraulic excavator(s) or front end loaders and off-road trucks which will haul the spoil and place it in parts of the pit where the coal has been removed, or in the excess spoil area shown on Drawings 5-3, 5-35 and 5-36. Overburden is removed in successively deeper benches until the coal seam is exposed. Some overburden in lower lifts may be moved by direct dozing into the mined out pit by large bulldozers.

When overburden removal is finished in a particular pit, the top of the coal will be cleaned (removal of any roof rock or other non-coal material on top of the seam) using a motor grader, dozer or front end loader. The material removed will be placed in the adjacent mined out pit. For the open pit mined coal, ~~I~~if necessary, the coal seam will be loosened by drilling and blasting or ripping prior to loading. Drilling and blasting of the coal is not expected to be necessary. The cleaned, exposed coal is then excavated by backhoe or front end loader and placed into off-road rear dump trucks. Coal mined with a highwall miner would not require blasting.

Once the coal is removed, the pit will be backfilled by spoil from adjacent mine pits. Spoil will be placed in lifts and spread with a dozer. Once the pit is backfilled to the planned final surface contour, suitable topsoil and subsoil will be replaced, and the area reseeded. Revegetation work will proceed seasonally as appropriate for planting.

Overburden excavation and coal mining at Coal Hollow will begin near the subcrop of the coal seam at the western end of the permit area in the NW ¼ NE ¼ of Section 30, T39S, R5W. Topsoil will be removed and stored separately in topsoil stockpiles as shown on Map 2-2. Overburden from the initial pits will be hauled to the excess spoil pile east of the mining area. Once the initial pits are established, as much spoil as possible will be placed directly in the pit backfill, allowing reclamation to closely follow mining. This

initial phase includes pits 1 through 8 as shown on Drawing 5-10. The mining and reclamation process for this phase can be viewed on Drawing 5-17.

From the initial mining area, operations will proceed eastward through the NE ¼ of Section 30 to the NW ¼ of Section 29 (as shown on Drawing 5-10) and from the southeast ¼ of Section 30, beginning with pit 28 and proceeding north. The mining and reclamation process for this phase can be viewed on Drawing 5-18. As shown on Drawing 5-19, the final pits, pit 17 through 21, will not be backfilled at this stage. The proposed method for filling these pits back to approximate original contour will be accomplished by utilizing overburden from the pit(s) in the adjacent federal reserves located immediately west of this area. Alton Coal Development, LLC is currently in the process of an Environmental Impact Study for these reserves with the intent of acquiring the rights to mine. It is expected that these rights will be acquired prior to the completion of the final phase in the proposed Permit Area. The final landform for the Permit Area is shown on Drawings 5-35 and 5-36.

In the case that Alton Coal Development, LLC is not successful with acquiring the rights to the adjacent federal coal reserves, spoil will be rehandled from the excess spoil and variance from the approximate original contour to fill the remaining pits. The final landform for this alternate scenario is shown on Drawing 5-37 and 5-37A.

An estimate of the primary mining equipment planned for use at the Coal Hollow Mine is listed below:

Diesel - Hydraulic Excavators (15 to 38 cu. yd. capacity)
Highwall Mining System (CAT HW300 or equivalent).
Rubber Tired Front End Loaders (8 to 20 cu. yd. capacity)
End Dump Trucks (100 to 240 ton capacity class)
Track Dozers (Caterpillar D7 through D11 Class)
Motor Graders (Caterpillar 16H to 24H Class)
Water Trucks (8,000 to 20,000 Gallon Class)

A variety of other equipment will also be used to support the mining operation.

Proposed engineering techniques for meeting the proposed mining methods will include:

- Design support for roads, pits, sediment impoundments etc…
- Field staking of designs utilizing high precision GPS survey systems.
- Weekly field engineering support to view and provide guidance related to designs and environmental controls.
- Ongoing geotechnical support for ensuring highwall stability
- As additional information becomes available, update geological models to ensure full recovery of resource.
- Weekly mine plans that specify appropriate engineering and environmental specifications.

If required, a record of seismographic and airblast information will include: type of instrument, sensitivity, and calibration signal or certification of annual calibration; exact location of instrument and the date, time, and distance from the blast; name of the person and firm analyzing the seismographic record; and the vibration and/or airblast level recorded; and the reasons and conditions for each unscheduled blast.

524.800 Use of Explosives:

Alton Coal Development LLC will comply with all appropriate Utah and federal laws and regulations in the use of explosives.

525. SUBSIDENCE CONTROL PLAN

Highwall mining or Auger mining, as defined in the definitions in R645-100-200 is Surface Mining, thus Underground regulations do not apply. Therefore, highwall mining in this plan have been addressed using the regulations contained in R645-302-240, Special Categories of Mining. The alternate highwall option has limited extraction with no subsidence. Refer to Appendix 5-8 (Feasibility of highwall mining the Smirl seam) for geotechnical and design information. Do to the design and mining method of highwall mining in this plan, no subsidence is projected and no monitoring is planned. Appendix 1-2 Right of Entry, Exhibit 5 contains the New Dame Lease. In this document, under Article 7 Section 7.03, provisions have been made if there is material damage as a result of subsidence.

526. **MINE FACILITIES**:

526.110-115 Existing Structures.

There are no existing structures within the permit area.

526.116. Public Roads:

526.116.1. Operations Within 100 ft. of a Public Road

Initial mining operations at the Coal Hollow Mine will be on the western edge of the property, and will require rerouting Kane County Road #136 (K3900) so that operations do not come within 100 feet of this road. During the initial development phase (topsoil removal, diversion construction, etc..), equipment traffic may cross the county road right-of-way to access the necessary area. see Drawing 5-3. Details related to the road relocation and reestablishment can be viewed on Drawings 5-3, 5-22E, 5-22F, 5-22H and in Appendix 1-7.

Also, mining begins with Pit 28 and proceeds alternately with Pits 9-13, north to Pit 23. The isopach shows that Pits 28 -23 have a relatively low strip ratio, approximately 4.2:1 increasing to 4.9:1 respectively. Overburden from Pit 28 will all be hauled to the excess spoil structure, with overburden from the successive pits to north back filling the previously mined. In this stage, the fill above original contour is approximately 3.0 million LCY. Drawing 5-18 (Phase 2) shows the details of this stage of the overburden removal and resulting landform.

Phase 3 overburden removal begins in Pit 14 and proceeds alternately with Pit 22 coming from the south to meet at Pit 18, the last pit to be mined. During this stage, the strip ratio reduces significantly from Phase 2 as mining progresses to Pit 18. As the strip ratio reduces to the south, significant backfill capacity is available in the preceding pits. This results in the distance between the backfill and the active coal face increasing. At the end of mining, an area will not be completely backfilled that is approximately 1,600 feet in length and 875feet wide and will require 3.3 million yards of fill to complete reclamation to approximate original contour. The backfill configuration at the end of this stage is shown in Drawing 5-19.

The proposed plan for backfilling these final pits includes acquiring the right to mine the adjacent federal coal reserves, located immediately west of this area. This plan provides an efficient method for transitioning operations into the federal reserves. At the time that this transition occurs, overburden will be removed from the federal reserves and placed in the final pits to approximate original contour. This final landform can be viewed on Drawing 5-35 and 5-36.

In the case that Alton Coal Development is not successful with acquiring the adjacent federal coal reserves, all the fill above approximate original contour and part of the excess spoil structure will be rehandled and placed back in the remaining backfill area. The final landform for this scenario is shown on Drawing 5-37. This step requires rehandle of approximately 3.3 million yards of spoil.

If the alternative highwall mining is selected, it is anticipated when pit 26 is completed, Highwall Trench 1 (HWT1) will be excavated. Dependent upon the arrival of the highwall machine, another option would be to utilize it in an active pit, for example Pit 9 is currently active with an exposed highwall. Highwalling would begin from this pit and surface disturbance of the successive pit (pits 10-15 going east) would not occur. Otherwise, the mining process, is for coal to be removed from the area of excavation. At this point a highwall miner is brought in. In this method of mining, an unmanned cutter module is driven underground and operated in front of the highwall. The highwall mining machine stands on the pit floor or on a bench, directly in front of the exposed seam and makes long parallel rectangular drives into the coal seam. A remote-operated cutter module is pushed into the seam by a string of push beams (unmanned coal-conveying elements) that transport the mined coal back to the entry of the drive onto a stockpile. Coal is then removed to the sizing/loading area. The miner is moved along the face making successive pushes into the coal face. Once coal is removed from the

southern panels of a Highwall Trench, overburden from excavation of the next Highwall Trench is used to backfilled the mined out area continuing with the progression of the trench.

The anticipated coal removal sequence for the Highwall mining is shown on drawing 5-10A or 5-10B if Pit 9 is the location selected for beginning highwall mining. Depending on the approval of the alternative and the delivery of the highwall miner, the highwall miner could be deployed on an exposed coal face. As is depicted, each Highwall Trench consists of Panels, each panel consisting of 10 holes. The spacing between the holes and the spacing between the panels are dictated by the amount of overburden over the panels. The alternate Highwall mining is designed such that subsidence does not occur to the surface with nonyieldable webs and barriers. Specific information concerning these design are found in Appendix 5-8. Highwall mining will have only the disturbance associated with the trench for placement of the highwall miner and will have no impact on the surface above the highwall panels.

The following tables show the material balance during the different phases of overburden removal for each scenario:

Preferred Scenario (Adjacent Federal Reserves Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Federal)	3,300,000	3,300,000	0	5,782,000
Total	40,035,000	34,253,000	5,782,000	5,782,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

Alternate Scenario (Adjacent Federal Reserves Not Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Rehandle)	0	3,300,000	-3,300,000	2,482,000
Total	36,735,000	34,452,000	2,482,000	2,482,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

Alternative Scenario (Highwall mining)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	7,381,000	7,277,000	104,000	2,845,000
3	5,257,000	5,257,000	0	2,845,000
4 (Federal)	3,300,000	3,300,000	0	2,845,000
Total	23,874,000	21,029,000	2,845,000	2,845,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

The Preferred scenario for overburden removal will minimize overall disturbance and maximize resource recovery by providing a transition into the adjacent federal reserves with minimal effect to existing reclamation and backfill in the Permit Area. This scenario will also minimize variances from approximate original contour on the federal lands by eliminating the need for an excess spoil structure from the initial boxcut once operations are transitioned into these reserves.

During the course of mining, some additional excavated overburden may be placed temporarily on mined over and backfilled areas due to operational considerations. This material will be re-excavated and moved to it's final placement location as operations allow.

All maps related to the overburden removal process can be viewed on Drawings 5-15 through 5-19.

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

528.310. Excess Spoil. Excess spoil will be placed in designated disposal areas within the permit areas, in a controllable manner to ensure mass stability and prevent mass movement during and after construction. Excess spoil will meet the design criteria of R645-301-535. For the purposes of SURFACE COAL MINING AND RECLAMATION ACTIVITIES, the permit application must include a description of the proposed disposal site and the design of the spoil disposal structures according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.100, R645-301-745.300, and R645-301-745.400.

Excess spoil will be placed in the area designated on Drawing 5-3 and 5-35. This fill will be placed in lifts not to exceed 4 feet in thickness. The material will be transported from the overburden removal area to the fill by end dump haul trucks and a dozer(s) will spread the spoil to this lift thickness. The fill will meet at minimum 85% compaction as related to the standard Procter. Final slopes will be

528.400. Dams, embankments and other impoundments.

Plans do not include using dams, embankments or other impoundments for disposal of coal, overburden, excess spoil or coal mine waste

529. **MANAGEMENT OF MINE OPENINGS.**

Alternative highwall mining will produce openings (holes) in the coal at the bottom of trenches specifically constructed for highwall mining. Trench depth to the holes range from 60 feet to 200 feet. After highwall mining is completed in a given trench, that trench will be completely backfilled, burying any openings made by highwall mining.

All wells will be managed to comply with R645-301-748 and R645-301-765. Water monitoring wells will be managed on a temporary basis according to R645-301-738.

Wells constructed for monitoring groundwater conditions in the proposed Coal Hollow Mine permit and adjacent area, including exploration holes and boreholes used for water wells or monitoring wells, will be designed to prevent contamination of groundwater and surface-water resources and to protect the hydrologic balance. A diagram depicting typical monitoring well construction methods is shown in Drawing 7-11. Monitoring wells will include a protective hydraulic seal immediately above the screened interval, an annular seal plugging the borehole above the hydraulic seal to near the ground surface, and a concrete surface seal extending from the top of the hydraulic seal to the ground surface which is sloped away from the well casing to prevent the entrance of surface flows into the borehole area. Well casings will protrude above the ground surface a sufficient height so as to minimize the potential for the entrance of surface water or other material into the well. A steel surface protector with a locking cover will be installed at monitoring wells to prevent access by unauthorized personnel. Where there is potential for damage to monitoring wells, the wells will be protected through the use of barricades, fences, or other protective devices. These protective devices will be periodically inspected and maintained in good operating conditions. Monitoring wells will be locked in a closed position between uses.

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State

530 OPERATIONAL DESIGN CRITERIA AND PLANS:

531 GENERAL:

There are five sediment impoundments proposed for the permit area. These structures will be constructed using a combination of dozers and backhoes. The structures have been designed to contain the required storm events as specified in Appendix 5-2. The structures will have sediment removed as necessary to ensure the required capacities. Details for these structures can be viewed on Drawings 5-25, 5-26 and 5-28 through 5-32. Calculations and supporting text can be viewed in Appendix 5-2.

There are no other coal processing waste banks, dams or embankments proposed within the permit area.

Underground mining has not occurred within the permit area.

532 SEDIMENT CONTROL:

Four diversion ditches along with five sediment impoundments are proposed for the permit area. In addition, miscellaneous controls such as silt fence and berms are also proposed for specific areas. The proposed locations for these structures are shown on Drawing 5-3. Details associated with these structures can be viewed on Drawings 5-25 through 5-34 and Appendix 5-2.

Mulch will be placed on the seedbed surface once soil amendments have been incorporated and seeding has been accomplished in areas that will be reclaimed to native plant communities. The mulch should control erosion by wind and water, decrease evaporation and seed predation, and increase survivability of the seeded species. Like the seeding methods, mulch will be applied with a variety of techniques and materials depending on the reclaimed area.

532.100 Disturbed Area:

The smallest practicable area, consistent with reasonable and safe mine operational practices will be disturbed at any one time during the mining operation and reclamation phases. This will be accomplished through progressive backfilling, grading, and prompt revegetation of disturbed areas. An estimated reclamation schedule is shown on Drawing 5-38 or 5-38A for alternative mining.

532.200 Backfill Stabilization:

The backfilled material will be stabilized by grading to promote a reduction of the rate and volume of runoff in accordance with the applicable requirements. The excess spoil and fill above approximate original contour will be graded to a maximum angle 3h:1v slope and revegetated to minimize erosion. This area is designed with concave slopes

Generally, mined areas will be backfilled and graded within approximately 180 days following coal removal, or 1,500 feet of the active coal removal face. One exception to this standard is during mining and backfilling of the final pits in the south end of the permit area. During this phase of mining, backfilling will follow approximately 2,000 feet from the active coal face. A detailed description of the reason for this variation are fully described in section 528 (Overburden) and the major steps can be viewed on Drawings 5-17 through 5-19. Areas needed for in-pit roads, ramps, drainage controls or areas which must be left open temporarily for operational reasons will be backfilled and graded when they are no longer needed. The rate of backfilling will depend on the availability of mined out pit areas for backfilling, and the rate of production at the mine. Based on anticipated production rates, Drawing 5-38,-or Drawing 5-38a if the alternative highwall mining is selected, provides an estimated sequence and timing for reclamation.

Topsoil will be replaced on the graded areas as soon as operationally practicable. This work will depend on weather and soil conditions in the removal and replacement areas, but is generally anticipated to occur within 90 days of completion of regrading.

Revegetation activities will be seasonal in nature. As currently planned, initial seeding will occur at the first planting opportunity following replacement of topsoil. Supplemental seeding may be done subsequently as needed.

Some delay is unavoidable in reclamation of the initial mining areas due to the time required to establish the initial working pit and backfill area, and to achieve a steady state excavation/backfill operation. As currently planned the initial mining areas will be backfilled to the planned post mining contour, graded, and the topsoil replaced by late in the first year or in the first half of the second year of mining. Reclamation activities will proceed at the regular planned rate thereafter. Proposed final reclamation contours and cross sections can be viewed on Drawings 5-35 and 5-36.

The sequence and timing of reclamation activities is dependent on the coal production rate. Should that rate differ significantly from the current plan, the reclamation schedule will also vary.

Final reclamation includes the following:

- Backfilling and Grading. Backfilling of all final pits will commence at the conclusion of coal production. All highwalls, spoil piles, and depressions will be removed, except that small depressions may be constructed if they are needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation. No permanent final pit impoundments are currently planned. The excess spoil structure will remain. All exposed coal seams, and acidic or toxic-forming strata will be covered with at least five feet of noncombustible material.
- Topsoil and Subsoil Replacement. 8 inches of topsoil underlain by 40 inches of subsoil will be placed on the backfilled pits and excess spoil. Other disturbed areas will have topsoil replaced (including facilities sites, roads etc.).

- Removal of Structures. Before abandoning the permit area or seeking bond release, all structures not needed for the approved post mining land use will be removed and reclaimed. The Lower Robinson Creek diversion is proposed to be temporary. Material from the coal stockpile base area and other areas where coal spillage may accumulate will be excavated and placed in a controlled manner in the final pit and covered with noncombustible material to prevent sustained combustion. The only structure planned to exist postmining is the water well with details shown in Drawing 5-8C and location shown on 5-3, 5-35 and 5-37.

- Removal of Roads. Roads not retained for use under an approved postmining land use will be reclaimed immediately after they are no longer needed for mining and reclamation operations. Roads that are not listed as postmining roads in this section, will be closed to traffic; and all bridges and culverts removed. Prior to reclamation, surface material that is incompatible with the postmining land use and revegetation requirements will be removed from the roads and properly disposed of at the mine site. The roadbeds will be scarified or ripped to break up the surface. Topsoil will be replaced on the roadbed and the surface revegetated in accordance with the standards set forth in R645.

  Roads that will remain postmining are the following:
  - Road to Water Well with details shown on Drawing 5-22D
  - Road to east C. Burton Pugh property (K3993) with details shown on Drawing 5-22C
  - County Road 136 (K3900) with details on Drawing 5-22E, 5-22F and 5-22G. This County road will be reconstructed within the permit area by Kane County. This reconstruction will occur concurrently with the final stage of reclamation as scheduled on Drawing 5-38 and is expected to be completed by 2017.
  - Road to Swapp Ranch (same specification as the Water Well Road)

  The location of these roads is shown on Drawings 5-35 and 5-37 along with the post mining topography.

- Removal of Water Control Structures. All sedimentation control structures, including ditches, berms and sedimentation ponds not retained as part of the approved post-mining land use will be removed, the areas regraded, topsoiled, and revegetated. All water control structures will be removed at final reclamation.

Final pit backfilling, removal of buildings, roads and other facilities, along with replacement of topsoil is expected to require approximately 15 months after the last coal is removed. In the alternate reclamation scenario (Drawing 5-37), the bulk of this period will be required to backfill the final pits.

542.700. Final Abandonment of Mine Openings and Disposal Areas.

Final abandonment of alternative mined highwall panels will be at the time when completed panels are backfilled as described in Section 529.

A preliminary estimate of reclamation costs is included in Appendix 8-1. This estimate is based upon the proposed plan of open pit mining. The cost for the alternative plan of highwall mining will be considerably less because of reduced surface disturbance with this mining operation. Therefore the cost estimate will remain based on the proposed plan of open pit mining. A final bond estimate will be provided by the applicant to the Division upon completion of the approved permit and reclamation plan.

550. RECLAMATION DESIGN CRITERIA AND PLANS

551. SEALING AND CASING OF UNDERGROUND OPENINGS

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State of Utah, Division of Water Rights or other applicable state regulations. Abandonment of wells will be performed by a licensed water well driller. The wells to be abandoned will be completely filled using neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout, or other materials approved by the Utah State Engineer's office. Alternatively, the well may be abandoned using a different procedure upon approval from the Utah State Engineer's office.

Abandonment materials will be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the State Engineer by the responsible licensed driller giving data related to the abandonment of the well. This shall include the name of the licensed driller or other person(s) performing abandonment procedures, name of well owner at the time of abandonment, the address or location of the well by section, township, and range, abandonment materials and equipment used, water right or file number covering the well, the final disposition of the well, and the date of completion.

At the time that the transition occurs into the federal reserves, overburden will be removed from the federal reserves and placed in the final pits to approximate original contour. This final landform can be viewed on Drawings 5-35 and 5-36.

The following is an overburden and backfill balance for this scenario:

Preferred Scenario (Adjacent Federal Reserves Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Federal)	3,300,000	3,300,000	0	5,782,000
Total	43,535,000	34,453,000	5,782,000	5,782,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

In the case that Alton Coal Development is not successful with acquiring the adjacent federal coal reserves, an alternate scenario has been developed. The Alternate scenario requires that all fill above approximate original contour and part of the excess spoil structure will be rehandled and placed in the remaining backfill area. The final landform for this scenario is shown on Drawing 5-37. This step requires rehandle of approximately 3.3 million yards of spoil. In this scenario, reclamation of the project area will be significantly delayed and the transition into adjacent federal coal reserves at a later date will disturb additional backfill along the west permit boundary approximately 2,000 feet in length by 230 feet wide (10 acres). An additional excess spoil structure would then need to be constructed on the federal lands to place spoil from the initial boxcut. Part of the excess spoil would likely be material removed from the Permit Area to access the coal beneath the Permit Area highwalls and provide the proper layback of the backfill material along the Permit boundary.

If the alternative highwall mining is selected, it is anticipated when pit 26 is completed, Highwall Trench 1 (HWT1) will be excavated. Coal is removed from the area of excavation. At this point a highwall miner is brought in. In this method of mining, an unmanned cutter module is driven underground and operated in front of the highwall. The highwall mining machine stands on the pit floor or on a bench, directly in front of the exposed seam and makes long parallel rectangular drives into the coal seam. A remote-operated cutter module is pushed into the seam by a string of push beams (unmanned coal-conveying elements) that transport the mined coal back to the entry of the drive onto a stockpile. Coal is then removed to the sizing/loading area. The miner is moved along the face making successive pushes into the coal face. Once coal is removed from the southern panels of a Highwall Trench, overburden from excavation of the next Highwall Trench is used to backfilled the mined out area continuing with the progression of the trench.

The anticipated coal removal sequence for the Highwall mining is shown on drawing 5-10A. Depending on the approval of the alternative and the delivery of the highwall miner, the highwall miner could be deployed on an exposed coal face. As is depicted, each Highwall Trench consists of Panels, each panel consisting of 10 holes. The spacing between the holes and the spacing between the panels are dictated by the amount of overburden over the panels. The alternate Highwall mining is designed such that subsidence does not occur to the surface with nonyieldable webs and barriers. Specific information concerning these design are found in Appendix 5-8. Highwall mining will have only the disturbance associated with the trench for placement of the highwall miner and will have no impact on the surface above the highwall panels.

The following tables summarizes the overburden and backfill balance for ~~this~~ these two scenarios:

Alternate Scenario (Adjacent Federal Reserves Not Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Rehandle)	0	3,300,000	-3,300,000	2,482,000
Total	36,735,000	34,253,000	2,482,000	2,482,000

Alternate Scenario (Highwall mining)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	7,381,000	7,277,000	104,000	2,845,000
3	5,257,000	5,257,000	0	2,845,000
4 (Federal)	3,300,000	3,300,000	0	2,845,000
Total	23,874,000	21,029,000	2,845,000	2,845,000

In both scenarios (Preferred and Alternate), Rough backfilling and grading operations will follow coal removal by not more than 60 days or 1500 linear feet except for the exemption in the south end of the mining area (Pits 17 through 21), which is described above in a step by step manner in the Phase 3 overburden removal process, the above tables and Drawings 5-17 through 5-19. This exemption is expected to take place in the last year of the mining process.

745.122 : Underdrains

No underdrains are planned in the excess spoil area.

745.300: Durable Rock Fills

No Durable Rock fills are planned.

745.400: Preexisting Benches

The MRP does not contemplate disposal of excess spoil on preexisting benches.

Alton Coal Development, LLC will provide the Division, as part of the annual report for each calendar year, ~~a plan view outline of the coal recovery, a 5' interval contour map of backfill progress and a reclamation progress map~~Drawing 5-38 or if the alternate highwall method is selected Drawing 538-A. The Drawing will provide an as-built of the reclamation sequence, depicting the acres of open pit and /or trench, the acres backfilled, the acres fully reclaimed (topsoiled and seeded) and revisions to the reclamation timetable. This information will be submitted by ~~June 30th~~March 28th of each calendar year with the appropriate C1/C2.

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 7-11	Petersen Hydrologic, LLC hydrologic investigation of mine-water inflows and re-evaluation of sediment pond network
Appendix 7-12	UPEDS Permit No. UTG040027
Appendix 7-13	Petersen Hydrologic, LLC hydrologic investigation to evaluate the acid/neutralization behavior of groundwater in the coal seam
Appendix 7-14	PHC of Coal Mining in the 85.88-acre New Dame Lease IBC at Alton Coal Development, LLC Coal Hollow Mine

CHAPTER 7

R645-301-700. HYDROLOGY

711. GENERAL REQUIREMENTS

711.100 – 711.500 Contents

This chapter provides a description of the hydrology and hydrogeology of the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area). Specifically, this permit section includes descriptions of existing hydrologic resources according to R645-301-720, proposed operations and potential impacts to the hydrologic balance according to R645-301-730, methods and calculations utilized to achieve compliance with the hydrologic design criteria and plans according to R645-301-740, applicable hydrologic performance standards according to R645-301-750, and reclamation activities according to R645-301-760.

This information is presented in subsequent sections of this chapter and in Appendix 7-1. Appendix 7-1 includes a comprehensive characterization of groundwater and surface-water systems in the proposed Coal Hollow permit and adjacent areas (including the 85.88-acre Dame Lease IBC), recommendations for groundwater and surface-water monitoring, and the results of a field investigation regarding the potential for alluvial valley floors in the proposed Coal Hollow Mine permit and adjacent area. It should be noted that Appendix 7-1 may be updated periodically in the future as additional hydrologic and hydrogeologic data become available.

712 CERTIFICATION

All cross sections, maps, and plans have been prepared per R645-301-512. Compliance with this section has been completed and certifications are available on all Drawings. The cross sections and maps that are included in this permit application and are required to be certified have been prepared by or under the direction of a qualified, registered, professional engineer or a professional geologist, with assistance from experts in related fields such as hydrology, geology and landscape architecture.

713 INSPECTION

Impoundments will be inspected as described under R645-301-514.300. Designs for proposed impoundments in the proposed Coal Hollow permit area are shown in Drawings 5-25 through 5-31 and Appendices A5-1 and A5-2. No impoundments or sedimentation

ponds meeting the size or other qualifying criteria of MSHA, 30 CFR 77.216(a) exist or are planned within the proposed Mine Permit Area.

A professional engineer or specialist experienced in the construction of impoundments will inspect impoundments. Inspections will be made regularly during construction, upon completion of construction, and at least yearly until removal of the structure or release of the performance bond. The qualified registered professional engineer will promptly, after each inspection, provide to the Division, a certified report that the impoundment has been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules. The report will include discussion of any appearances of instability, structural weakness or other hazardous conditions, 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. A copy of the report will be retained at or near the mine site.

720 ENVIRONMENTAL DESCRIPTION

721 GENERAL REQUIREMENTS

The existing, pre-mining hydrologic resources within the permit and adjacent areas that may be affected by coal mining and reclamation operations (including the 85.88-acre Dame Lease IBC) are described in Appendix 7-1 and are summarized below.

Groundwater Resources

A spring and seep survey of the proposed Coal Hollow Mine permit and surrounding area (that includes the 85.88-acre Dame Lease IBC) has been conducted by Petersen Hydrologic, LLC (see sub-appendix B of Appendix 7-1). The locations of springs and seeps in the proposed permit and adjacent area are shown on Drawing 7-1. Seasonal discharge and field water quality measurements for springs and seeps in the proposed Coal Hollow Mine permit and adjacent area have been submitted electronically to the Utah Division of Oil, Gas and Mining Utah Coal Mining Water Quality Database (UDOGM, 2007). Baseline discharge and water quality data for groundwater resources in the proposed Coal Hollow Mine permit and adjacent area are have also been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007). Locations of baseline monitoring stations are shown on Drawing 7-2. Locations of water rights in and adjacent to the proposed Coal Hollow Mine permit area (including the 85.88-acre Dame Lease IBC area) are shown on Drawing 7-3. Water rights data from the proposed Coal Hollow Mine permit and adjacent area are detailed in Appendix 7-3. A plot showing potentiometric levels in alluvial groundwater systems in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC) is presented in Drawing 7-13.

horizon along the eastern margin of lower Sink Valley, no springs or seeps with measurable discharge have been identified in the Tropic Shale. The lack of appreciable groundwater discharge in the Tropic Shale is a result of the poor water transmitting properties of the marine shale unit. While sandstone units occur stratigraphically higher in the Tropic Shale in the surrounding area, in areas proposed for surface mining, the unit present consists of a fairly uniform sequence of soft shale, silty shale, and claystone with minor siltstone horizons. Competent sandstone strata in the Tropic Shale overlying proposed mining areas was not observed during drilling. The Tropic Shale acts as a barrier impeding downward migration of groundwater in the proposed Coal Hollow Mine permit and adjacent area where it is present. The unit also forms a basal confining layer for alluvial groundwater systems in the proposed permit area.

Groundwater discharge from the Dakota Sandstone in the permit and adjacent area is also meager. The Dakota Formation consists of shaley strata interbedded with lenticular, fine- to medium-grained sandstone and coal. Because of the pervasiveness of interbedded low-permeability horizons in the formation and the vertical and lateral discontinuity of sandstone horizons, the potential for vertical and horizontal movement of groundwater is limited. While no springs discharge from the Dakota Formation in the permit area, a spring with a discharge of about 1 gpm and displaying little seasonal variability in discharge (SP-4; Drawing 7-1) discharges from an apparent fault zone in the Dakota Formation approximately 1.1 miles south of the proposed Coal Hollow permit area. Additionally, two seeps with discharges of less than 0.05 gpm (SP-27 and SP-34; Drawing 7-1) seep from the Dakota Formation in lower Sink Valley more than ½ mile south of the proposed Coal Hollow Mine permit area. The results of slug testing performed on wells screened in the Smirl coal seam indicate relatively low values of hydraulic conductivity for the coal seam (Table 7-8). In much of the proposed mining area, the coal seam is dry (UDOGM, 2007). Thus, appreciable migration of groundwater through the Smirl coal seam is not anticipated.

No water wells are known to exist in the Tropic Shale or Dakota Formation in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area), demonstrating the inability of these formations to transmit useful quantities of water to wells. Groundwaters from the Tropic Shale and Dakota Formation do not contribute measurable baseflow to streams in the proposed permit and adjacent area (at least at the surface in stream channels).

Natural groundwater discharge in the permit and adjacent area occurs primarily from alluvial sediments. Alluvial discharge occurs both as discrete springs and seeps (Drawing 7-1) and also locally as diffuse seepage to the surface. Groundwater discharge areas in the proposed Coal Hollow Mine permit and adjacent area are shown on Drawing 7-4 (see also photograph section). The area of most appreciable alluvial groundwater discharge occurs in central Sink Valley in the northwest quarter of Section 29, T39S, R5W (see Drawing 7-4; groundwater discharge area A). The alluvial groundwater system in this area exists under artesian conditions, resulting from the presence of a considerable thickness of sloping, low permeability clayey sediments overlying coarser, water-bearing alluvial sediments at depth (See Drawing 6-3). The artesian alluvial

Surface Water Resources

Surface water resources in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC) are described in Appendix 7-1 and are summarized below.

Surface waters in the proposed Coal Hollow Mine permit and adjacent area are tributary to Kanab Creek. Surface waters in the northern portion of the proposed permit and adjacent area drain into the Robinson Creek and upper Kanab Creek drainages. Surface waters in the southern portion of the proposed permit and adjacent area drain into the Sink Valley Wash drainage which is tributary to Kanab Creek about 6 miles below the proposed Coal Hollow Mine permit area. Surface water drainages in the permit and surrounding areas are shown in Appendix 7-1. Surface water baseline monitoring stations are shown on Drawing 7-2. Locations of surface-water water rights in and adjacent to the proposed Coal Hollow Mine permit and adjacent area are shown on Drawing 7-3. Water rights data from the proposed Coal Hollow Mine permit and adjacent area are detailed in Appendix 7-3.

Information on water quality for groundwaters and surface-waters has been uploaded into the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007) and is summarized and described in Appendix 7-1.

Surface waters in Kanab Creek are used for stock watering and crop irrigation in the irrigable lands adjacent to Kanab Creek west of the proposed Coal Hollow Mine permit area. Discharge in Kanab Creek measured near the town of Alton (SW-1) is seasonally dependent and largely influenced by upstream water use. Discharge in Kanab Creek monitored at SW-1 typically ranges from 10 cfs or less during the springtime runoff period to 1 cfs or less during the summertime.

Discharge in Lower Robinson Creek drainage is meager. Other than during the springtime runoff event in wet years or during torrential precipitation events, flow has not been observed at monitoring stations SW-4 and SW-101 (Drawing 7-2). Discharge at the lower monitoring site on Lower Robinson Creek (SW-5; Drawing 7-2) is meager. The small discharge occasionally present at SW-5 is derived from the seepage of alluvial groundwater into the Lower Robinson Creek stream channel between monitoring sites SW-101 and SW-5.

Tributaries to the Sink Valley Wash drainage in the proposed Coal Hollow Mine permit and adjacent areas include (from north to south) Water Canyon, an unnamed drainage south of Water Canyon in Section 21 T39S, R5W, and Swapp Hollow. Discharge rates in these drainages are highly seasonally dependent (UDOGM, 2007; Appendix 7-1). Discharges in the Water Canyon and Swapp Hollow drainages are intermittent or perennial in nature with discharge peaks occurring during the springtime runoff season and much lower flows occurring during the late summer and fall months. Discharge in the unnamed drainage in Section 21 T39S, R5W is ephemeral.

722 CROSS SECTIONS AND MAPS

722.100 A map showing the locations of springs and seeps in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area) is presented in Drawing 7-1. A map showing potentiometric levels in alluvial groundwater systems in the proposed Coal Hollow and adjacent areas (including the 85.88-acre Dame Lease IBC) is presented in Drawing 7-13. It is important to note that the alluvial groundwater potentiometric contours depicted in Drawing 7-13 are not representative of a laterally or vertically continuous groundwater system. Within the proposed Coal Hollow Mine permit and adjacent area, appreciable portions of the alluvial sediments are not saturated. Additionally, perched groundwater conditions are present in many locations in the alluvium in the area. In other words, the alluvial groundwater systems in the proposed Coal Hollow Mine permit and adjacent area are not a single, interconnected aquifer. Rather, there exist several areas of saturated alluvium, which may or may not be in good hydraulic communication with adjacent areas. Consequently, it is not possible or meaningful to construct a true potentiometric contour map in the strict sense. Consequently, it is not appropriate to evaluate regional potentiometric trends over large distances or to infer precise groundwater flow directions or hydraulic gradients in the alluvial groundwater system based on Drawing 7-13. The alluvial groundwater system potentiometric map presented in Drawing 7-13 is useful for evaluating approximate local potentiometric conditions and general saturation trends.

722.200 Location of surface water bodies

Within the proposed Coal Hollow Mine permit and adjacent area, no significant natural ponds or lakes occur. The locations of springs and streams are shown in Drawing 7-1. Many small earthen impoundments and ponds have been created to store surface-water runoff and spring discharge water for stock watering and irrigation use. Some of these impoundments were created by constructing straight or semi-circular berms across ephemeral surface water drainages to impound surface runoff. Because of the character of the alluvial sediments, some of the ponds have become filled with sediment over time and the holding capacities have diminished. The locations of ponds and associated conveyance ditches are shown on Drawing 7-7.

722.300 Baseline monitoring stations

723 SAMPLING AND ANALYSIS

Water quality sampling and analyses have been and will be conducted according to the "Standard Methods for the Examination of Water and Wastewater" or EPA methods listed in 40 CFR Parts 136 and 434. Information regarding laboratory analytical methods utilized in performing water quality analyses at the analytical laboratories has been submitted to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007).

724 BASELINE INFORMATION

Baseline groundwater, surface-water, geologic, and climatologic data (including information for the 85.88-acre Dame Lease IBC area) are described in Appendix 7-1 and summarized below.

724.100 Groundwater Information

The location of wells and springs in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC) are shown on Drawings 7-1 (Spring and seep survey map), 7-2 (Baseline monitoring locations), and 7-12 (Monitoring well location map). Groundwater rights in and around the proposed Coal Hollow Mine permit area are shown on Drawing 7-3 and tabulated in Appendix 7-3.

Seasonal quality and quantity of groundwater and usage is presented in Appendix 7-1 and UDOGM (2007). Baseline discharge and water quality data have been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality (UDOGM, 2007).

Baseline monitoring of groundwater resources in and around the proposed Coal Hollow permit area have been carried out by several entities. Previous hydrologic studies of the region have been made in the Alton Coal Field area by Goode (1964, 1966), Sandberg (1979), Cordova (1981), and Plantz (1983). Selected hydrologic data collected in conjunction with these studies have been incorporated into the hydrologic analysis and baseline data included in this permit application.

During the 1980's, extensive monitoring of groundwater resources in the proposed permit and surrounding areas was performed by Utah International, Inc. Utah International Inc.'s groundwater monitoring activities included the construction of numerous groundwater monitoring wells, aquifer testing activities, and the performance of discharge, water level, and field and laboratory water quality monitoring of springs, seeps, and wells. These baseline monitoring activities were performed as part of a

724.200 Surface Water Information

The locations of streams, stock watering ponds, and conveyance ditches in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area) are shown on Drawing 7-7. Surface-water rights in and adjacent to the proposed Coal Hollow Mine permit area are shown on Drawing 7-3 and tabulated in Appendix 7-3. Surface-water discharge rates and water quality data have been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007). Additional surface-water information is provided in Appendix 7-1.

It is not anticipated currently that discharge from the proposed Coal Hollow Mine will be necessary. Where necessary, alluvial groundwater that may be intercepted by mining will be placed in drains and diverted away from disturbed areas and discharged (i.e., as groundwater dewatering). However, a Utah UPDES discharge permit will be obtained so that if discharge of mine water becomes necessary, it can be discharged in accordance with the UPDES discharge permit. The exact locations of mine water discharge points will be established upon issuance of the UPDES discharge permit. Any mine discharge water will be placed in either the Lower Robinson Creek drainage or the Sink Valley Wash drainage. Both of these drainages are tributary to Kanab Creek.

As described in R645-301-728.320, acid drainage is not expected from the proposed mining operation. This is due to the pervasiveness of carbonate minerals in the mine environment that will neutralize any acid produced.

Seasonal quality and quantity of groundwater and usage is described herein and in Appendix 7-1. Baseline discharge and water quality data have been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality (UDOGM, 2007).

Baseline monitoring of surface-water resources in and around the proposed Coal Hollow permit area have been carried out by several entities. Previous hydrologic studies of the have been made in the Alton Coal Field area by Goode (1964, 1966), Sandberg (1979), Cordova (1981), and Plantz (1983). Selected hydrologic data collected in conjunction with these studies have been incorporated into the baseline data as part of this permit application.

During the 1980's, extensive monitoring of surface water resources in the proposed permit and surrounding areas was performed by Utah International, Inc. Utah International Inc.'s groundwater monitoring activities included the operation of continuous recording stations on selected streams, and the performance of routine surface-water discharge measurements and field and laboratory water quality analyses. These baseline monitoring activities were performed as part of a proposed coal mine permitting action in the Alton Coal Field. Ultimately, the proposed coal mining action did not proceed. Relevant monitoring information from the Utah International, Inc. baseline monitoring activities have been included as supplemental baseline data as part of this permit application. Commencing in the 2nd quarter of 2005, regular quarterly baseline

permit (which is considered unlikely), Alton Coal Development, LLC may when necessary and with the approval of the Utah Division of Oil, Gas and Mining construct supplemental containment and settlement ponds in which mine discharge waters may be held for treatment (where necessary) and subsequent discharge through UPDES discharge points in compliance with the UPDES discharge permit.

724.700 Alluvial Valley Floor Determination

A field investigation has been performed in the proposed Coal Hollow Mine permit and adjacent area to provide to the Division the information required to make an evaluation regarding the existence of a probable alluvial valley floor in the proposed Coal Hollow Mine permit and adjacent area. The results of this field investigation and related information is provided in Appendix 7-1. Additional information regarding potential alluvial valley floors in the area is provided in Appendix 7-7.

A report detailing the findings of a previous field investigation performed by Water Engineering & Technology, Inc., entitled "Geomorphological and sedimentological characteristics of Sink Valley, Kane County, Utah" is included as Appendix 7-4.

725 BASELINE CUMULATIVE IMPACT AREA INFORMATION

Appendix 7-1 contains the results of a comprehensive investigation of groundwater and surface-water systems in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area). Appendix 7-1 also includes information regarding the probable hydrologic consequences of coal mining in the proposed Coal Hollow Mine permit area and recommendations for hydrologic monitoring. Appendix 7-1 also includes the results of a field investigation performed in the proposed Coal Hollow Mine permit and adjacent area to provide to the Division of Oil, Gas and Mining the information required to make an evaluation regarding the existence of a probable alluvial valley floor in the proposed Coal Hollow Mine permit and adjacent area. This Information together with the information submitted herein can be used to assess the probable cumulative hydrologic impacts of coal mining and reclamation operations in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area) as required by R645-301-729.

R645-301-726 Modeling

No numerical models have been created for the permit area nor are any planned.

727 ALTERNATIVE WATER SOURCE INFORMATION

This section provides information on the alternative water source that will be used to replace water from groundwaters or surface waters should they be impacted by mining and reclamation activities in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area).

The alternative water source is a water production well planned for construction on private land leased by Alton Coal Development, LLC in the northwest quarter of Section 29, Township 39 South, Range 5 West. The planned location for the well, which is situated within the proposed Coal Hollow Mine permit area, is shown on Drawing 5-8C. The well will produce water from the alluvial groundwater system in Sink Valley in locations up-gradient of proposed mining operations. Based on aquifer testing performed in the alluvial groundwater system near the proposed water well (using the existing well Y-61 as a pump testing well), it is believed that adequate water can be produced from the new well to satisfy the potential water replacement needs of the mine. Details of the aquifer testing and information on the hydrogeologic characteristics of the Sink Valley alluvial groundwater system are presented in Appendix 7-1.

Water quality data from the Sink Valley alluvial groundwater system near the location of the proposed new water well have been collected from well Y-102 and have been submitted electronically to the Utah Division of Oil, Gas and Mining Utah Coal Mining Water Quality Database (UDOGM, 2007). It is anticipated that the quantity and quality of water produced from the new water production well will be suitable for the existing premining uses and approved postmining land uses.

It should be noted that the proposed water replacement well source will produce water from the coarse-grained alluvial groundwater system in Sink Valley. Nearby springs that could potentially be impacted by mining and reclamation activities are supported by the same alluvial groundwater system. However, while modest decreases in the artesian hydraulic pressures in the alluvial groundwater system could potentially result in diminution of spring flows, the planned new water well will likely be approximately 100 feet deep and will be equipped with an electric well pump giving it the capacity to produce groundwater from the alluvial system even if the hydraulic head in the area were to be diminished such that artesian flow conditions temporarily ceased to exist.

An analysis of the total average discharge of state appropriated groundwaters from the permit and adjacent area has been performed to determine whether the quantity of water that could likely be produced from the new water replacement well will be adequate for potential replacement needs. Based on baseline spring discharge data submitted to the Division (UDOGM, 2007), it is determined that the average discharge of all state appropriated groundwater from groundwater discharge area A (Drawing 7-3, Drawing 7-4) is approximately 35 gpm. The state appropriated waters in groundwater discharge Area A include most of the significant springs in the area and essentially all of the largest springs in the area (Drawing 7-3; Appendix 7-3). The average discharge of all state

728 PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION

This section describes the probable hydrologic consequences of surface coal mining in the proposed Coal Hollow Mine permit area. This determination is based on data presented herein and on information provided in Appendix 7-1. The probably hydrologic consequences associated with proposed highwall mining activities within the 85.88-acre Dame Lease IBC area are presented in Appendix 7-4. This mining and reclamation plan has been designed to minimize potential adverse impacts to the hydrologic balance. It should be noted that this PHC and also Appendix 7-1 may be updated periodically as required as additional hydrogeologic information and mining data become available in the future.

728.310 Potential adverse impacts to the hydrologic balance

Other than the possible short-term diminution in discharge rates from alluvial groundwater systems, including the potential short-term diminution of discharge rates from some springs and seeps in Sink Valley, appreciable adverse impacts to the hydrologic balance, either on or off the permit area are not expected to occur. The basis for this determination is discussed below.

As discussed in Section 721 above, minimal groundwater resources exist in the Tropic Shale, which directly overlies the coal reserves in proposed mining areas. Groundwater in the Tropic Shale does not provide measurable baseflow discharge to streams in the area. The lack of appreciable groundwater flow in the Tropic Shale is a result of the poor water transmitting properties of the marine shale unit. Consequently, it is anticipated that little groundwater will be encountered in the Tropic Shale in mining areas. Thus, the potential for adverse impacts to the hydrologic balance resulting from mining through the Tropic Shale in the proposed Coal Hollow Mine permit area is minimal.

Similarly, as described in Section 722 above, groundwater resources in the Dakota Formation underlying the coal seam to be mined are not appreciable. This condition is fundamentally a result of the heterogeneity of the rock strata in the Dakota Formation which impedes the ability of the formation to transmit groundwaters significant distances vertically or horizontally. The presence of the essentially impermeable Tropic Shale on top of the Dakota Formation also minimizes the potential for vertical recharge to the Dakota Formation. Mining operations will remove the overlying Tropic Shale rock strata from the Dakota Formation in addition to the Smirl coal seam deposit at the top of the Dakota Formation in mined areas. However, because the pre-mining hydraulic communication between the Tropic Shale and the underlying Dakota Formation in planned mining areas is believed to be minimal, the removal of the Tropic Shale overburden and Smirl coal seam from the Dakota Formation, followed by the rapid backfilling of pit areas with low-permeability fill materials should not result in adverse impacts to the hydrologic balance in the Dakota Formation (i.e., the post-mining degree

731.200 Water Monitoring

This section describes the hydrologic monitoring plan (including that for the 85.88-acre Dame Lease IBC). Locations of surface-water and groundwater monitoring sites are indicated on Drawing 7-10. Hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-4. Groundwater and surface-water monitoring locations are listed in Table 7-5. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in Table 7-6, and for groundwater in Table 7-7. The hydrologic monitoring plan during reclamation will be the same as during the operational phase. The hydrologic monitoring parameters have been selected in consultation with the Division's directive Tech-006, *Water Monitoring Programs for Coal Mines.*

The groundwater and surface-water monitoring plan is extensive and includes 53 monitoring sites. The monitoring plan is designed to monitor groundwater and surface-water resources for any potential impacts that could potentially occur as a result of mining and reclamation activities in the proposed Coal Hollow Mine permit and adjacent area. Each of the sampling locations and their monitoring purpose are described below.

Streams

Kanab Creek will be monitored at sites SW-3 (above the permit area), and SW-2 (below the permit area). Lower Robinson Creek will be monitored at sites SW-4 (above the permit area), SW-101 (within the permit area), and SW-5 (below the permit area above the confluence with Kanab Creek). The irrigation water near SW-4 will also be monitored at site RID-1. Swapp Hollow creek will be monitored above the permit area at site SW-8. Sink Valley Wash will be monitored at SW-6 (a small tributary to the wash immediately below the permit area) and at SW-9, located in the main drainage below the permit area. All of these locations, with the exception of RID-1) will be monitored for discharge and water quality parameters specified in Table 7-6 quarterly, when reasonably accessible. Additionally, Lower Robinson Creek will be monitored at site BLM-1, which is near the location of alluvial groundwater emergence in the bottom of the stream channel. RID-1 will be monitored for discharge and field water quality parameters. BLM-1 will be monitored for discharge and water quality parameters specified in Table 7-6 quarterly. Monitoring sites BLM-1, SW-5, SW-6, and SW-9 will also be monitored for total and dissolved selenium quarterly.

85.88-acre Dame Lease IBC

In conjunction with highwall mining activities within the 85.88-acre Dame Lease IBC, supplemental water monitoring activities will be performed at selected nearby springs and wells. This will include weekly monitoring of spring discharge rates at sites SP-8, SP-14, SP-20, SP-22, and SP-40, and weekly measurements of water levels in monitoring wells C4, C2, C3, C5, and Y-61. The weekly monitoring at these sites will begin one month prior to the commencement of highwall mining in the 85.88-acre Dame Lease IBC and will continue until one month after highwall mining in the IBC is concluded. Following the period of weekly monitoring, the above specified stations will be monitored monthly for a period of six months. The flow and water level data generated during this period of accelerated monitoring will be sent to the Division of Oil, Gas and Mining as a spreadsheet via e-mail at the end of each month.

In accordance with R645-302.245.230 all holes discharging water will be sealed within 72 hours after completion with impervious and noncombustible material. However, in the approved Ground Control Plan for CHM, MSHA requires the adjacent hole remain open for monitoring of the web. Thus, if an adjacent hole is discharging water and needs to be kept open for web monitoring then the discharge will be tested to determine if it contains acid or toxic-forming material and approvel to keep this hole open for web monitoring will be requested from the Division in accordance with R645-302.245.230.

In order to verify that the highwall mining holes excavated into the 85.88-acre Dame Lease IBC do not cause depletion of the overlying shallow alluvial groundwater systems, the groundwater discharge rate (if any) that occurs from the mouths of the holes within the Dame Lease IBC will be monitored daily. The daily monitoring will commence upon completion of the hole excavation and continue until the hole is sealed. Where it is reasonably possible to do so, the discharge rate measurements will be performed using an appropriate field flow measurement technique (i.e. pipe and a calibrated container, flume, weir, etc.). In areas where the performance of a field discharge measurement is not reasonably possible (i.e. under diffuse seepage conditions or where unconcentrated dispersed flow conditions exist) the discharge rate will be estimated. Discharge rate measurements from the highwall holes will not be performed in areas where such measurements cannot be performed safely. In those areas where the discharge rates cannot safely be measured, this will be noted in the flow record and, where possible, a visual estimate of the discharge rate will be made. Upon approval from the Division, at times when no discharge is occurring from any of the open highwall mining holes in the Dame Lease IBC, discharge measurements will be performed daily on those days that the mine is operating (generally Monday through Friday). Under conditions where measurable flows are present at any open highwall mining hole in the 85.88-acre Dame Lease IBC, the flow measurements will be performed on a continuous daily basis (7 days a week) until the hole is sealed. The flow data for each hole will be sent to the Division as a spreadsheet via e-mail at the end of each month.

731.530 State-appropriated water supply

The proposed water replacement well will be used both as a water supply source for the mine and for water replacement if needed (also for use if needed as a replacement water source for mining in the 85.88-acre Dame Lease IBC). Alton Coal Development, LLC commits to having the water-replacement well (or other appropriate water replacement source as approved by the Division) drilled and developed before beginning overburden removal for Pits 13, 14, and 15.

731.600 Stream Buffer Zones

Any perennial or intermittent streams in the mine area will be protected by 100 foot stream buffer zones on either side of these streams. Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water standards and will not adversely affect the water quality and quantity or other environmental resources of the stream.

Temporary or permanent stream channel diversion will comply with R645-301-742-300. It should be noted that the proposed Coal Hollow Mine plan calls for the temporary diversion of a reach of the Lower Robinson Creek stream channel approximately 2,000 feet in length in the southeast ¼ of Section 19, T39S, R5W. Details of the proposed diversion are given in Chapter 5, Section 527.220 of this MRP. If this action results in diminution of the meager discharge of surface water in the drainage below the planned diversion, where required a suitable mitigation for this potential impact will be designed and implemented in consultation with the Division of Oil, Gas and Mining.

The areas surrounding the streams that are not to be disturbed will be designated as buffer zones, and will be marked as specified in R645-301-521.260.

731.700 Cross sections and Maps

The locations of springs and seeps identified in the proposed Coal Hollow Mine permit and adjacent area are shown in Drawing 7-1. The locations of baseline hydrologic monitoring locations are shown on Drawing 7-2. The locations of water rights in the proposed Coal Hollow permit and adjacent area are provided on Drawing 7-3. Cross-sections depicting the stratigraphy and hydrostratigraphy of the proposed Coal Hollow Mine permit and adjacent area are presented in Chapter 6, Drawing 6-2. Designs for proposed impoundments in the proposed Coal Hollow permit area are shown in Drawings 5-25 through 5-31

731.800 Water Rights and Replacement

Alton Coal Development, LLC commits to replace the water supply of an owner of interest in real property who obtains all or part of his or her supply of water for domestic, agricultural, industrial, or other legitimate use from the underground or surface source, where the water supply has been adversely impacted by contamination, diminution, or interruption proximately resulting from the surface mining activities. Baseline hydrologic information required in R645-301-624.100 through R645-301-624.200, R645-301-625, R645-301-626, R645-301-723 through R645-301-724.300, R645-301-724.500, R645-301-725 through R645-301-731, and R645-301-731.210 through R645-301-731.223 will be used to determine the extent of the impact of mining upon ground water and surface water.

Table 7-4 Hydrologic monitoring protocols.

Discharge and water level measurements

Protocol	Applies to	Parameter	Frequency
A	Streams	Discharge	Quarterly
B	Springs	Discharge	Quarterly
C	Monitoring wells	Water elevation	Quarterly
D	Springs	Discharge	Weekly measurements beginning one month prior to highwall mining and continuing until one month after highwall mining in the area, followed by monthly measurements for a period of six months
E	Monitoring wells	Water elevation	Weekly measurements beginning one month prior to highwall mining and continuing until one month after highwall mining in the area, followed by monthly measurements for a period of six months

Water quality

Protocol	Applies to	Parameters	Table	Frequency
1	Streams	Operational field and laboratory water quality measurements	7-6A*	Quarterly
2	Streams	Field water quality measurements only	7-6A*	Quarterly
3	Springs	Operational field and laboratory water quality measurements	7-7A*	Quarterly
4	Springs	Field water quality measurements only	7-7A*	Quarterly
5	Monitoring wells	Operational field and laboratory water quality measurements	7-7A*	Quarterly
6	Monitoring wells	Field water quality measurements only	7-7A*	Quarterly
7	Monitoring wells	Laboratory acidity measurements for a period of two years	---	Quarterly
8	Streams	Laboratory total and dissolved selenium measurements	---	Quarterly

*Note: Every 5 years for the third or fourth quarter monitoring event, laboratory analysis will be performed according to the baseline parameter lists specified in Tables 7-6B and 7-7B for surface waters and groundwaters, respectively. This will first be performed in the year 2015, continuing on a schedule of every five years thereafter.

Table 7-5 Hydrologic monitoring locations and protocols for operational and reclamation phase monitoring.

Site	Protocols	Comments
Streams		
BLM-1	A, 1, 8	Lower Robinson Creek adjacent to mined areas
RID-1	A, 2	Irrigation ditch in Robinson Creek
SW-2	A, 1	Kanab Creek below Robinson Creek
SW-3	A, 1	Kanab Creek above permit area
SW-4	A, 1	Lower Robinson Creek above permit area
SW-5	A, 1, 8	Lower Robinson Creek above Kanab Creek
SW-6	A, 1, 8	Sink Valley Wash at permit boundary
SW-8	A, 1	Swapp Hollow Creek above permit area
SW-9	A, 1, 8	Sink Valley Wash below permit area
SW-101	A, 2	Lower Robinson Creek in permit area
Springs		
Sorensen Spring (SP-40)	B,4, D	Developed alluvial spring in Sink Valley at Sorensen ranch
SP-3	B, 4	Spring in upland pediment alluvium south of permit area (developed and piped down canyon in Sink Valley Wash – now monitored at transfer box at mouth of canyon)
SP-4	B, 3	Developed spring in Sink Valley Wash 1 mile below permit area
SP-6	B, 3	Seep in Sink Valley below permit area
SP-8	B, 3, D	Developed alluvial spring in Sink Valley at Dames ranch
SP-14	B, 3, D	Alluvial spring in Sink Valley
SP-16	B, 4	Alluvial spring in Sink Valley
SP-20	B, 3, D	Alluvial spring in Sink Valley
SP-22	B, 4, D	Alluvial spring in Sink Valley
SP-23	B, 4	Alluvial spring in Sink Valley
SP-33	B, 3	Developed spring in lower Sink Valley alluvium
Wells		
Y-36	C	Coal well in Sink Valley above permit area
Y-38	C~~, 7~~	Coal well in Sink Valley in permit area
Y-45	C	Coal seam well in Swapp Hollow above permit area
Y-61	C, 5~~, 7~~, E	Water well in Sink Valley artesian alluvial groundwater system above permit area
Y-63	C	Monitoring well in lower Sink Valley Alluvium below mining areas
Y-98	C	Alluvial well in Robinson Creek above permit area
Y-102	C	Alluvial well in upper Sink Valley in permit area
C0-18	C	Alluvial monitoring well in Lower Robinson Creek drainage
C0-54	C	Monitoring well in Lower Robinson Creek drainage near coal seam

Site	Protocols	Comments
C1-24	C	Alluvial monitoring well in Lower Robinson Creek drainage
C2-15	C, E	Monitoring well in Sink Valley alluvium
C2-28	C, E	Monitoring well in Sink Valley alluvium
C2-40	C, E	Monitoring well in Sink Valley alluvium
C3-15	C, E	Monitoring well in Sink Valley alluvium
C3-30	C, E	Monitoring well in Sink Valley alluvium
C3-40	C, E	Monitoring well in Sink Valley alluvium
C4-15	C, E	Monitoring well in Sink Valley alluvium
C4-30	C, E	Monitoring well in Sink Valley alluvium
C4-50	C, E	Monitoring well in Sink Valley alluvium
C5-130	C, E	Monitoring well in Sink Valley artesian alluvial groundwater system above permit area
C7-20	C	Monitoring well in Sink Valley alluvium
C9-15	C	Monitoring well in Sink Valley alluvium
C9-25	C	Monitoring well in Sink Valley alluvium
C9-40	C	Monitoring well in Sink Valley alluvium
LR-45	C, 5	Monitoring well in Lower Robinson Creek alluvium below mine area
LS-28	C, 5	Monitoring well in Sink Valley Alluvium below mining areas
LS-60	C	Monitoring well in Sink Valley Alluvium below mining areas
LS-85	C, 5	Monitoring well in artesian Sink Valley Alluvium below mining areas
SS-15	C	Monitoring well in Sink Valley Alluvium below mining areas
SS-30	C, 5	Monitoring well in Sink Valley Alluvium below mining areas
SS-75	C	Monitoring well in burned coal area material
UR-70	C, 5	Monitoring well in Lower Robinson Creek alluvium above mine area

Table 7-6A Surface water operational and reclamation phase water quality monitoring.

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Dissolved Oxygen	mg/L
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Total Suspended Solids	mg/L:
Bicarbonate	mg/L
Carbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Potassium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Oil and grease	mg/L
Cations	meq/l
Anions	meq/l
Cation/Anion Balance	%

Table 7-6B Surface water baseline water quality monitoring

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Dissolved Oxygen	mg/L
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Total Suspended Solids	mg/L
Total Alkalinity	mg/L
Total Hardness ($CaCO_3$)	mg/L
Acidity	mg/L
Aluminum (dissolved)	mg/L
Arsenic (dissolved)	mg/L
Bicarbonate	mg/L
Boron (dissolved)	mg/L
Cadmium (dissolved)	mg/L
Carbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Copper (dissolved)	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Lead (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Molybdenum (dissolved)	mg/L
Ammonia	mg/L
Nitrate+Nitrite	mg/L
Phosphate (total)	mg/L
Potassium (dissolved)	mg/L
Selenium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Zinc (dissolved)	mg/L
Oil and grease	mg/L
Cations	meq/l
Anions	meq/l
Cation/Anion Balance	%

Table 7-7A Groundwater operational and reclamation phase water quality monitoring.

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Carbonate	mg/L
Bicarbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Potassium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Cations	meq/L
Anions	meq/L
Cation/Anion Balance	%

Table 7-7B Groundwater baseline water quality monitoring.

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Total Alkalinity	mg/L
Total Hardness ($CaCO_3$)	mg/L
Acidity	mg/L
Aluminum (dissolved)	mg/L
Arsenic (dissolved)	mg/L
Bicarbonate	mg/L
Boron (dissolved)	mg/L
Cadmium (dissolved)	mg/L
Carbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Copper (dissolved)	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Lead (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Molybdenum (dissolved)	mg/L
Ammonia	mg/L
Nitrate+Nitrite	mg/L
Phosphate (total)	mg/L
Potassium (dissolved)	mg/L
Selenium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Zinc (dissolved)	mg/L
Cations	meq/l
Anions	meq/l
Cation/Anion Balance	%

CHAPTER 8

R645-301-800. BONDING AND INSURANCE

820. REQUIREMENT TO FILE A BOND

820.100 The Operator Agrees to File a Bond.

After the permit application is approved, but before the permit is issued, the applicant will file with the Division, on a form prescribed and furnished by the Division, a bond or bonds conditioned upon performance of all requirements of the State Program, the permit and the reclamation bond.

820.110-111 Area to be Covered by the Performance Bond

The disturbed area at the Coal Hollow Project will be bonded. Bonding will be in Phases according to sequence of disturbance identified on Drawing 5-3. The area to be mined is also identified on Drawing 5-3.

820.112-114 Incremental Bonding

Not applicable at this time.

820.120 Acceptance of Bond

The applicant agrees not to commence operations until the Division approves a performance bond for the Coal Hollow Project.

820.130 Coverage of Bond

The applicant will provide a performance bond for the disturbed area within the permit.

820.200 Form of the Performance Bond

820.223 Surety Bond

Alton Coal Development, LLC is proposing to submit a surety bond consistent with the requirements of R645-301-860.100 and any additional requirements in the State Program.

830. DETERMINATION OF BOND AMOUNT

830.100 Determined by the Division

The amount of the bond required will be determined by the Division.

830.140 Detailed Estimated Costs

The bonding amount for final reclamation will depend upon the approved permit and reclamation plan (R645-301-830.120). The alternative highwall mining will reduce surface disturbance. Mining disturbance to the surface will be reduced along with reclamation needs. Thus—Eestimates have been completed for the individual mining phases shown in Drawings 5-17, 5-18 and 5-19 .the mining that will generate the largest disturbance and require the larger bond. These estimates are provided as Appendix 8-1. These cost calculations are based on the specific details shown on these drawings. As requested by the Division, a separate bond estimate is completed for all three phases shown in the drawings and in general, each stage is representative of the expected reclamation liability for Phase 1, 2 and 3, respectively. If the alternative highwall mining is selected the bond will be reduced as appropriate for the area of disturbance generated. The bond estimate by Phase, escalated for the 2017 (anticipated end of mining) is the following:

Phase 1:	$5,346,000
Phase 2:	$9,888,000
Phase 3:	$6,624,000

A summary and supporting calculations for these cost estimates is provided in Appendix 8-1.

840. GENERAL TERMS AND CONDITIONS OF THE BOND

General terms and conditions of the bond as stated at R645-301-840 through R645-301-840.520 will be met by Alton Coal Development, LLC

850. BOND REQUIREMENTS FOR UNDERGROUND COAL MINING

Not Applicable

860. FORM OF BOND

860.100 Surety Bond

The applicant will submit a surety bond as defined under R645-100-200 and meet all the requirements under R645-301-860.110 to .120.

870. REPLACEMENT OF BONDS

Equivalent bond coverage will be provided if Alton Coal Development, LLC replaces the surety bond.

880. REQUIREMENT TO RELEASE PERFORMANCE BONDS

Upon completion of reclamation operations, the applicant will apply for bond release and meet the requirements of R645-301-880.

890. TERMS AND CONDITIONS FOR LIABILITY INSURANCE

890.100 Certificate of Liability Insurance

A copy of the Certificate of Liability Insurance is provided in Appendix 1-3. Alton Coal Development, LLC will meet the requirements of R645-301-890 prior to commencing any mining operations.

C/025/005 Incoming

#4517

Alton Coal Development, LLC
463 North 100 West, Suite 1
Cedar City, Utah 84720
Phone (435) 867-5331 • Fax (435) 867-1192

March 3, 2014

Daron R. Haddock
Coal Program Manager
Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

RECEIVED
MAR 04 2014
DIV. OF OIL, GAS & MINING

Subject: **Response to Incidental Boundary Change and Highwall mining alternative, Task ID #4502, Coal Hollow Project, Kane County, Utah, C/025/0005**

Dear Mr. Haddock,

Alton Coal Development, LLC is providing this submittal to address deficiencies identified in Task ID #4502 for the previously submitted Incidental Boundary Change (IBC) to the Coal Hollow Mine (CHM) permit area. The IBC includes a new mineral lease of 85.88 acres adjacent to the CHM. There will be no surface disturbance within the IBC, approximately 38.95 acres will be undermined for the extraction of coal utilizing highwall mining technics. It appears that several of the regulations that are cited with a deficiency have little bearing to that deficiency. For those deficiencies, the best response was made based on the comments.

Please find enclosed 1 (one) redline copies of the revised text for review and 2 (two) clean copies of text and drawings for insertion into the MRP. Please do not hesitate to contact me if you have any questions 435-691-1551.

Sincerely

B. Kirk Nicholes
Environmental Specialist

General Contents

Permit Term

Section 116 of the MRP describes three phases of mining that began in 2010 and is anticipated to be completed in 2017. Section 116 states that there are 394 acres total to be disturbed during all three phases of mining. Phase 1 is listed as 269 acres disturbance. Phase 2 is 57 acres disturbance. Phase 3 is listed as 68 acres disturbance. The cover letter accompanying this submittal states that acreage listed in Section 116 is consistent with the three phases shown on Dwg 5-3 (bonded acreage).

In accordance with R645-301-121, to accurately reflect the bonded acreage, the following changes should be made to the plan: 1)Section 116 should state that Phase 1 is 289 acres and Phase 2 is 40 acres (as shown on Drawing B-2 of the Revised Reclamation Agreement Exhibit D, signed 12/13/13), and
2) Phase 3 will correspond to the remaining acreage shown on Drawing 5-3 Phase 3; and,
3) Phase 2 shown on Drawing 5-3 must reflect the same area drawn as Phase 2 on Drawing B-2 of the Revised Reclamation Agreement Exhibit D, (signed 12/13/13); and,
4) Drawing 5-3 must provide the bonded acreage figures in the legend for each phase of bonding.

pburton

Texts in Section 116 as well as Drawing 5-3 have been revised to reflect the required changes

Maps and Plans

The information is not adequate to meet the requirement of this section of the regulations. Prior to approval the following information must be provided in accordance with R645-301-140; Plate 3-7 needs to be revised to show the current phases of mining and the proposed highwall mining activities. The current plate is for a three year surface operation.

jhelfric

Plate 3-7 has been revised to show Phases rather than years, also a Plate 3-7A has been added that shows the proposed highwall mining activities.

Environmental Resource Information

Land Use Resource Information

The information is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with R645-301-411.140; ACD needs to include a commitment in Chapter 4, section 411.140 to conduct a presite survey of the proposed 500 foot disturbance associated with the trench and any additional disturbances associated with the development of proposed highwall mining activity.

jhelfric

As stated in Chapter 4, section 411.140 "A cultural resource inventory was conducted by Montgomery Archaeological Consultants Inc.(MOCA) in June 2005 for Alton Coal Development, LLC." This Class III inventory includes the proposed 500 foot disturbance associated with the trench. No further action is required.

Prime Farmland

In accordance with R645-301-121.100, Section 221 of the MRP must be revised to state that the NRCS has made a determination that 80 acres of the 85.88 acre IBC Dame lease are considered Farmlands of Statewide and Local Importance. A copy of the referenced letter should be included in Section 1 of Appendix 2-1 with the previous NRCS correspondence.

pburton

The referenced letter has been included to Section 1 of Appendix 2-1. This also necessitated change be made to text in Chapter 2 pages 2-1 & 2-2. These changes have been included in this submission.

Operation Plan

Fish and Wildlife Protection and Enhancement Plan

The impacts to wildlife from the extended mining activities are not adequately addressed in chapter three of the current Mining and Reclamation Plan, (MRP). Prior to approval the following information must be provided;

In accordance with R645-301-333.300. During the meeting on January 7, 2014 ACD agreed to provide a commitment to restore the wet meadow habitat, the location is shown on drawing 3-1(Meadow). The application needs to include a commitment to restore the wet meadow habitat in the 85.88 parcel in the event of habitat loss due to water diminution. This commitment has not been included in the application.

In the approved MRP, the last paragraph in Chapter 3 Page 3-58 states "Additionally, the coal mining and reclamation operations at the Coal Hollow Project will avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife. . . . . ". No further action is required.

In accordance with R645-301-322.200, .200, 342.100, 358.400 a narrative describing how springs SP-8, SP-14, SP-20, SP-22, SP-40 and wells C4, C2, C3, C5, and Y-61 that sustain the critical brood rearing habitat will be restored in the event of water diminution,

In the previous submittal as well as the current submittal, paragraph two and three of Chapter 3 Page 3-58 address this issue. No further action is required.

In accordance with R645-301-322.100 a table that includes a schedule to initiate compensatory mitigation of 343.52 acres for the addition of the 85.88 acre parcel by no later than August 1, 2014 and complete the mitigation within six months or by January 31st 2015.

Page 19 of the "Conservation Plan for Greater Sage-grouse in Utah, February 14, 2013" reads as follows:

6.1 Disturbance

Disturbance, as defined in Section 10.0, is any ground disturbing activity, event or action, natural or human-caused, which will either eliminate or render greater sage-grouse habitat unusable for the life-cycle of the bird, or human activities and presence which causes a negative response from birds within the SGMA. Disturbance based on round disturbing activities can be temporary or permanent, while negative response disturbances can cause negative effects year-round, seasonally, or only at certain times of day.

6.1.1 Temporary ground disturbance is defined as any ground disturbing activity which lasts less than five years. Temporary disturbances do not need to be mitigated, if the reclamation or restoration work is effective within the five year period.

6.1.2 Permanent ground disturbance is defined as any ground disturbing activity which lasts five years or more.

Coal removal from the 85.88 acre parcel of the Dame IBC Lease will occur subsurface through the use of a highwall miner on the current Coal Hollow Mine, no disturbance will occur to the surface. As planned, highwall mining in the 85.88 acre parcel entails 90 highwall holes that will penetrate some, but not all of the 85.88 acres. Each hole will be completed in approximately one day with the total of 90 holes being completed within a two year period. As defined in the "Conservation Plan for Greater Sage-grouse in Utah, February 14, 2013", the disturbances that will occur to 38.95 acres of the 85.88 acre parcel will be "temporary". As ACD has committed to complete 1700 acres of compensatory mitigation for "permanent" disturbance (far in excess of the 4:1 ratio required by the Conservation Plan for Greater Sage-grouse). Current "permanent" disturbance approved in the MRP is 396 acres. If the alternate highwall mining method is selected, "permanent" disturbance could be as low as 320 acres shown in this amendment.

In accordance with Chapter 3, Appendix 3-5 and R645-301-333.300 a commitment to monitor the vegetation and bird use in the 85.88 acre parcel for vegetation (annually) and bird use (monthly except for May, June and July).

Past bird monitoring has included the area of the new Dame Lease. Birds were documented during the June, July, and August surveys (sightings were in the area of ACD's water well down to and Swapp Ranch House. All other months that surveys where done in this area no grouse where observed. It seems questionable to restrict monitoring of this area 2 of the 3 months that the grouse utilize the area and require it the remainder of the year. Appendix 3-5 page 21 has been modified to include "All areas of the approved MRP permit boundary". Timing of bird use monitoring will follow the currant protocol in Appendix 3-5 established by a sage-grouse biologist, Dr Steven Petersen. Annual monitoring of a vegetation community that will not be disturbed makes little sense. No further action is required.

In accordance with R645-301-121.200 Chapter3, Page 3-7, the last sentence needs to include the word surface before disturbance.

The word "surface" has been added.

In accordance with R645-301-322.100 Chapter 3, Page 3-34 ACD needs to provide valid documentation that defines the amount of the 808 acres they have been given credit for by the Division and this sentence needs to be revised to reflect that,

The sentence has been revised to correctly reflect "885 acres". Also, reference to the letter from Director Baza addressed to Denise A. Dragoo, Esq. dated May 16, 2012 has been added to verify credit given by the Division.

In accordance with R645-301-322.100 Chapter 3, Page 3-34 ACD needs to provide written concurrence from the surface management agency, (BLM), verifying the completion of the lop and scatter pinyon/juniper removal from the 355 acre parcel,

A letter dated XXXXXXX from Lisa Church of the Kanab Field Office, BLM has been added to Appendix 3-7 "2013 Sage-grouse Habitat Mitigation Project".

In accordance with R645-301-330Page 3-44, Sage-Grouse Work, Sentence #4 needs to be revised to read as follows The implementation of the highwall miner provides an additional method for recovering coal. This is because the disturbance associated with the development of the 500 foot disturbance associated with the trench (Figure 5-41) will be located in the middle of the lek and nesting and brood rearing areas for an extended period of time and perhaps indefinitely with the addition of underground mining.

This deficiency has no basis on the current amendment. It is without reason as to how a determination of the location of disturbance was derived from Figure 5-41 (a cross section of a typical highwall). The approved MRP shows the estimated schedule for final reclamation of all disturbances as 2017. The amendment currently under review shows the estimated schedule for final reclamation of all disturbances as 2017. No extensions have been proposed. The approved MRP as well as the amendment currently under review does not anticipate "underground mining". At this time, there has not been an amendment that proposes "underground mining".
No changes have been made to the amendment.

In accordance with R645-301-333.300 the application needs to include a monitoring plan for the noise levels in the proposed 85.88 parcel from the mining equipment that will be used to implement the proposed highwall mining activities.

jhelfric

Noise levels for mining equipment is regulated by the Federal Mine Health and Safety Administration and a monitoring plan for noise levels is currently in place.

Topsoil and Subsoil

R645-301-121.100 and R645-301-231.100, Please provide a version of Dwg 2-2 for the highwall mining scenario shown in Dwg5-10A.

pburton

Drawing 2-2A has been added to the amendment package.

Maps Affected Area

Two mining methods have been proposed. Under the surface mining method the affected area is shown on Dwg 5-2 disturbance sequence and 5-16 overburden removal map and the reclaimed area is shown on Dwg 5-38 reclamation sequence. For the highwall mining method, the pertinent maps are Dwg 5-2A, 5-16A, and Dwg 5-38A. To provide clarity, actual disturbance and reclamation should be provided in an as-built submitted with the annual report.

In addition, Drawings 5-2A, 5-16A, and 5-38A appear to align the highwall mine trench along the Section 30 and Section 29 boundary line; whereas the trench is shown centered in Section 30 on Drawing 5-10A and 5-10B. If the trench is constructed with trench floor as shown in Dwg. 5-10A and Dwg. 5-10B, then the Area disturbed by topsoil & overburden removal and reclamation will be slightly different than that shown on Dwg 5-2A, 5-16A and 5-38A.

Due to the above ambiguity, the following commitment will be required. In accordance with R645-301-521.162 and R645-301-121.100, Please state a commitment in the plan to provide an as-built of the reclamation sequence map (Dwg, 5-38 and/or 5-38A) filed with the annual report each year and include in the legend:
The acres of open pit and trench;
The acres backfilled;
The acres fully reclaimed (topsoiled and seeded);
Revisions to the reclamation timetable, if any.
The map should be accompanied by a C1C2 form to allow replacement of the existing Dwg. 5-38 or 5-38A in the MRP.

pburton

Changes were made in Chapter 5, Page 5-81 to update Drawing 5-38 or 5-38A at the time the Annual Report is due.

In accordance with R645-301-121.100, plates 5-16 and 5-16A must be in agreement on the area of overburden removed in the past year, 2013,

Appropriate changes were made.

In accordance with R645-301-121.200,please review and correct as necessary the year shown for overburden removal on the northeast corner of Section 30, because the area shown in pink will either have overburden removal 2016 (according to the legend) or in 2015 (according to the year written in the pink area).

Appropriate changes were made.

In accordance with R645-301-553, both plates 5-38 and 5-38A must illustrate compliance with the backfilling and grading rule for surface mining with regard to pits 9 and 10. Pit 9 was mined out in September of 2013 and pit 10 is shown on both Plate 5-10 and Plate 5-10A as being developed in 2014. Therefore, Dwg 5-38 and 5-38A must show reclamation of the pit 9 &10 area in 2014 and 2015 respectively.

Pits 1, 2, 5, 7, 9, & 10 are all under the under the Excess Spoils Pile. The majority of material to be placed in the Excess Spoils Pile will come from the mining of the eastern pits 11- 15. At this time pits 1, 2, 5, & 7 have been mined and backfilled at least up to approximate original contour and in some places above approximate original contour to begin forming the Excess Spoils Pile. Enough excess spoils have now been placed above the mined out Pit 1 and some of the re-contouring completed for final reclamation. Final reclamation cannot proceed above the remaining pits with in the foot print of the Excess Spoils Pile until excess spoils is placed from the mining of pits 10 – 15.

In accordance with R645-301-122.100, please review the active pit location shown on Dwg. 5-19, as it does not appear to reflect either reclamation scenario illustrated on Dwg 5-38 or 5-38A.

phess

Drawing 5-19 is one of three drawings show the greatest amount of disturbance anticipated at three different stages of mining for bonding purposes. The MRP contains two scenarios of traditional open pit mining. One scenario (the approved scenario) the private property is mined and reclaimed with no further mining. The second anticipates Alton Coal acquiring the Federal coal in the LBA. Drawing 5-19 depicts how mining would proceed prior to rolling out on to the Federal coal. This scenario, if approved, would be the greatest amount of disturbance in Phase 3 of mining and thus bonding for Phase 3 has been calculated based on the greatest amount disturbance anticipated.

The information is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with R645-301-322, -301-323, -301-331, -301-333, -301-341, -301-342- and 301-521
The redline text on page 3-57A, The Alternate highwall mining will reduce the practicable area to be reclaimed, does not describe how and when the highwall mining activity will be reclaimed. As previously stated the application does not include a description of or provide for the reclamation of the proposed highwall mining method.

The application needs to include at a minimum in accordance with R645-301-521:,
A narrative describing how the highwall mining disturbance will be reclaimed,
Where the material for backfilling and grading will come from,
A narrative describing the volume of different materials including topsoil that will be needed for reclamation of the highwall and the 500 foot disturbance associated with the trehch trench,
A revised time table for reclamation in accordance with R645-301-341.100,
And in accordance with R645-301-352 a commitment to meet with the Division each year in August to define the amount of reclamation to be completed for that calendar year.

jhelfric

Text has been added to Chapter 3, Section 341.100. In response to a prior deficiency by pburton a commitment has been made to update Drawings 5-38 and/or 5-38A as appropriate to refine the reclamation schedule annually.

Revegetation Timing

Clean copies of this amendment must be revised to include the wording changes made to Section 341.100 approved January 24, 2013 (Task4463, DO-13).

pburton

The approved text has been included in this submission.

Special Categories

Auger Mining

In accordance with R645-301-121.200 please update Dwg 5-10 to show the as-built size and location of pits 25-28.

pburton

A revised Drawing 5-10 has been included with this submission.

Auger Mining

R645-302.240: The language on Page 7-61 shall be updated stating "All holes except as provided in R645-302.245.230 will be sealed within 72 hours" and the follow language shall be removed:
"As specified in R645-302-240, all auger holes not discharging water containing acid- or toxic forming material will be sealed with an impervious noncombustible material as contemporaneously as possible with the augering operation, as approved by the Division."

khoffman

The following text was substituted to allow for requirements by two of many regulating agencies: "All holes except as provided in R645-302.245.230 will be sealed within 72 hours with the exception of the hole adjacent to the current hole being mined. In the approved "Ground Control Plan" for CHM, MSHA requires the adjacent hole remain open for monitoring of the web."

APPLICATION FOR COAL PERMIT PROCESSING

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

Permittee: Alton Coal Development, LLC
Mine: Coal Hollow **Permit Number:** C/025/0005
Title: Incidental Boundry Change, and addition of highwall mineing alternative Task ID #4502
Description, Include reason for application and timing required to implement:

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

☒ Yes ☐ No 1. Change in the size of the Permit Area? Acres: 85.88 Disturbed Area: ___ ☒ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# ____
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☒ Yes ☐ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # ____
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: ____
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes ☒ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☐ Yes ☒ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☐ Yes ☒ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

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

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

B. Kirk Nicholes
Print Name

B. Kirk Nicholes Env. Spec. 3/3/14
Sign Name, Position, Date

Subscribed and sworn to before me this 3 day of March, 2014

Notary Public

My commission Expires: Sept 11, 2017
Attest: State of Utah } ss:
County of Iron

Notary Public
MARTY NICHOLES
Commission #670359
My Commission Expires
Sept 11, 2017
State of Utah

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining
		RECEIVED MAR 04 2014 DIV. OF OIL, GAS & MINING

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

Permittee: Alton Coal Development, LLC
Mine: Coal Hollow **Permit Number:** C/025/0005
Title: Incidental Boundry Change, and addition of highwall mineing alternative Task ID #4502

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	Volume 1, Chapter 1, Pages 5-13
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 1, Appendix 1-10
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 1, Drawing 1-1 to 1-6
☐ Add	☒ Replace	☐ Remove	Volume 1, TOC, Page 2
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 2, Pages 2-1, 2-2, 2-21 and 2-26
☐ Add	☒ Replace	☐ Remove	Volume 1, Chapter 2, Drawing 2-1 and 2-2
☒ Add	☐ Replace	☐ Remove	Volume 1, Chapter 2, Appendix 2-3
☐ Add	☒ Replace	☐ Remove	Volume 2, Chapter 3, Pages 3-2,3-3,3-7,3-34,3-35,3-37,3-41,3-43,3-44,3-57A,3-85and 3-86
☐ Add	☒ Replace	☐ Remove	Volume 2, Chapter 3, Drawing 3-1 to 3-7
☐ Add	☒ Replace	☐ Remove	Volume 2, Chapter 4, Page 4-3, 4-4 and 4-10
☐ Add	☒ Replace	☐ Remove	Volume 3, Chapter 5, Table of Contents
☐ Add	☒ Replace	☐ Remove	Volume 3, Chapter 5, All text
☒ Add	☐ Replace	☐ Remove	Volume 3, Chapter 5, Appendix 5-8
☐ Add	☒ Replace	☐ Remove	Volume 3, Chapter 5, Drawing 5-1 to 5-3, 5-9,5-10, 5-16 to 5-19, 5-35, 5-65, 5-37 and 5-38
☒ Add	☐ Replace	☐ Remove	Volume 3, Chapter 5, Drawing 5-2A, 5-9A, 5-10A, 5-16A, 5-38A, & 5-41to 5-44
☐ Add	☒ Replace	☐ Remove	Volume 7, Chapter 7, Table of Contents, Page v
☐ Add	☒ Replace	☐ Remove	Volume 7, Chapter 7, Pages 7-1,7-2,7-4,7-9,7-12,7-14,7-17,7-22,7-23,7-25, 7-58and 7-61
☒ Add	☐ Replace	☐ Remove	Volume 8, Chapter 7, Appendix 7-14
☐ Add	☒ Replace	☐ Remove	Volume 8, Chapter 7, Table 7-4 to 7-7B
☐ Add	☒ Replace	☐ Remove	Volume 8, Chapter 7, Drawing 7-1 to 7-3, 7-7, 7-10, 7-12, 7-13, & 7-15
☐ Add	☒ Replace	☐ Remove	Volume 8, Chapter 8, All text
☐ Add	☒ Replace	☐ Remove	Volume 9, Confidential, Table of Contents
☐ Add	☒ Replace	☐ Remove	Volume 9, Confidential, Appendix 1-2 (cover sheet only)
☒ Add	☐ Replace	☐ Remove	Volume 9, Confidential, Appendix 1-2 Exhibit 5
☒ Add	☐ Replace	☐ Remove	Volume 2, Chapter 3, Appendix 3-7 add to back
☒ Add	☐ Replace	☐ Remove	Volume 1, Chapter2, Appendix 2-1, End of Section 1
☐ Add	☐ Replace	☐ Remove	
☐ 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

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Sleepy Hollow Mineral Investors, LLC Manager of SH Coal Investment, LLC
August 2, 2010 (begin date)
Sleepy Hollow Mineral Investors, LLC
Charles Ungurean Manager
August 2, 2010 (begin date)
Thomas Ungurean Manager
August 2, 2010 (begin date)

RECEIVED
JAN 16 2014
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112.500 Legal or Equitable Owner of the Surface and Mineral Properties

The legal and equitable owners of the properties to be affected by this mining operation during the duration of the permit period along with legal descriptions are included in this section. Surface and coal ownership are also shown on Drawings 1-3 and 1-4. The following table is a summary of the ownership within the Permit boundary.

Permit Area Ownership (Acres)**				
	Fee	Federal	State	Total
Surface	721	0	0	721
Coal*	521	200	0	721
Total				
Note*: Federal minerals located within the Permit area are not planned for mining as part of this application. These areas have been included as part of the LBA application described in 112.800. Note**: Acreages are approximate based on legal descriptions				

The legal description for lands included within the Permit Boundary is provided below for each surface owner.

SURFACE OWNERSHIP:

Owner/Lessor:

C. Burton Pugh
533 N 650 E
Lindon, Utah 84042-1567
801-785-6220

Lessee:

Alton Coal Development, LLC

Legal Description (C. Burton Pugh Property):

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 30: All of Section Lot #1 (NW¼ NW¼); NE¼ NW¼ ; N½ NE¼ ; ALSO: BEGINNING 3.50 chains West of the East Quarter corner of Said Section 30, and running South 34° 34' West 22.64 chains to the 1/16 section line; thence West 2.64 chains to the Southwest corner of NE¼ SE¼ of Said Section 30; thence North 40.00 chains; thence East 20.00

chains; thence South 14.69 chains; thence southwesterly to the point of beginning.

....containing 217.64 acres, more or less.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 29: BEGINNING at the Northwest corner of Said Section 29, and running thence South 34.69 chains; thence North 33°22' East 35.50 chains; thence North 40° West 0.58 chains; thence North 37°30' East 12.30 chains; thence West 22.23 chains to the point of beginning.

....containing 36.04 acres, more or less.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 19: SW¼SE¼, E½SE¼, SE¼NE¼

....containing 160.0 acres, more or less

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 20: SW¼

....containing 160.0 acres, more or less

COAL OWNERSHIP:

Owner/Lessor:	*Lessee:*
C. Burton Pugh 533 N 650 E Lindon, Utah 84042-1567 801-785-6220	Alton Coal Development, LLC
Roger M. Pugh 140 South 100 West Kanab, UT 84741	
Mark and Margaret Moyers 9397 Avanyu Drive Pleasant Grove, UT 84062	

SURFACE OWNERSHIP:

Owner/Lessor:	*Lessee:*
Alecia Swapp Dame Trust Through Richard Dame, Trustee 1620 Georgia Ave.	Alton Coal Development, LLC

Boulder City, NV 89005
702-293-4773

Legal Description (Alecia Dame Swapp Trust):

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 30: BEGINNING at a point 5.31 chains North of the E¼ corner of Said Section 30, and running thence South 45.31 chains; thence West 20.00 chains; thence North 20.00 chains; thence East 2.64 chains; thence North 34° 34' East 22.64 chains to the 1/16 section line; thence North 33° 22' East to the point of beginning.

....containing 61.96 acres, more or less.

The following description is an addition to the original permit and constitutes an Incidental Boundary Change(IBC) as shown on Drawing 1-1. Coal contained in the IBC will be mined by highwall mining, no surface mining may take place on the leased premises.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M
Section 29: BEGINNING at the Northeast Corner of the Northwest Quarter of Section 29, Township 39 South, Range 5 West, Salt lake Base and Meridian and running thence South 14.97 chains; thence West 73 degrees North, 12.41 chains; thence South 36 degrees 45 minutes West to the Quarter Section Line of Section 29, Township 39 South, Range 5 West, Salt Lake Base and Meridian; thence South 36 degrees 45 minutes West 15.61 chains; thence South 5.20 chains to the center section line of Section 29, Township 29 South, Range 5 West, Salt lake Base and meridian; thence South 20.0 chains; thence West 10.96 chains to the west section line of Section 29, Township 39 South, Range 5 West, Salt lake Base meridian; thence North 20.0 chains to the Quarter Section Corner of Section 29, Township 39 South, Range 5 West, Salt Lake Base and meridian; thence North 25.31 chains; thence North 33 degrees 22 minutes East 35.50 chains; thence in a Northwesterly direction 2 rods; thence North 37 degrees 30 minutes East 12.30 chains to the North Section Line of Section 29, Township 39 South, Range 5 West, Salt Lake Base meridian; thence East 17.77 chains to the point of beginning.

....containing 85.88 acres, more or less.

COAL OWNERSHIP:

Owner/Lessor:	*Lessee:*
Alecia Swapp Dame Trust Through Richard Dame, Trustee 1620 Georgia Ave.	Alton Coal Development, LLC

Boulder City, NV 89005
702-293-4773

112.600 Owners of Record of Property Contiguous to Proposed Permit Area

Owners of surface properties contiguous to the proposed permit area are shown on Drawing 1-3 and the name and address of each such owner is as follows:

Department of the Interior, Bureau of Land Management
District and Regional Office
Salt Lake City, Utah

Darlynn and Arlene Sorensen
Orderville, Utah
435-648-2462

112.700 MSHA Numbers

The MSHA Mine Identification Number for the Coal Hollow Project is 42-02519.

112.800 Interest in Contiguous Lands

The applicant has interest in lands contiguous to the permit area. A Lease by Application (LBA) is currently being processed by the United States Department of the Interior, Bureau of Land Management, Salt Lake City, Utah.
Alton Coal Development, LLC, the sole party in interest, submitted the LBA application in September, 2004. The LBA is contiguous to the permit area and contains approximately 3,581 acres. See Drawing 1-2 for LBA delineation.

In addition to the LBA application, Alton Coal Development, LLC also has property leased from C. Burton Pugh located east of the permit boundary. This property which is contiguous to the permit area, is part of a land tract (9-5-20-2) owned by Mr. Pugh that is split across the permit boundary and is located in Section 20, Township 30 South, Range 5 West. This entire tract was leased prior to the final determination of the Permit Boundary (9/10/04). The area leased from Mr. Pugh outside the Permit Boundary are not planned for development except for approximately 43 acres located in the SW¼, NW¼ Section 20 which is included as part of the LBA application. The 43 acres would possibly be developed for surface coal mining operations if the LBA mining rights are successfully acquired. Land tracts leased by Alton Coal Development, LLC within and contiguous to the permit area are identified on Drawing 1-3.

112.900 Certification of Submitted Information

After Alton Coal Development, LLC is notified that the application is approved, but before the permit is issued, Alton Coal will update, correct or indicate that no change has occurred in the information submitted under R645-301-112.100 through .800.

113 VIOLATION INFORMATION

Neither the applicant, affiliates, members or managers or persons controlled by or under common control with the applicant (including Charles Ungurean and Thomas Ungurean, as confirmed by the Applicant/Violator System (AVS) search, dated December 23, 2013) has: (i) had a federal or state mining permit suspended or revoked in the last five years; (ii) nor forfeited a mining bond or similar security deposited in lieu of a bond. Neither the applicant, affiliates, members or managers or persons controlled by or under common control with the applicant has received a violation during the last three year period. Compliance information on Ungurean's operations and the Coal Hollow Mine is attached at Appendix 1-10.

114 RIGHT OF ENTRY INFORMATION

Applicant bases its right to enter and begin coal mining activities in the permit area and the consent of the surface owner to extract coal by surface mining methods upon the following documents:

Lessor:	*Lessee:*
C. Burton Pugh	Alton Coal Development, LLC

Surface and Mineral Lease, dated 9/10/04; originally recorded 5/25/06

Lessor:	*Lessee:*
Roger M. Pugh	Alton Coal Development, LLC

Mineral Lease, dated 9/11/08; recorded 9/11/08

Lessor:	*Lessee:*
Margaret and Mark Moyers	Alton Coal Development, LLC

Mineral Lease, dated 6/26/08; recorded 7/21/08

Lessor:	*Lessee:*
Alecia Swapp Dame Trust	Alton Coal Development, LLC

Surface and Mineral Lease, dated 4/29/05; recorded 5/17/06
Mineral Lease, dated 10/23/13; recorded 10/23/13

Copies of these lease assignments are included in Appendix 1-2 located in the Volume 9, Confidential binder.

115 STATUS OF UNSUITABILITY CLAIMS

115.100 The permit area is not within an area or under study as an area designated as unsuitable for mining under R645-103-400, nor has any petitions been filed with the UDOGM under R645-103-420 that could affect the proposed permit area. The Coal Hollow Project is located on private lands adjacent to federal lands,

which after careful consideration were declared suitable for mining in 1980 by then Secretary of Interior Andrus. Secretary's Decision, Petition to Designate Certain Federal Lands In Southern Utah Unsuitable for Surface Coal Mining, OSM Ref No. 79-5-001, dated December 16, 1980, copy attached at Appendix 1-3.

This petition was filed under the provisions of section 522(c) of the federal Surface Mining Control and Reclamation Act ("SMCRA"). OSM Notice, Receipt of a Complete Petition for Designation of Lands as Unsuitable for Surface Coal Mining Operations, 45 fed. Reg. 3398, Jan. 17, 1980, attached at Appendix 1-3.

Those federal lands in the Petition area found suitable for mining include lands adjacent to the private lands which the Project has included in a federal lease by application and located in Kane County, Utah within Township 39 South, Ranges 5 and 6 West, SLM. Secretarial Decision at Paragraph 4. The Secretarial Decision was based on an extensive Administrative Record, including the Petition filed under Section 533 of SMCRA, 30 U.S.C. Section 1272, public hearings, a combined petition evaluation document and environmental impact statement published in two volumes on November 26, 1980 as, "Southern Utah Petition Evaluation Document" and the "Southern Utah Petition Evaluation Document - Comments and Responses." The Secretarial Decision was further supported by a 52 page Statement of Reasons, dated January 13, 1981, attached at Appendix 1-3.

The Secretarial Decision was upheld by the federal court in *Utah International, Inc. v. Watt*, 553 F. Supp. 872 (D. Utah 1982).

115.300 Coal mining and reclamation activities at the Coal Hollow Project are not planned within 300 feet, measured horizontally, of an occupied dwelling or 100 feet of a public road. Drawing 1-5 shows the proximity of the Swapp Ranch to the planned operations. With the alternate highwall method, coal will be recovered by highwall mining beneath the Swapp Ranch. Engineering has been completed and incorporated into the plan such that subsidence does not occur to the surface.

116 PERMIT TERM

116.100 There are 3 mining phases associated with this permit term. The first phase of mining began on November 10, 2010. Phase 3 is anticipated to conclude in year 2017.

Acres of disturbance per Mining Phase

Phase 1	289 acres
Phase 2	40 acres
Phase 3	89 acres

116.200 Permit Term

The Coal Hollow Mine Project is proposed for a 5-year term under the Permanent Regulatory Program for 5 years

117 INSURANCE, PROOF OF PUBLICATION

Proof of publication pursuant to R645-303-322 is included in Appendix 1-5.

117.100 Certificate of Liability Insurance

A copy of the Certificate of Liability Insurance is found in Appendix 1-4.

118 PERMIT FILING FEE

A copy of this permit is on file with the Utah Division of Oil, Gas and Mining (UDOGM), P.O. Box 145801, Salt lake City, Utah 84114-5801. A filing fee of $5.00 accompanied permit submittal.

120 PERMIT APPLICATION FORMAT AND CONTENTS

This permit application contains information and will comply with R645-301-120. A notarized statement attesting to the accuracy of this information is set forth at Appendix 1-6.

130 REPORTING OF TECHNICAL DATA

All technical data submitted in the permit application will be accompanied by the name or organization responsible for the collection and analysis of data, dates of collection and descriptions of methodology used. Technical analyses will be planned by or under the direction of a qualified professional in the subject to be analyzed.

The following assisted or were consulted in the preparation of this permit application:

State of Utah, Department of Natural Resources
Division of Oil, Gas and Mining
Salt Lake City, Utah

Department of the Interior, Bureau of Land Management
District and Regional Office
Kanab and Salt Lake City, Utah

United States Geological Survey, Utah Region
Salt Lake City, Utah

United States Department of Agriculture
Natural Resources Conservation Service
Salt Lake City, Richfield and Cedar City, Utah

State of Utah, Department of Natural Resources Dr. James E. Nelson

Division of Wildlife Resources (DWR)
Salt Lake City, Price and Cedar City, Utah

Dr. Patrick D. Collins
Mt. Nebo Scientific Research & Consulting
Springville, UT

Erik Petersen, P.G.
Petersen Hydrologic, LLC
Lehi, UT

John T. Boyd Company
James Boyd
Mining & Geological Consulting
Canonsburg, PA

John T. Boyd Company
Rich Bate
Mining & Geological Consulting
Denver, CO

Keith Montgomery
Montgomery Archaeological
Moab, UT
Dr. Stephen Petersen
Philomath, OR

Larry Hayden-Wing
Hayden-Wing Associates, LLC
Laramie, WY

Mark Page
Water Rights Consultant
Price, UT

D.A. Smith Drilling
Loma, CO

Kane County
76 North Main
Kanab, UT

Heaton Livestock
PO Box 100773
Alton, UT

Brigham Young University
Provo, UT

Talon Resources, Inc
Huntington, UT

C. Burton Pugh
Lindon, UT

Richard Dame
Boulder City, NV

University of Miami
Miami, FL

Geochron Laboratories
Cambridge, MA

Energy Labs
Billings, MT

Taylor Geo-Engineering
Alan O. Taylor
Lehi, UT

Long Resource Consultants
Robert E. Long
Morgan, UT

JBR Environmental, Inc.
Dawn Whaley
Sandy, UT

Bruce Chesler
Escalante, UT

A.H. Hamblin
Paleontogical Consulting
Cedar City, UT

Patricia Stavish
Montgomery Archeological
Moab, UT

Mike Shurtz, C.E.T
AGEC
Cedar City, UT

Byron Caton
SGS North America, Inc
Denver, CO

Inter-Mountain Laboratories
Karen Secor
1673 Terra Avenue
Sheridan, WY

Glenn Grossman
Will Spitzenberg, P.E.
Boss Engineering
Pleasant Grove, UT

Tom Campbell
TerraTek
Salt Lake City, UT

140 DRAWING AND PLANS

The Drawing and plans in the Mining and Reclamation Plan are submitted consistent with the requirement of R645-301-140.

150 COMPLETENESS

Alton Coal Development, LLC represents that the information contained in the Coal Hollow Mining and Reclamation Plan permit application to be complete and correct.

Entity Name or ID: johnson (251418) Johnson Larry Begin Date: 1/9/2014 Mail To: Back To Reports

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Dept of the Interior/Office of Surface Mining

Applicant/Violator System

Violations for Entity (251418) Johnson

List of all violations preceding the date of the application: 1/9/2014

This report is designed to assist regulatory authorities with conducting a review of an applicant and operator's compliance history as disclosed in a permit application as required at 30 CFR 773.11. This report is also designed to assist applicants and operators with providing violation information to a regulatory authority as part of a permit application as required at 30 CFR 778.14. CAUTION: If someone wants to evaluate an entity to determine if they have any unabated violations of SMCRA, they should not use this report but instead should run an evaluation report in the entity module of AVS. For further clarification on how to use or interpret results from this generated report, contact an AVS User Liaison at 800.643.9748.

State	Permit No	Seq No	Violation No	Violation Type	Violation Status	Violation Date	MSHA ID(s)

1 of 1

Entity Name or ID: nead (036531) Nead Jr Robert Begin Date: 1/9/2014 Mail To: Send Back To Reports

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Dept of the Interior/Office of Surface Mining

Applicant/Violator System

Violations for Entity (36531) Nead Jr

List of all violations preceding the date of the application: 1/9/2014

This report is designed to assist regulatory authorities with conducting a review of an applicant and operator's compliance history as disclosed in a permit application as required at 30 CFR 773.11. This report is also designed to assist applicants and operators with providing violation information to a regulatory authority as part of a permit application as required at 30 CFR 778.14. CAUTION: If someone wants to evaluate an entity to determine if they have any unabated violations of SMCRA, they should not use this report but instead should run an evaluation report in the entity module of AVS. For further clarification on how to use or interpret results from this generated report, contact an AVS User Liaison at 800.643.9748.

State	Permit No	Seq No	Violation No	Violation Type	Violation Status	Violation Date	MSHA ID(s)

1 of 1

Entity Name or ID: ungurean (64574) Ungurean Thomas Begin Date: 1/9/2014 Mail To: Back To Reports

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1 of 1 Find | Next

Dept of the Interior/Office of Surface Mining

Applicant/Violator System

Violations for Entity (64574) Ungurean

List of all violations preceding the date of the application: 1/9/2014

This report is designed to assist regulatory authorities with conducting a review of an applicant and operator's compliance history as disclosed in a permit application as required at 30 CFR 773.11. This report is also designed to assist applicants and operators with providing violation information to a regulatory authority as part of a permit application as required at 30 CFR 778.14. CAUTION: If someone wants to evaluate an entity to determine if they have any unabated violations of SMCRA, they should not use this report but instead should run an evaluation report in the entity module of AVS. For further clarification on how to use or interpret results from this generated report, contact an AVS User Liaison at 800.643.9748.

State	Permit No	Seq No	Violation No	Violation Type	Violation Status	Violation Date	MSHA ID(s)

1 of 1

Entity Name or ID: ungurean (107810) Ungurean Charles Begin Date: 1/9/2014 Mail To: Back To Reports

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Dept of the Interior/Office of Surface Mining

Applicant/Violator System

Violations for Entity (107810) Ungurean

List of all violations preceding the date of the application: 1/9/2014

This report is designed to assist regulatory authorities with conducting a review of an applicant and operator's compliance history as disclosed in a permit application as required at 30 CFR 773.11. This report is also designed to assist applicants and operators with providing violation information to a regulatory authority as part of a permit application as required at 30 CFR 778.14. CAUTION: If someone wants to evaluate an entity to determine if they have any unabated violations of SMCRA, they should not use this report but instead should run an evaluation report in the entity module of AVS. For further clarification on how to use or interpret results from this generated report, contact an AVS User Liaison at 800.643.9748.

State	Permit No	Seq No	Violation No	Violation Type	Violation Status	Violation Date	MSHA ID(s)

1 of 1

Entity Name or ID: wayland (247290) Wayland James Begin Date: 1/9/2014 Mail To: Back To Reports

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1 of 1 Find | Next

Dept of the Interior/Office of Surface Mining

Applicant/Violator System

Violations for Entity (247290) Wayland

List of all violations preceding the date of the application: 1/9/2014

This report is designed to assist regulatory authorities with conducting a review of an applicant and operator's compliance history as disclosed in a permit application as required at 30 CFR 773.11. This report is also designed to assist applicants and operators with providing violation information to a regulatory authority as part of a permit application as required at 30 CFR 778.14. CAUTION: If someone wants to evaluate an entity to determine if they have any unabated violations of SMCRA, they should not use this report but instead should run an evaluation report in the entity module of AVS. For further clarification on how to use or interpret results from this generated report, contact an AVS User Liaison at 800.643.9748.

State	Permit No	Seq No	Violation No	Violation Type	Violation Status	Violation Date	MSHA ID(s)

1 of 1

Entity Name or ID: sh coal (250907) SH Coal Investment LLC Begin Date: 1/9/2014 Mail To: Back To
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Applicant/Violator System

Violations for Entity (250907) SH Coal Investment LLC

List of all violations preceding the date of the application: 1/9/2014

This report is designed to assist regulatory authorities with conducting a review of an applicant and operator's compliance history as disclosed in a permit application as required at 30 CFR 773.11. This report is also designed to assist applicants and operators with providing violation information to a regulatory authority as part of a permit application as required at 30 CFR 778.14. CAUTION: If someone wants to evaluate an entity to determine if they have any unabated violations of SMCRA, they should not use this report but instead should run an evaluation report in the entity module of AVS. For further clarification on how to use or interpret results from this generated report, contact an AVS User Liaison at 800.643.9748.

State	Permit No	Seq No	Violation No	Violation Type	Violation Status	Violation Date	MSHA ID(s)

1 of 1

Alton Coal Development, LLC
Coal Hollow Mine

Permit Number	MSHA	Violation Number	Date of Issuance	Issued to	Issuing Agency	State	Brief Description of NOV	Action taken to Abate NOV	Current Status of NOV
C250005	42-02519	10078	3/9/2011	K.Nicholes	UDOGM	Utah	Failure to maintain sediment	Repaired Silt Fence	Terminated
C250005	42-02519	10079	3/9/2011	K.Nicholes	UDOGM	Utah	Failure to protect soil	Resumed topsoil stockpiling	Vacated
C250005	42-02519	10084	5/2/2011	K.Nicholes	UDOGM	Utah	Discharging water	Treated Water	Terminated
C250005	42-02519	10085	5/25/2011	K.Nicholes	UDOGM	Utah	Failure to conduct quarterly inspection of Excess Spoils Pile		Terminated
C250005	42-02519	10092	12/5/2011	K.Nicholes	UDOGM	Utah	Failure to comply with permit	Amend MRP	Terminated
C250005	42-02519	10123	6/19/2013	K.Nicholes	UDOGM	Utah	Failure to comply with Chapter 3	Amend MRP	Vacated

OXFORD MINING CO INC

Permit Number	Violation Number	Date of Issuance	Issuing Agency	State	Brief description of NOV	Action Taken to Abate NOV	STATUS
2313	29068	10-Jan-11	DMRM	OHIO	FAILURE TO SEAL HIGHWALL MINER HOLES PER PLAN		Terminated
680	29511	01-Mar-11	DMRM	OHIO	LANDSLIDE REOCCURED YR. 17 SEGMENT		Terminated
2244	29528	03-Mar-11	DMRM	OHIO	EROSION GULLY EXISTS EAST FOR POND-001		Terminated
2325	29282	15-Mar-11	DMRM	OHIO	FAILURE TO DIRECT ALL DRAINAGE TO A POND		Vacated
2325	29281	15-Mar-11	DMRM	OHIO	FAILURE TO PREVENT SHORT-CIRCUITING		Vacated
2325	29284	15-Mar-11	DMRM	OHIO	EXCEEDING EFFLUENT LIMITS AT POND #004		Terminated
2325	29277	16-Mar-11	DMRM	OHIO	FAILURE TO PROTECT TOPSOIL PILES		Terminated
2325	29277	16-Mar-11	DMRM	OHIO	FAILURE TO PROTECT TOPSOIL PILES		C
2325	29278	16-Mar-11	DMRM	OHIO	FAILURE TO INSTALL SADE DRAINAGE CONTROLS		Vacated
2325	29279	17-Mar-11	DMRM	OHIO	BREACHED DIVERSION DITCH		Vacated
2325	29283	17-Mar-11	DMRM	OHIO	FAILUE TO DIRECT ALL RUNOFF TO A SILTATION STRUCTURE		Terminated
2097	29146	06-Apr-11	DMRM	OHIO	EXCEEDING AIRBLAST LIMITS		Non-Remedial
2276	29285	06-Apr-11	DMRM	OHIO	FAILURE TO PREVENT EROSION BELOW SPILLWAY OF POND #009		Terminated
2276	29286	06-Apr-11	DMRM	OHIO	FAILURE TO PREVENT SHORT-CIRCUITING IN POND #009		Terminated
1086	29318	13-Apr-11	DMRM	OHIO	FAILURE TO ACHIEVE VEGETATION SUCCESS STANDARDS		Terminated
2325	I-13067	18-Apr-11	DMRM	OHIO	EXCEEDING THE PERMIT LIMITS		Terminated
2334	29091	18-Apr-11	DMRM	OHIO	ACID WATER 4.5 PH DISCHARING FROM SUMPS &POND 04		Terminated
2245	29289	09-May-11	DMRM	OHIO	EROSION		Terminated
2245	29291	10-May-11	DMRM	OHIO	FAILURE TO MAINTAIN POND #009 EMBANKMENT		Terminated
2245	29290	10-May-11	DMRM	OHIO	FAILURE TO MAINTAIN POND #007 PRINCIPAL SPILLWAY		Terminated
2245	29292	10-May-11	DMRM	OHIO	BREACHED DIVERSION DITCH WEST OF POND #007		Terminated
2254	28331	17-May-11	DMRM	OHIO	FAILURE TO COMPLETE SILT STRUC. PRIOR TO MINING		Terminated
2254	29320	17-May-11	DMRM	OHIO	FAILURE TO PASS ALL SURFACE DRAINAGE THRU PRO POND		Terminated
2254	28330	17-May-11	DMRM	OHIO	FAILURE TO CERTIFY POND 106 BY REGISTERED PRO ENG.		Terminated
2198	29563	24-May-11	DMRM	OHIO	WEB PILLERS DEVIATE FROM ENG. PLANS		Non-Remedial
2097	29151	31-May-11	DMRM	OHIO	FAILURE TO FOLLOW APPROVED AUGERING PLAN		Terminated
838	29559	03-Jun-11	DMRM	OHIO	CONSTRUCTED HAUL ROAD SUMPS BEYOND THE PERMIT LIMITS		E
2325	29297	15-Jun-11	DMRM	OHIO	EXCEEDING EFFLUENT LIMITS FROM POND #002		Terminated
2295	29521	16-Jun-11	DMRM	OHIO	FAILURE TO PASS ALL SURFACE DRAINAGE THUR SILT STRUC.		Terminated
2295	I-11715	16-Jun-11	DMRM	OHIO	UNPROTECTED TOPSOIL LANDSLIDE EXISTS OFF THE PERMIT		Terminated
2295	29523	16-Jun-11	DMRM	OHIO	FAILURE TO PASS ALL SURFACE DRAINAGE THUR SILT STRUC.		Terminated
2295	29526	16-Jun-11	DMRM	OHIO	EMBANKMENT OF SED STRUCTURE POND 002E IS SLIPPING		Terminated
2290	29096	11-Jul-11	DMRM	OHIO	BLASTING EXCEEDED PPV & FREQ. DEP. LIMITS		Non-Remedial
2290	29095	11-Jul-11	DMRM	OHIO	FAILURE MONITOR BLASTS @ SELVIN & REED PROPERTIES		
2238	29067	12-Jul-11	DMRM	OHIO	GRUBED TREE STUMPS WITHIN 100 FEET OF STREAM 1 & b		Terminated
2324	29299	20-Jul-11	DMRM	OHIO	EXCEEDING EFFLUENT LIMITS		Terminated
2330	29298	20-Jul-11	DMRM	OHIO	EXCEEDING EFFLEUNT LIMITS FOR IRON		Terminated
2295	29564	09-Aug-11	DMRM	OHIO	FAILURE TO MAINTAIN SEDIMENT CONTROLS		Terminated
2295	29568	10-Aug-11	DMRM	OHIO	FAILURE TO MAINTAIN POND 008 AS DESIGNED		Terminated
2295	29565	10-Aug-11	DMRM	OHIO	ACID WATER DISCHARGING FROM POND-006		Terminated

2295	29567	10-Aug-11	DMRM	OHIO	SEDIMENT & RIP RAP DISCHARGED OFF PERMIT TO PS-25		Terminated
2295	29566	11-Aug-11	DMRM	OHIO	OUT OF COMPLIANCE WITH NPDES EFFLUENT LIMITS		Vacated
2295	29569	24-Aug-11	DMRM	OHIO	OUT OF COMPLIANCE WITH NPDES EFFLUENT LIMITS		Vacated
2318	29328	20-Sep-11	DMRM	OHIO	FAILURE TO COMPLY WITH SD & SEIS.@NEAREST DWELLING		Non-Remedial
2254	29323	03-Oct-11	DMRM	OHIO	FAILURE TO CONSTRUCT POND 106 W/APPROVED DESIGN		Terminated
2377	29570	24-Oct-11	DMRM	OHIO	MACHINERY OUTSIDE OF PERMIT BOUNDARY		Terminated
2364	29161	09-Dec-11	DMRM	OHIO	EXCEEDING THE PEAK PARTICLE VELOCITY		Non-Remedial
2364	29416	20-Jan-12	DMRM	OHIO	FAILURE TO FOLLOW THE APPROVED MINING PLAN		VacatedA
2295	29571	07-Mar-12	DMRM	OHIO	FAILED PERIMETER DIVERSIONS W/SEDIMENT OFF THE PERMIT		Terminated
2364	29417	20-Mar-12	DMRM	OHIO	EXCEEDED THE PEAK PARTICLE VELOCITY		Non-Remedial
2295	29841	27-Mar-12	DMRM	OHIO	FAILURE TO MAINTAIN SEDIMENT CONTROLS CAUSING EROSION		Terminated
2254	29334	03-Apr-12	DMRM	OHIO	STOCKPILED COAL ON THE PERMIT IN EXCESS OF 30 DAYS		Vacated
2295	29842	15-May-12	DMRM	OHIO	FAILURE TO MAINTAIN ENERGENCY SPILLWAY CAUSING EROSION		Terminated
2295	29843	15-May-12	DMRM	OHIO	FAILURE TO MAINTAIN ENERGENCY SPILLWAY CAUSING EROSION		E
2319	29539	21-Jun-12	DMRM	OHIO	REMOVAL OF COAL WITHIN THE DESIGNATED BUFFER ZONE		
2097	29167	02-Jul-12	DMRM	OHIO	MINING IN WATERSHED W/O COMPLETED DRAINAGE CONTROL SYST		Terminated
1164	29844	10-Jul-12	DMRM	OHIO	FAILURE TO MAINTAIN PRIMARY SPILLWAY & DAM		Terminated
2376	29343	17-Aug-12	DMRM	OHIO	FAILURE TO FOLLOW BLASTING PLAN		Non-Remedial
2386	29540	19-Sep-12	DMRM	OHIO	AFFECTED ACRES EXCEEDS ACRES OF PERFORM BOND		Terminated
2325	29418	20-Nov-12	DMRM	OHIO	AFFECTED WITHIN THE BUFFER ZONE OF STREAM D		Terminated
2254	29353	28-Nov-12	DMRM	OHIO	MINING WITHIN A DESIGNATED AREA ONLY		Terminated
981	29249	29-Nov-12	DMRM	OHIO	FAILURE TO FOLLOW APPROVED DISPOSAL PLAN		Terminated
2319	29542	16-Jan-13	DMRM	OHIO	FAILURE TO MAINTAIN POND 003		Terminated
2369	29881	16-Apr-13	DMRM	OHIO	POND 9 LEAKING DISCHARGING THRU DEVELOPED SPRING		
2369	29903	08-May-13	DMRM	OHIO	POND 9 LEAKING EXCEEDING MAX LIMIT SUSP. SOLIDS		Terminated
2398	29900	15-May-13	DMRM	OHIO	BLASTING PPV EXCEEDED 2.0 LIMIT		Non-Remedial
2398	29898	15-May-13	DMRM	OHIO	FAILURE TO MONITOR & PROVIDE BLASTING DATA		Non-Remedial
2393	29421	11-Jun-13	DMRM	OHIO	ACID WATER PH 4.5 DISCHARGING FROM POND 002		Terminated
2376	29398	18-Jun-13	DMRM	OHIO	BLASTING PPV EXCEEDED LIMIT OF .50 IPS		Non-Remedial
2315	29901	26-Jun-13	DMRM	OHIO	FAILURE TO PASS ALL SURFACE DRAINAGE TUR SILT STRUC		Non-Remedial
2295	29845	23-Jul-13	DMRM	OHIO	EROSION EXITS AT POND 011 SPILLWAY & OFF PERMIT AREA		Terminated
2295	29846	24-Jul-13	DMRM	OHIO	SEDIMENT IN EXCESS OF POND CAPACITY		Terminated
2295	29848	24-Jul-13	DMRM	OHIO	EROSION EXISTS AT STREAM CROSSING & DIVERSION DITCHES		Terminated
2295	29847	24-Jul-13	DMRM	OHIO	ERIOSION EXISTSPOND 15 SPILLWAY TO RECEIVING STREAM		Terminated
2386	I13165	02-Aug-13	DMRM	OHIO	LANDSLIDE OCCURRED BEYOND PERMIT LIMITS		Terminated
2315	29908	13-Aug-13	DMRM	OHIO	BLAST EXCEEDED PPV OF 1.0 IPS LIMIT @ NEAREST DWELLING		Non-Remedial
2408	I-13170	10-Dec-13	DMRM	OHIO	LANDSLIDE HAS OCCURRED BEYOND PERMIT LIMITS		Terminated

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R645-301-200. SOILS

210. INTRODUCTION

211. Soil Removal

In this section, the Alton Coal Project will present a description of the pre-mining soil resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be separately removed and segregated from other materials.

212. Soil Redistribution

After removal, topsoil will be immediately redistributed in accordance with R645-301-242 and stockpiled pending redistribution under R645-301-234. For details refer to Section 5 of Appendix 2-1.

220. ENVIRONMENTAL DESCRIPTION

221. Prime Farmland Investigation

The Natural Resource Conservation Service conducted a prime farmland assessment in October 2006 and determined that "No Prime Farmland or Soils of Statewide Importance were found within the study area (Coal Hollow Mine area), per criteria outlined in the National Survey Handbook Part 622 and Exhibit UT603-1, respectively (C. Meier, 2006)." The assessment stated that the soils "..could classify as Soils of Statewide Importance, if irrigated.."

"An available and reliable source of moisture to sustain crops common to the area is the primary limiting factor that excludes the observed soils from classifying as Prime Farmland or SSI (C. Meier, 2006)."

"In addition to a lack of a reliable source of water, soils did not classify as Prime Farmland due to high pH, high electrical conductivity, excessive erosion potential on steep slopes and slow permeability (C. Meier, 2006)."

On January 28, 2014, the Natural Resource Conservation Service provided a prime farmland assessment for the Dame Lease IBC. It was determined that "About 80 acres of the area of interest meets the definition of "Statewide Important Farmland, if irrigated" . It is in map unit "1103- Sili-Sidshow- Gypsic Haplustepts complex, 2 to 15 percent slopes" .

A copy of the NRCS Prime Farmland Determination for both the 2006 (Coal Hollow Mine) and the 2014 (Dame Lease IBC) is included in Section 1 of Appendix 2-1.

222. Soil Survey

An order 2 soils survey has been completed in 2007 at the Coal Hollow Project. Appendix 2-1 contains a report that provides the details for this survey. Utilizing existing soils data, the soil map units were extended to include the Dame Lease IBC. Appendix 2-3 contains a report

that provides details for this survey. The survey area is on private lands leased by Alton Coal Development (ACD) and adjacent lands. These soil surveys were prepared so that ACD could: 1) identify suitable sources of subsoil and topsoil; 2) determine topsoil and subsoil salvage depths and quantities; and, 3) develop a post mining reclamation plan using salvaged soil materials. These soil surveys cover approximately 716 acres.

222.100. Soils Map

A map with soil map unit delineations is shown on Drawing 2-1.

222.200. Soil Identification

Soils in the Coal Hollow project soil survey area have been grouped into thirteen soil map units based on taxonomic classification, depth to parent material, and slope. The composition of these map units is described in table 2-1. Detailed descriptions of each soil map unit are included in Appendix 2-1. The soil survey map is Drawing 2-1.

Table 2-1. Soil map unit composition for the Coal Hollow project area.

Map Unit	Pct	Soil Type[1]	Taxonomic Classification[2]	Modal Pedon[3]
1		**A Family – Wapiti Family complex, 3 to 8 percent slopes**		
	65	A Family	fine, mixed, superactive, mesic Aridic Calciustept	1
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	32
	10	D	fine, mixed, superactive, mesic Aridic Calciustoll	33
	5	Manzanst Family	fine, mixed, superactive, mesic Aridic Haplustalf	48
	5	N Family	fine, mixed, superactive, frigid Aquic Calciustoll	26
2		**M Family - Calendar Family – D Family complex, 3 to 8 percent slopes**		
	60	M Family	fine, mixed, superactive, mesic Aridic Calciustepts	3
	25	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	4
	15	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	2
3		**Cibeque Family – Wapiti Familiy complex, 3 to 8 percent slopes**		
	60	Cibeque Family	fine-loamy, mixed, superactive, mesic Aridic Calciustept	6
	30	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	31
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
	5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	
4		**Jonale Family - Graystone Cobbly Substratum Family - Wapiti Family complex, 3 to 8 percent slopes**		
	50	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	17
	25	Graystone cobbly substratum Family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	39
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	19
	5	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	

222.400 Present and Potential Productivity of Existing Soils

Soils in the Coal Hollow project area support big sagebrush, grasses (native and introduced species), pinyon pine, Utah juniper, and Gambel oak. Detailed descriptions of the present and potential productivity of the soils are detailed in Chapter 3, Section 321.200.

223. Soil Characterization

This soil survey was made in accordance with the guidelines for an order 2 soil survey as detailed in the Soil Survey manual (USDA 1993). Soils were classified using the Keys to Soil Taxonomy, Ninth Edition (USDA 2003). Soils for the New Dame Lease IBC were classified using the Keys to Soil Taxonomy, Eleventh Edition (NRCS 2010). Representative soil samples were submitted for laboratory analysis of the parameters outlined by the Utah Division of Oil Gas and Mining's *Guidelines for Management of Topsoil and Overburden* (2005).

224. Substitute Topsoil

Based on the 2006-2007 order 2 soil survey, sufficient quantities of suitable topsoil and subsoil are available for reclamation within the project area. The Coal Hollow Project does not plan to use substitute material for topsoil at the time of reclamation. However, if in the future the Coal Hollow mine plan proposes to use selected overburden materials as a supplement or substitute for topsoil, an application will be provided to the DOGM that includes results of analyses, trials, and tests as described under R645-301-232.100 through R645-301-232.600, R645-301-234, R645-301-242, and R645-301-243. DOGM may also require the results of field-site trials or greenhouse tests as required under R645-301-233.

230. Operation Plan

231. General Requirements

231.100. Methods for Removing and Storing Subsoil and Topsoil

The methods for removing and storing topsoil, subsoil, and other materials will be to first remove the woody plants from the area and place them in piles for later placement in pit backfills. Next, dozers or scrapers will remove the topsoil layer to a depth determined by the soil survey. The topsoil will be stockpiled and protected from wind and water erosion. Stockpiles that will be in place for less than 1 year will be coated with a tackifier at the manufacturer's suggested rate for dust control applications. Those stockpiles that will be in place for at least one year will be seeded and covered with mulch during the appropriate season. Side slopes of stockpiles will be sloped to 3h:1v: The suitable subsoil will then be removed and stockpiled separately from the topsoil. The depth of topsoil and subsoil salvage will be determined by the aforementioned soil survey and in the field during mining by the Coal Hollow environmental technician in consultation with a certified professional soil scientist. Stockpiling of topsoil and subsoil will only occur when direct placement (or live hauling) is not operationally practical. Drawing 2-2 shows planned topsoil stockpiles and topsoil removal plans.

234.240. (d) They will not be moved until required for redistribution unless approved by the UDOGM. Anticipated storage time for each stockpile is shown on Drawing 2-2.

234.300. Long-Term Disturbance & Stockpiling

When long-term disturbed areas will result from facilities and preparation plants and when stockpiling of materials removed under 8645-301-232.100 would be detrimental to the quality or quantity of those materials, DOGM may approve the temporary distribution of the soil materials removed to an approved site within the permit area to enhance the current use of that site until later when needed for reclamation, provided that the following conditions occur.

234.310. Such action will not permanently diminish the capability of the topsoil of the host site.

234.320. The material will be retained in a condition more suitable for redistribution than if stockpiled.

240. Reclamation Plan (General Requirements)

A detailed Order 2 soil survey has been completed in 2006 and 2007 and extended to include the New Dame Lease IBC in 2014. This information provides detail for onsite soil suitability, salvage depths, and volumes available for reclamation of the mine site. Dozers or Scrapers will replace the subsoil and topsoil. The topsoil is estimated to average 8 inches and the subsoil will be approximately 39 inches in thickness. The total profile of topsoil and subsoil is estimated to average 48 inches.

242. Soil Redistribution

242.100. Topsoil materials removed under R645-301-232.100, R645-301-232.200, and R645-301-232.300 and stored under R645-30I-234 will be redistributed in a manner that meets the following conditions.

242.110. (a) The material achieves an approximately uniform, stable thickness consistent with the approved postmining land use, contours, and surface-water drainage systems. All slopes will be appropriately graded and leveled prior to placement of topsoil and subsoil layers. Soil layer thicknesses will be regularly checked using a high precision GPS system and spot checking by the ACD environmental technician.

242.120. (b) Reduced material handling of the soil resource prevents excess compaction. Material handling will be minimized by direct hauling and placing materials when operationally practical rather than stockpiling. Materials will be spread by a dozer or scrapers and spread only as much as necessary to obtain the required uniform thickness. Traffic from rubber tired equipment across topsoil and subsoil will be minimized.

APPENDIX 2-3

2014 Soil Survey Report

Order 2 Soil Survey

of

New Dame Lease IBC
Coal Hollow Mine
Located near Alton, Utah

Prepared for Alton Coal Development, LLC

By

Long Resource Consultants, Inc.
Morgan, Utah

January 10, 2014

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Section One

Purpose of Soil Survey

The purpose of this report is to summarize the results of an Order 2 soil survey in the New Dame Lease IBC for Alton Coal Development, LLC (ACD) in an area proposed for expansion of the existing Coal Hollow surface coal mine. Underground mining is proposed in the New Dame Lease IBC. This soil survey was prepared so that ACD could identify existing soil properties (e.g. depths, textures, chemistry, rock fragment content, and aquic soil conditions). Surface soil disturbance is not proposed.

This soil survey report is an addendum to the Order 2 soil survey report prepared for ACD in 2008 as part of the original baseline studies for the Coal Hollow Mine (Long 2008). Soil families, map unit descriptions, climate, geology, and laboratory analysis results are fully described in the 2008 soil survey.

Project Area

The Coal Hollow Project soil survey area is located in the Sink Valley portion of the Alton Amphitheater, figures 1-1 and 1-2. It is bounded on the northeast and east by the Paunsaugunt Plateau and by the Markagunt Plateau on the northwest. Black Mountain separates Sink Valley from Long Valley on the west. It is bounded on the south by the Skutumpah Terrace The *New Dame Lease IBC* project area is located in the northwest quarter of section 19, Township 39 south, Range 5 west, Salt Lake Base meridian. Elevation ranges from approximately 6,840 to 7,030 feet.

The *New Dame Lease IBC* is located along the southeast boundary of the existing Coal Hollow mine. The area is drained by Sink Valley Wash which flows into Kanab Creek approximately 7.3 miles south of the *New Dane Lease IBC*.

Vegetation is dominated by developed rangeland. Grasses had been grazed when the soils were examined in September 2007 and could not be identified. Woods rose and rabbitbrush are scattered throughout the area. Field bindweed and thistle were present when the area was examined in 2007.

Climate

The Coal Hollow soil survey contains a detailed description of the climate in the Alton, Utah area (Long 2008). The average annual air temperature is 45.6° F and the average annual precipitation is 16.43 inches. The precipitation pattern is ustic and the soil temperature regime is mesic (Parslow 2014a). Table 1-1 summarizes the monthly and annual weather for Alton, Utah.

Table 1-1. Summary of weather data for Alton, Utah.

	Ave Max Temp (F)	Ave Min Temp (F)	Ave Total Precip (in)	Ave. Total Snowfall (in)	Ave Total Snow Depth (in)
January	39.6	15.1	1.79	21.1	6
February	42.2	17.5	1.79	19.2	8
March	47.8	21.8	1.57	14.5	5
April	57.7	28.0	1.05	4.4	1
May	67.3	34.8	0.84	0.6	0
June	76.8	42.0	0.56	0.1	0
July	82.7	49.8	1.42	0.0	0
August	80.4	48.9	1.74	0.0	0
September	73.9	41.8	1.49	0.0	0
October	63.0	33.0	1.43	1.3	0
November	49.9	23.0	1.23	6.6	1
December	41.8	16.8	1.52	15.4	2
Annual	60.3	31.0	16.43	83.3	2

Source: Western Regional Climate Center, April 2007.

Figure 1-1. General location of *New Dame Lease IBC* soil survey area for the Coal Hollow mine. Location and shape are approximate. Base map is index map of Paunsaugunt Plateau region (Utah Geological Survey, 2001).

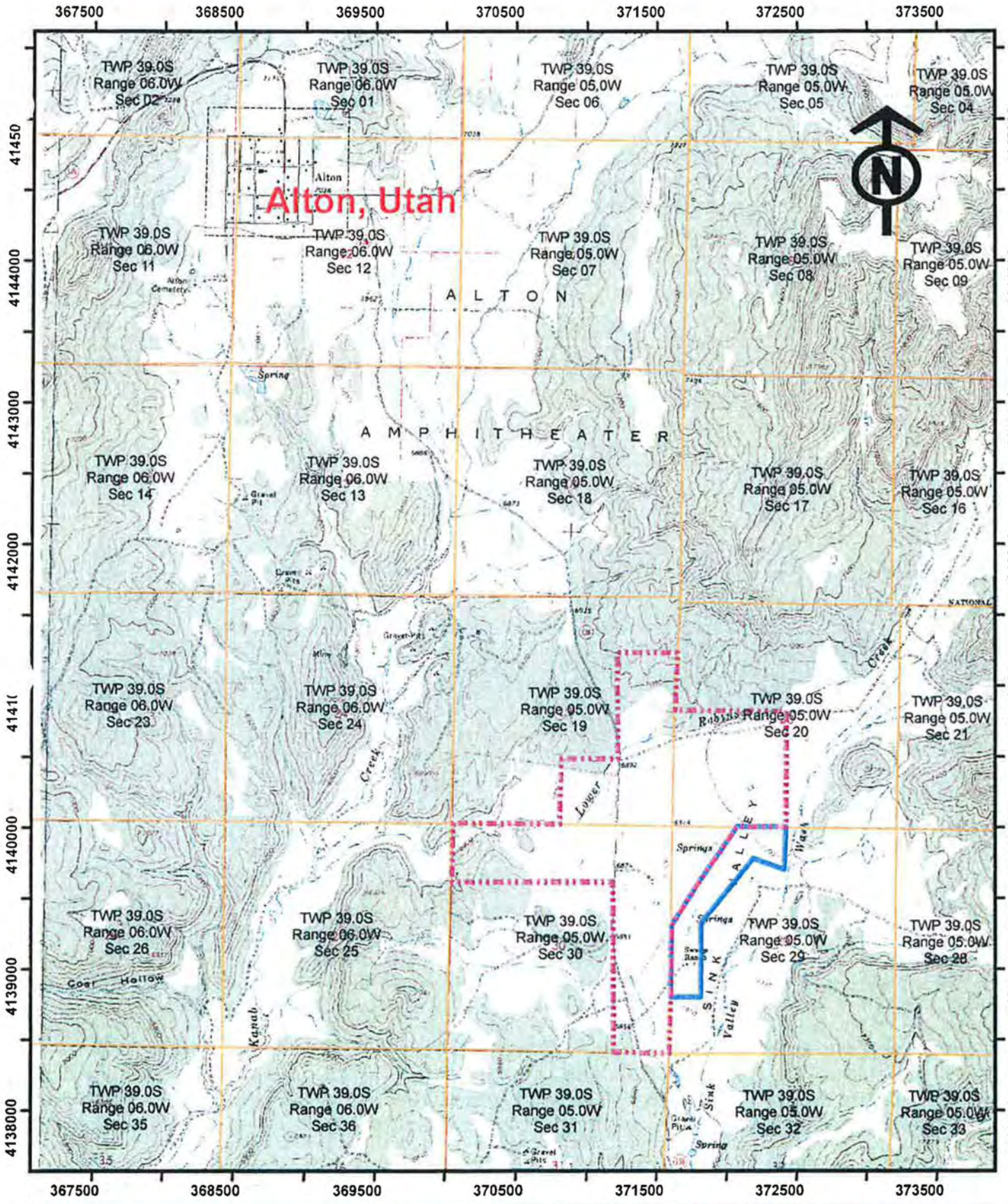


Fig. 1-2. Alton Coal - New Dame Lease IBC

January 10, 2014

Alton, Utah USGS 7.5' Topo Map

1 inch = 3,000 feet

Coal Hollow Mine

New Dame Lease IBC

NRCS Order 3 Soil Survey

The Natural Resource Conservation Service (NRCS) has conducted an Order 3 soil survey in the Alton, Utah area as part of the Kane County, Utah Area Soil Survey (NRCS 2014). This soil survey is in progress and final correlation has not been completed. Information obtained from the NRCS (Parslow 2014a) and described in this report is subject to change. Figure 1-3 illustrates the NRCS soil map units within and adjacent to the *New Dame Lease IBC*.

Soils in the New Dame Lease IBC were identified by the NRCS with soil map unit 1103 (Sili family-Sideshow family-Redig family complex, 2 to 15 percent slopes). This soil map unit consists of 40 percent Sili family soils, 35 percent Sideshow family soils, and 25 percent Redig family soils. Elliston and Quezcan soils are also present in the map unit as minor inclusions.

Sili family soils (Aridic Haplustepts) are fine textured, have a cambic horizon, contain 5 to 15 percent gypsum masses in the lower subsurface and subsoil (By and Cy horizons). The calcium carbonate equivalent in Sili family soils ranges from 0 to 10 percent (Parslow 2014a).

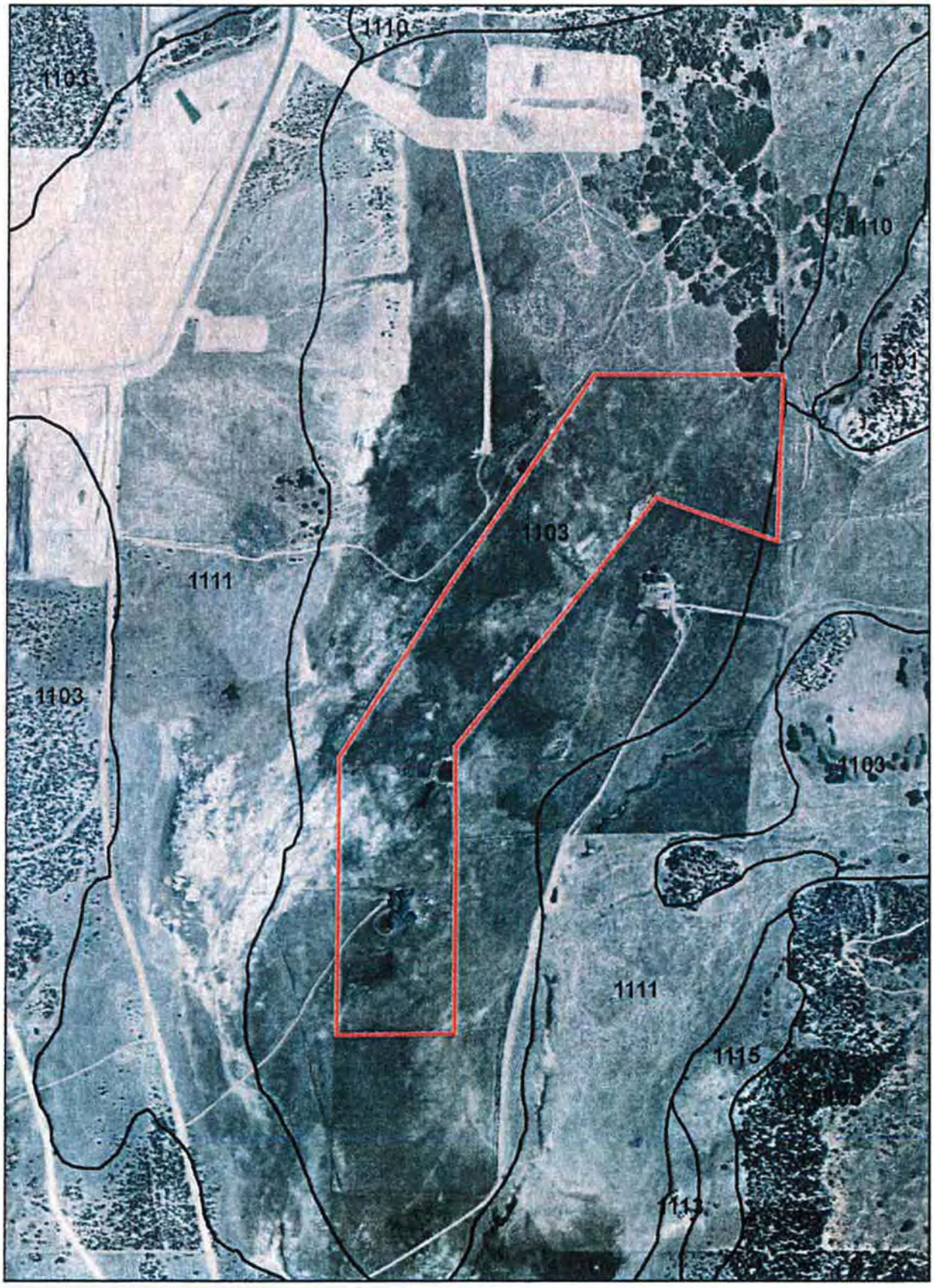
Sideshow family soils (Gypsic Haplusterts) are fine textured, have a cambic horizon, and contain 5 to 15 percent gypsum masses in the subsurface (By horizon). The calcium carbonate equivalent in Sideshow family soils ranges from 0 to 15 percent (Parslow 2014a).

Redig family soils (Gypsic Haplustepts) are fine-loamy, have a cambic horizon, and contain an 5 to 15 percent gypsum masses in the subsurface (By horizon). The calcium carbonate equivalent in Redig family soils ranges from 0 to 15 percent (Parslow 2014a).

Elliston family soils (Aquic Haplustepts) are fine-loamy, have a cambic horizon, and a seasonal high water table at 24 to 42 inches (NRCS 2014). The calcium carbonate equivalent ranges from 3 to 10 percent in the subsurface (NRCS 2014). Soils similar to the Elliston family dominate the *New Dame Lease IBC*.

Quezcan soils (Aridic Ustorthents) are moderately deep (20 to 40 inches) to shale, fine textured, and have limited development. The calcium carbonate equivalent ranges from 3 to 10 percent in the subsurface and subsoil (NRCS 2014).

Alton Expansion Area - December, 2013



0 300 600 1,200 1,800 2,400 Feet

1:10,000

Figure 1-3. NRCS soil survey, draft subject to change.

How the Soil Survey was Made

This soil survey was made in accordance with the guidelines for an order 2 soil survey as detailed in the Soil Survey manual (NRCS 1993). Soils were classified to the taxonomic family using the *Keys to Soil Taxonomy, Eleventh Edition* (NRCS 2010). The dominant soil sub-groups identified in the *New Dame Lease IBC* soil survey area are Aquic Calciustepts, Aridic Calciustepts, Calcidic Haplustalfs, Oxyaquic Haplustalfs, and Aeric Epiaquents.

Field Evaluation of Soils

Five soil profile descriptions were described in the *New Dame Lease IBC* area during September 2007. These profiles were sampled with hand dug pits in the upper 11 to 24 inches (28 to 60 cm) and a soil auger to depths of 60 to 64 inches (150 to 162 cm). Representative samples of each soil horizon were placed in soil profile boxes for later examination. Standard NRCS soil profile log sheets were completed at each location using the methods detailed in the *Field Book for Describing and Sampling Soils, version 2.0* (Schoenberger et. al., 2002) and later updated using the *Field Book for Describing and Sampling Soils, version 3.0* (Schoenberger et. al., 2012).

Each soil profile description was digitized using Pedon PC software version 5.1 (NRCS 2012). These soil profile descriptions are contained in Appendix A. Photographs of each soil profile location in the *New Dame Lease IBC* are in Appendix B. Photographs of each soil profile box are in Appendix C.

Analysis of Soils

A complete laboratory analysis was conducted of each of the major soil types was completed as part of the Order 2 Soil Survey of Coal Hollow Mine Disturbance Area (Long 2008). Each of the soil samples were analyzed for the parameters outlined by the Utah Division of Oil Gas and Mining's (DOGM) *Guidelines for Management of Topsoil and Overburden* (DOGM, 2005), Table 1-2.

No additional laboratory analysis was completed for the *New Dame Lease IBC*, because of it is immediately adjacent to and an extension of the *Order 2 Soil Survey of Coal Hollow Mine Disturbance Area* (Long 2008). All soils described in the *New Dame Lease IBC* were correlated to soils previously identified during the 2008 soil survey.

Table 1-2. Soil analysis parameters for topsoil and overburden (Utah DOGM, 2005).

Topsoil Suitability Parameters	
Paste pH	Available Phosphorus
Saturation percent	Particle Size Analysis (% very fine sand, sand, silt, and clay)
Electrical Conductivity (ECe)	Organic Matter Percent
Soluble Na, K, Mg, and Ca	CaCo3 Percent
Sodium Adsorption Ratio	Extractable Potassium
Additional Analyses for Topsoil and Overburden	
Soluble Selenium	Soluble Boron
Alkalinity	

Prime Farmland

NRCS soil map unit 1103 contains two soils listed as *Farmland of Statewide Importance, if Irrigated*. These are the Sili and Sideshow families (Parslow 2014b). However, neither of these soils were identified in the *New Dame Lease IBC*.

Evidence of historic surface irrigation was observed within the *New Dame Lease IBC* south of the southernmost pond. Irrigation from this pond is limited to catchment of local surface runoff. Evidence of historic surface irrigation consisted of poorly maintained ditches overgrown with grasses.

Section Two

Soil Survey Legend

Five soil map units were extended from the *Order 2 Soil Survey of Coal Hollow Mine Disturbance Area* soil survey into the *New Dame Lease IBC*. These soil map units and the approximate acres of each are listed in table 2-1. The components of each soil map unit are listed in table 2-2. Detailed descriptions of each soil map unit are contained in the *Order 2 Soil Survey of Coal Hollow Mine Disturbance Area* (Long 2008).

Table 2-1. Soil map units identified within the New Dame Lease IBC soil survey.

Soil Map Unit	Map Unit Name	Approximate Acres
3	Cibeque Family - Wapiti Family complex, 3 to 8 percent slopes	25.70
4	Jonale Family – Graystone cobbly substratum Family - Wapiti Family complex, 3 to 8 percent slopes	15.53
7	Happyhollow Family – Alamosa complex, 1 to 5 percent slopes	30.63
8	Brumley – Graystone Cobbly - Snilloc complex, 3 to 8 percent slopes	2.78
13	A Family – Happyhollow Family complex, 1 to 5 percent slopes	10.39
W	Stock water impoundents	0.86
Total		85.88

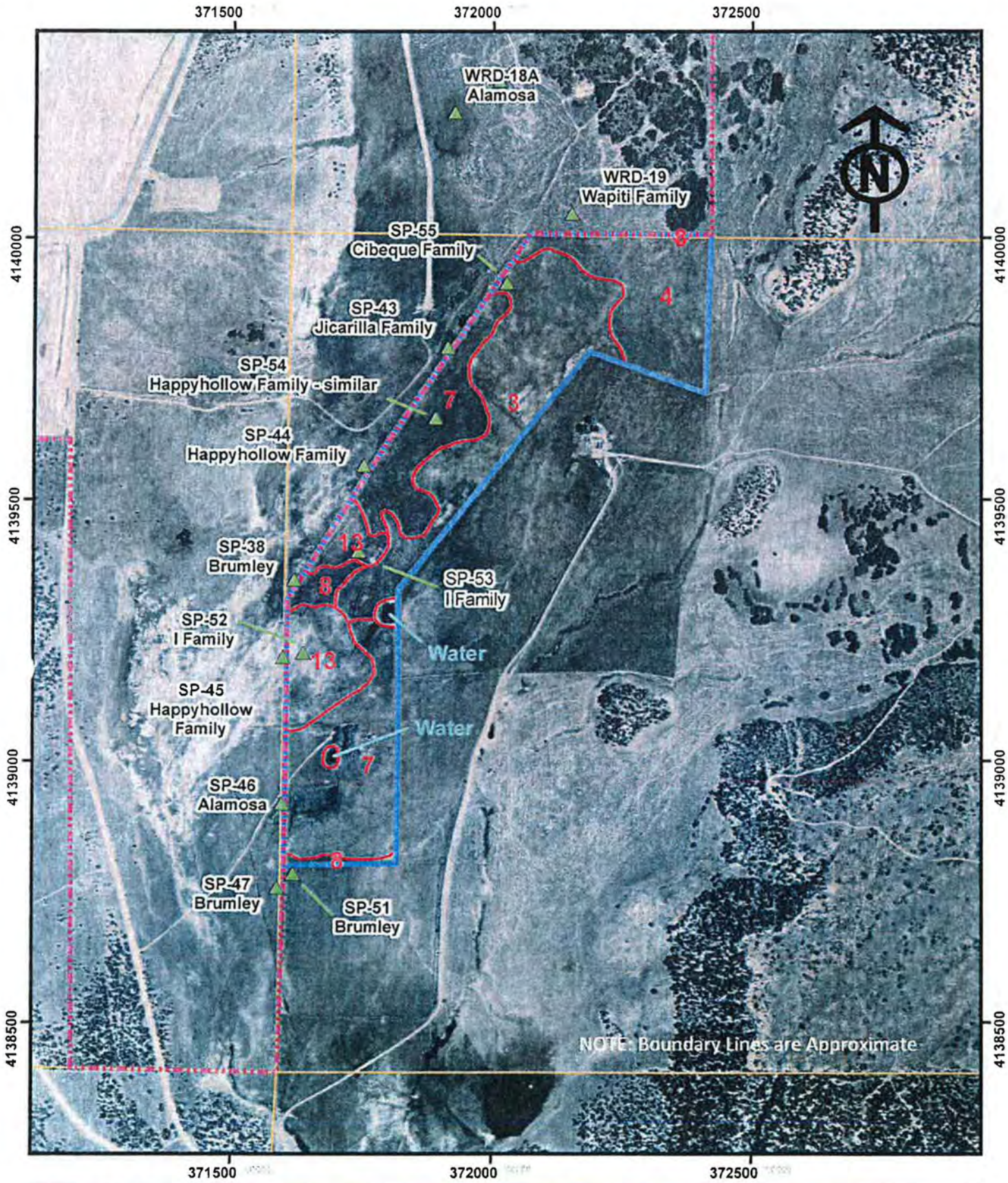


Fig. 2-1. New Dame Lease IBC - Order 2 Soil Survey

January 10, 2014

2011 NAIP Aerial Photography

1 inch = 800 feet

Coal Hollow Mine
New Dame Lease IBC
IBC Soil Lines
Soil Data Points

Table 2-2. Soil map unit composition for the New Dame Lease IBC.

Map Unit	Pct.	Soil Type	Taxonomic Classification
3	**Cibeque Family – Wapiti Familiy complex, 3 to 8 percent slopes**		
	60	Cibeque Family	fine-loamy, mixed, superactive, mesic Aridic Calciustept
	30	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept
	5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts
4	**Jonale Family - Graystone Cobbly Substratum Family - Wapiti Family complex, 3 to 8 percent slopes**		
	50	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
	25	Graystone cobbly substratum Family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
	5	D Family	fine, mixed, superactive, mesic Aridic Calciustoll
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept
7	**Happyhollow Family - Alamosa complex, 1 to 5 percent slopes**		
	55	Happyhollow Family	fine, mixed, superactive frigid Aeric Epiaquept
	20	Alamosa	fine-loamy, mixed, superactive, frigid Typic Argiaquoll
	10	Jicarilla Family	fine, mixed, superactive, frigid Typic Argiaquoll
	10	Tetonview Family	fine-loamy, mixed, superactive frigid Aeric Calciaquoll
	3	Brumley	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
	2	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
8	**Brumley – Graystone - Snilloc complex, 3 to 8 percent slopes**		
	40	Brumley	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
	30	Graystone Cobbly Substratum Family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
	20	Snilloc	coarse-loamy, mixed, superactive, mesic Aridic Calciustept
	10	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
13	**A Family – Happyhollow Family complex, 1 to 5 percent slopes**		
	80	A Family	fine, mixed, superactive, mesic Aridic Calciustept
	15	Happyhollow Family	fine, mixed, superactive frigid Aeric Epiaquept
	5	I Family	fine-loamy, mixed, superactive, frigid Aquic Calciustept

1 Soil families were given letter designations, because it was not possible to correlate the soils to established soil series since no NRCS published or SSURGO certified soil survey data exists in or adjacent to the Coal Hollow project area. Assignment of soil type letters enables comparison of map units and simplifies map unit names.

2 Soil families classified using Keys to Soil Taxonomy, Tenth Edition (NRCS 2006).

Section Three

Soils Identified

Five major soil types were identified within the *New Dame Lease IBC*. These soil types are listed by soil profile description in table 3-1.

Table 3-1. Major soil types identified in the *New Dame Lease IBC*.

Soil Profile	Soil Type	Soil Map Unit	Taxonomic Classification
51	Brumley	8	Fine-loamy, mixed, superactive, mesic Calcidic Haplustalfs
52	I Family	13	Fine-loamy, mixed, superactive, mesic Aquic Calciustepts
53	Disturbed I Family - similar	13	Coarse-loamy, carbonatic, superactive Aeric Epiaquents
54	Happyhollow Family - Similar	7	Fine, smectitic, mesic Oxyaquic Haplustalfs
55	A Family	3	Fine, smectitic, mesic Aridic Calciustepts

Aquic Conditions

Four of the five soil profiles described within the *New Dame Lease IBC* had aquic conditions. The depth to either mottles or gleying ranged from 23 to 104 cm (9 to 41 inches) below the soil surface. These aquic conditions are evident in the taxonomic classifications of profiles 52, 53, and 54. The source of these aquic soil conditions is likely the result of moisture from springs in the *New Dame Lease IBC* perching on or between heavy clay horizons.

Calcium Carbonate

Soils in the New Dame Lease IBC are dominated by calcium carbonate equivalents ranging from 18 to 53 percent. Profiles 51, 52, 54, and 55 have calcic horizons. Profile 53 has carbonatic mineralogy with a weighted average of 40.8 percent calcium carbonate in the control section (25 to 100 cm).

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Appendix A

Soil Profile Descriptions

Profile Description - 51

Pedon ID: 51
Description Date: 9/24/2007
Describer: Robert Long

Pedon Notes: Amount of estimated clay films in the Btk was revised from 35 percent down to 20 percent after examination of the box sample.

Current Taxonomic Name: Brumley
Current Taxonomic Class: Fine-loamy, mixed, superactive, mesic Calcidic Haplustalfs

MLRA: 47 - Wasatch and Uinta Mountains
County or Parish: UT025 - Kane
State or Territory: UT - Utah

UTM: 371618E, 4138785N -- Datum NAD83, Zone 12
Legal Description: Section 29, Township 39 South, Range 5 West of the 29 Meridian

Landscape: valley
Landform: alluvial fan
Geomorphic Component: Side Slope
Profile Pos: Footslope
Slope: 3 percent
Elevation: 2091 meters (6860.2 feet)
Aspect: 180°
Shape: up/down: Linear; **across:** Linear
Complexity: Simple

Flooding: None
Ponding: None
Drainage: Well drained
Runoff: Low
Erosion: None - deposition

Primary Earth Cover: Grass/herbaceous cover

Parent Materials: alluvium derived from limestone, sandstone, and shale
Particle Size Control Section: 8 to 61 centimeters (3.1 to 24 inches)

Diagnostic Features: Argillic horizon: 8 to 61 centimeters (3.1 to 24 inches), Calcic horizon: 28 to 61 centimeters (11 to 24 inches), Argillic horizon: 97 to 163 centimeters (38.2 to 64.2 inches) and Calcic horizon: 137 to 163 centimeters (53.9 to 64.2 inches)

A --- 0 to 8 centimeters (0 to 3.1 inches); grayish brown (10YR 5/2) dry, clay loam; dark grayish brown (10YR 4/2) moist; null percent sand; null percent silt; 28 percent clay; weak medium subangular blocky parting to moderate medium granular structure; friable, slightly hard, slightly sticky, moderately plastic; fine roots throughout and very fine roots throughout; very fine tubular pores; very slightly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 14 Percent.

Bt --- 8 to 28 centimeters (3.1 to 11 inches); light brownish gray (10YR 6/2) dry, clay loam; dark grayish brown (10YR 4/2) moist; null percent sand; null percent silt; 34 percent clay; moderate medium subangular blocky structure; friable, hard, moderately sticky, moderately plastic; fine roots throughout and very fine roots throughout; very fine tubular pores; 10 percent (few) clay films on surfaces along pores and 55 percent (many) clay films on all faces of peds; very slightly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; abrupt smooth boundary; Field Measured Properties: CaCO3 12 Percent.

Btk --- 28 to 61 centimeters (11 to 24 inches); light yellowish brown (10YR 6/4) dry, clay loam; brown (10YR 5/3) moist; null percent sand; null percent silt; 32 percent clay; structure; friable, hard, moderately sticky, moderately plastic; fine roots throughout and very fine roots throughout; very fine tubular pores; 20 percent (few) clay films on all faces of peds finely disseminated carbonates throughout; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 19 Percent.

Bk --- 61 to 97 centimeters (24 to 38.2 inches); very pale brown (10YR 7/4) dry, sandy clay loam; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 22 percent clay; moderate fine subangular blocky structure; friable, hard, slightly sticky, slightly plastic; fine roots throughout and very fine roots throughout; very fine tubular pores; 12 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH indicator solutions; abrupt smooth boundary; Field Measured Properties: CaCO3 13 Percent.

2Btk1 --- 97 to 137 centimeters (38.2 to 53.9 inches); brown (10YR 5/3) dry, clay loam; brown (10YR 4/3) moist; null percent sand; null percent silt; 35 percent clay; structure; firm, very hard, moderately sticky, moderately plastic; fine roots throughout and very fine roots throughout; very fine tubular pores; 5 percent (few) clay films on surfaces along pores and 40 percent (common) clay films on all faces of peds; 5 percent (common) medium masses of carbonate and 10 percent (common) fine masses of carbonate; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; violent effervescence on concentrations; gradual smooth boundary; Field Measured Properties: CaCO3 12 Percent.

2Btk2 --- 137 to 163 centimeters (53.9 to 64.2 inches); very pale brown (10YR 7/4) dry, clay loam; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 32 percent clay; structure; friable, very hard, moderately sticky, moderately plastic; very fine roots throughout; very fine tubular pores; 5 percent (few) clay films on surfaces along pores and 30 percent (common) clay films on all faces of peds; 12 percent (common) fine threadlike masses of carbonate; violently effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH indicator solutions; Field Measured Properties: CaCO3 22 Percent.

Profile Description - 52

Pedon ID: 52
Description Date: 9/24/2007
Describer: Robert Long

Pedon Notes: Concentration descriptions were revised after examination of soil profile box sample. Effervescences classes revised for 81 to 157 cm after examination of soil profile boxes.

Current Taxonomic Name: I Family
Current Taxonomic Class: Fine-loamy, mixed, superactive, mesic Aquic Calciustepts

MLRA: 47 - Wasatch and Uinta Mountains
County or Parish: UT025 - Kane
State or Territory: UT - Utah

UTM: 371637E, 4139208N -- Datum NAD83, Zone 12
Legal Description: Section 29, Township 39 South, Range 5 West of the 29 Meridian

Landscape: valley
Landform: alluvial fan
Geomorphic Component: Base Slope
Profile Pos: Toeslope
Slope: 3 percent
Elevation: 2100 meters (6889.8 feet)
Aspect: 225°
Shape: up/down: Linear; **across:** Linear
Complexity:

Flooding: None
Ponding: Occasional
Drainage: Somewhat poorly drained
Runoff: Very low
Erosion: None - deposition

Primary Earth Cover: ; **Secondary Earth Cover:** Grassland rangeland
Existing Vegetation: ROWO - Woods' rose (*Rosa woodsii*)

Parent Materials: alluvium derived from limestone, sandstone, and shale
Particle Size Control Section: 25 to 100 centimeters (9.8 to 39.4 inches)
Diagnostic Features: Aquic conditions: 61 to 157 centimeters (24 to 61.8 inches) and Calcic horizon: 61 to 137 centimeters (24 to 53.9 inches)

A1 --- 0 to 10 centimeters (0 to 3.9 inches); gray (2.5Y 6/1) dry, loam; dark gray (2.5Y 4/1) moist; null percent sand; null percent silt; 24 percent clay; moderate medium subangular blocky parting to moderate fine granular and moderate fine subangular blocky structure; very friable, slightly hard, slightly sticky, slightly plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial and very fine tubular pores; 2 percent (common) very fine gypsum crystals; strongly effervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 27 Percent.

A2 --- 10 to 30 centimeters (3.9 to 11.8 inches); grayish brown (2.5Y 5/2) dry, loam; dark grayish brown (2.5Y 4/2) moist; null percent sand; null percent silt; 24 percent clay; moderate medium subangular blocky structure; friable, hard, slightly sticky, slightly plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 3 percent (common) gypsum crystals; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 26 Percent.

Bk1 --- 30 to 61 centimeters (11.8 to 24 inches); very pale brown (10YR 7/4) dry, sandy clay loam; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 24 percent clay; moderate medium subangular blocky structure; very friable, hard, slightly sticky, slightly plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 2 percent (common) fine masses of carbonate; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 19 Percent.

Bk2 --- 61 to 81 centimeters (24 to 31.9 inches); very pale brown (10YR 7/4) dry, clay loam; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 28 percent clay; 20 percent fine prominent reddish yellow (5YR 6/8) mottles; structure; friable, hard, slightly sticky, slightly plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 8 percent (common) fine masses of carbonate; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 33 Percent.

2A --- 81 to 97 centimeters (31.9 to 38.2 inches); light yellowish brown (10YR 6/4) dry, clay; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 40 percent clay; 18 percent fine prominent reddish yellow (5YR 6/8) mottles; structure; friable, hard, very sticky, very plastic; very fine roots throughout; very fine tubular pores; 10 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 38 Percent.

2Bkg --- 97 to 137 centimeters (38.2 to 53.9 inches); light olive gray (5Y 6/2) dry, silty clay loam; dark gray (5Y 4/1) moist; null percent sand; null percent silt; 30 percent clay; 8 percent

very fine prominent greenish gray (10Y 6/1) mottles; moderate fine subangular blocky structure; friable, hard, moderately sticky, moderately plastic; very fine roots throughout; very fine tubular pores finely disseminated carbonates and 12 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 46 Percent.

2Bk --- 137 to 157 centimeters (53.9 to 61.8 inches); light brownish gray (2.5Y 6/2) dry, silty clay loam; dark grayish brown (2.5Y 4/2) moist; null percent sand; null percent silt; 34 percent clay; 5 percent fine prominent reddish yellow (7.5YR 7/6) and 10 percent very fine prominent reddish yellow (7.5YR 7/6) mottles; structure; friable, hard, moderately sticky, moderately plastic; very fine roots throughout; very fine tubular pores; 8 percent (common) fine masses of carbonate; strongly effervescent by HCl, 1 normal; neutral, pH 7.3, pH indicator solutions; Field Measured Properties: CaCO3 28 Percent.

Profile Description - 53

Pedon ID: 53
Description Date: 9/24/2007
Describer: Robert Long

Site Notes: Vegetation indicates previous disturbance. Upper 70 cm appeared to have been deposited by land leveling.

Pedon Notes: Soil is similar to both Happyhollow and I families in map unit 13. Classified as an Epiaquent based on heavy clay layers observed in the area that perch the groundwater.

Current Taxonomic Name: Disturbed - I Family similar
Current Taxonomic Class: Coarse-loamy, carbonatic, superactive Aeric Epiaquents

MLRA: 47 - Wasatch and Uinta Mountains
County or Parish: UT025 - Kane
State or Territory: UT - Utah

UTM: 371742E, 4139402N -- Datum NAD83, Zone 12
Legal Description: Section 29, Township 39 South, Range 5 West of the 29 Meridian

Landscape: valley
Landform: alluvial fan
Geomorphic Component: Side Slope
Profile Pos: Footslope
Slope: 1 percent
Elevation: 2107 meters (6912.7 feet)
Aspect: 202°
Shape: up/down: Linear; **across:** Linear
Complexity: Simple

Flooding: Occasional
Ponding: Occasional
Drainage: Poorly drained
Runoff: Very low
Erosion: None - deposition

Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:**
Existing Vegetation: ROWO - Woods' rose (*Rosa woodsii*)

Parent Materials: alluvium
Particle Size Control Section: 25 to 100 centimeters (9.8 to 39.4 inches)

Diagnostic Features: Anthropic epipedon: 1 to 57 centimeters (0.4 to 22.4 inches) and Episaturation: 24 to 154 centimeters (9.4 to 60.6 inches)

Oi --- 0 to 1 centimeter (0 to 0.4 inches); Decomposing leaves & grass.

^A --- 1 to 11 centimeters (0.4 to 4.3 inches); very dark grayish brown (10YR 3/2) moist, loam; grayish brown (10YR 5/2) dry; null percent sand; null percent silt; 23 percent clay; weak fine subangular blocky structure; very friable, slightly hard, slightly sticky, slightly plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial pores; slightly effervescent by HCl, 1 normal; moderately alkaline, pH 8, pH indicator solutions; abrupt smooth boundary; Field Measured Properties: CaCO3 53 Percent.

^C1 --- 11 to 24 centimeters (4.3 to 9.4 inches); light gray (2.5Y 7/2) moist, very gravelly sandy loam; pale yellow (2.5Y 8/2) dry; null percent sand; null percent silt; 16 percent clay; single grain; loose, loose, nonsticky, nonplastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial pores; 45 percent angular travertine gravels; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; abrupt smooth boundary; Field Measured Properties: CaCO3 51 Percent.

^C2 --- 24 to 57 centimeters (9.4 to 22.4 inches); gray (2.5Y 6/1) moist, sandy loam; light gray (2.5Y 7/1) dry; null percent sand; null percent silt; 16 percent clay; 2 percent fine prominent (10Y 7/4) and 3 percent very fine prominent very pale brown (10YR 7/4) mottles; single grain; loose, loose, nonsticky, nonplastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial pores; 5 percent (common) fine masses of carbonate and 5 percent (common) very fine masses of carbonate; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; abrupt smooth boundary; Field Measured Properties: CaCO3 44 Percent.

2Ab --- 57 to 70 centimeters (22.4 to 27.6 inches); dark grayish brown (2.5Y 4/2) moist, peaty sandy loam; light brownish gray (2.5Y 6/2) dry; null percent sand; null percent silt; 16 percent clay; massive; very friable, slightly hard, nonsticky, nonplastic; fine roots throughout and very fine roots throughout; very fine interstitial pores; noneffervescent; peat and soil mixture; gradual smooth boundary; Field Measured Properties: CaCO3 38 Percent.

2C1 --- 70 to 98 centimeters (27.6 to 38.6 inches); light brownish gray (2.5Y 6/2) moist, peaty sandy loam; pale yellow (2.5Y 8/2) dry; null percent sand; null percent silt; 16 percent clay; massive; very friable, slightly hard, nonsticky, nonplastic; fine roots throughout and very fine roots throughout; very fine interstitial pores; noneffervescent; Decomposing

peat mixed with mineral soil; clear smooth boundary; Field Measured Properties: CaCO3 39 Percent.

2C2 --- 98 to 154 centimeters (38.6 to 60.6 inches); dark grayish brown (2.5Y 4/2) moist, silt loam; light brownish gray (2.5Y 6/2) dry; null percent sand; null percent silt; 24 percent clay; 2 percent fine prominent brownish yellow (10YR 6/6) and 3 percent very fine prominent brownish yellow (10YR 6/6) mottles; massive; firm, very hard, slightly sticky, slightly plastic; very fine roots throughout; very fine tubular pores; very slightly effervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH indicator solutions; Field Measured Properties: CaCO3 24 Percent.

Profile Description - 54

Pedon ID: 54
Description Date: 9/24/2007
Describer: Robert Long

Pedon Notes: Carbonate concentrations added to 2Btk horizon after examination of soil profile box sample. Clay increase from A2 to Bw is not sufficient for an argillic horizon, even though clay films are present.

Current Taxonomic Name: Happyhollow family similar
Current Taxonomic Class: Fine, smectitic, mesic Oxyaquic Haplustalfs

MLRA: 47 - Wasatch and Uinta Mountains
County or Parish: UT025 - Kane
State or Territory: UT - Utah

UTM: 371889E, 4139657N -- Datum NAD83, Zone 12
Legal Description: Section 29, Township 39 South, Range 5 West of the 29 Meridian

Landscape: valley
Landform: alluvial fan
Anthropogenic Feature: fill
Geomorphic Component: Side Slope
Profile Pos: Backslope
Slope: 3 percent
Elevation: 2118 meters (6948.8 feet)
Aspect: 180°
Shape: up/down: Linear; **across:** Linear
Complexity: Simple

Flooding: None
Ponding: Occasional
Drainage: Somewhat poorly drained
Runoff: Very low
Erosion: None - deposition

Primary Earth Cover: Grass/herbaceous cover
Existing Vegetation: BRMA4 - mountain brome (*Bromus marginatus*); JUBA - Baltic rush (*Juncus balticus*)

Parent Materials: alluvium derived from limestone, sandstone, and shale

Particle Size Control Section: 97 to 122 centimeters (38.2 to 48 inches)

Diagnostic Features: Cambic horizon: 28 to 48 centimeters (11 to 18.9 inches), Argillic horizon: 97 to 122 centimeters (38.2 to 48 inches), Calcic horizon: 122 to 163 centimeters (48 to 64.2 inches) and Aquic Conditions 48 to 163 cm (18.9 to 64.2 inches).

A --- 0 to 8 centimeters (0 to 3.1 inches); brown (10YR 5/3) dry, peaty clay loam; dark brown (10YR 3/3) moist; null percent sand; null percent silt; 30 percent clay; moderate fine granular structure; very friable, slightly hard, moderately sticky, moderately plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial pores; strongly effervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 27 Percent.

A --- 8 to 28 centimeters (3.1 to 11 inches); gray (2.5Y 6/1) dry, clay loam; dark gray (2.5Y 4/1) moist; null percent sand; null percent silt; 32 percent clay; moderate fine subangular blocky structure; friable, hard, moderately sticky, moderately plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; strongly effervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 29 Percent.

Bw --- 28 to 48 centimeters (11 to 18.9 inches); light brownish gray (2.5Y 6/2) dry, clay loam; dark grayish brown (2.5Y 4/2) moist; null percent sand; null percent silt; 34 percent clay; structure; friable, hard, moderately sticky, moderately plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 45 percent (common) clay films on all faces of peds; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 31 Percent.

Bk1 --- 48 to 81 centimeters (18.9 to 31.9 inches); pale yellow (2.5Y 7/3) dry, silt loam; light olive brown (2.5Y 5/3) moist; null percent sand; null percent silt; 26 percent clay; 4 percent fine prominent reddish yellow (7.5YR 7/6) and 4 percent very fine prominent reddish yellow (7.5YR 7/6) mottles; structure; friable, hard, slightly sticky, slightly plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 15 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 32 Percent.

Bk2 --- 81 to 97 centimeters (31.9 to 38.2 inches); light yellowish brown (2.5Y 6/3) dry, clay loam; light olive brown (2.5Y 5/3) moist; null percent sand; null percent silt; 34 percent clay; 18 percent fine prominent reddish yellow (7.5YR 7/6) mottles; structure; friable, hard, moderately sticky, moderately plastic; medium roots throughout, fine roots

throughout and very fine roots throughout; very fine tubular pores; 15 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 26 Percent.

2Btk --- 97 to 122 centimeters (38.2 to 48 inches); gray (2.5Y 6/1) dry, clay; dark gray (2.5Y 4/1) moist; null percent sand; null percent silt; 50 percent clay; 14 percent fine prominent reddish yellow (7.5YR 6/6) and 14 percent very fine prominent reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; very firm, very hard, very sticky, very plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 70 percent (many) clay films on all faces of peds; 5 percent (common) fine masses of carbonate; slightly effervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 18 Percent.

2Bk --- 122 to 163 centimeters (48 to 64.2 inches); pale yellow (2.5Y 8/2) dry, clay; light gray (2.5Y 7/1) moist; null percent sand; null percent silt; 42 percent clay; 20 percent fine prominent reddish yellow (7.5YR 6/6) and 15 percent medium prominent reddish yellow (7.5YR 6/6) mottles; massive; firm, very hard, moderately sticky, moderately plastic; very fine roots throughout; very fine tubular pores; 5 percent (common) medium masses of carbonate and 10 percent (common) fine masses of carbonate; strongly effervescent by HCl, 1 normal; neutral, pH 7.3, pH indicator solutions; Field Measured Properties: CaCO3 27 Percent.

Profile Description - 55

Pedon ID: 55
Description Date: 9/24/2007
Describer: Robert Long

Pedon Notes: Text: Weighted estimated clay in control section is 35 percent which is fine (A family), but it is marginal to fine-loamy (Cibeque family).

Current Taxonomic Name: A family
Current Taxonomic Class: Fine, smectitic, mesic Aridic Calciustepts

MLRA: 47 - Wasatch and Uinta Mountains
County or Parish: UT025 - Kane
State or Territory: UT - Utah

UTM: 372027E, 4139915N -- Datum NAD83, Zone 12
Legal Description: Section 29, Township 39 South, Range 5 West of the 29 Meridian
Landscape: valley
Landform: alluvial fan
Geomorphic Component: Side Slope
Profile Pos: Backslope
Slope: 4 percent
Elevation: 2128 meters (6981.6 feet)
Aspect: 0°
Shape: up/down: ; across:
Complexity:

Flooding: None
Ponding: Rare
Drainage: Moderately well drained
Runoff: Low
Erosion: Class 1 - Sheet erosion

Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:**
Existing Vegetation: CHRYS9 - rabbitbrush (*Chrysothamnus*); CONVO - bindweed (*Convolvulus*)

Parent Materials: alluvium derived from limestone, sandstone, and shale
Particle Size Control Section: 25 to 100 centimeters (9.8 to 39.4 inches)

Diagnostic Features: Cambic horizon: 8 to 30 centimeters (3.1 to 11.8 inches), Calcic horizon: 30 to 157 centimeters (11.8 to 61.8 inches) and Aquic conditions: 104 to 157 centimeters (40.9 to 61.8 inches)

A --- 0 to 8 centimeters (0 to 3.1 inches); grayish brown (10YR 5/2) dry, loam; brown (10YR 4/3) moist; null percent sand; null percent silt; 27 percent clay; weak fine subangular blocky parting to moderate fine single grain structure; very friable, slightly hard, moderately sticky, moderately plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial pores; slightly effervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 19 Percent.

Bw --- 8 to 30 centimeters (3.1 to 11.8 inches); pale brown (10YR 6/3) dry, clay loam; dark grayish brown (10YR 4/2) moist; null percent sand; null percent silt; 38 percent clay; structure; firm, very hard, very sticky, very plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine interstitial pores; slightly effervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 18 Percent.

Bk1 --- 30 to 76 centimeters (11.8 to 29.9 inches); very pale brown (10YR 7/4) dry, clay loam; light yellowish brown (10YR 6/4) moist; null percent sand; null percent silt; 36 percent clay; structure; friable, hard, moderately sticky, very plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 10 percent (common) fine masses of carbonate; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 23 Percent.

Bk2 --- 76 to 104 centimeters (29.9 to 40.9 inches); very pale brown (10YR 7/4) dry, clay loam; light yellowish brown (10YR 6/4) moist; null percent sand; null percent silt; 34 percent clay; structure; friable, hard, moderately sticky, moderately plastic; medium roots throughout, fine roots throughout and very fine roots throughout; very fine tubular pores; 15 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH indicator solutions; clear smooth boundary; Field Measured Properties: CaCO3 27 Percent.

Bk3 --- 104 to 135 centimeters (40.9 to 53.1 inches); light yellowish brown (10YR 6/4) dry, clay loam; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 33 percent clay; 20 percent fine distinct reddish yellow (7.5YR 7/6) mottles; structure; friable, hard, moderately sticky, moderately plastic; fine roots throughout and very fine roots throughout; very fine tubular pores; 15 percent (common) fine masses of carbonate; violently effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH indicator solutions; gradual smooth boundary; Field Measured Properties: CaCO3 24 Percent.

Bk4 --- 135 to 157 centimeters (53.1 to 61.8 inches); very pale brown (10YR 7/4) dry, sandy clay loam; yellowish brown (10YR 5/4) moist; null percent sand; null percent silt; 30 percent clay; 35 percent fine distinct yellow (10YR 7/6) mottles; moderate medium subangular blocky structure; friable, hard, moderately sticky, moderately plastic; very fine roots throughout; very fine tubular pores; 15 percent (common) fine masses of carbonate;

violently effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH indicator solutions; Field Measured Properties: CaCO3 31 Percent.

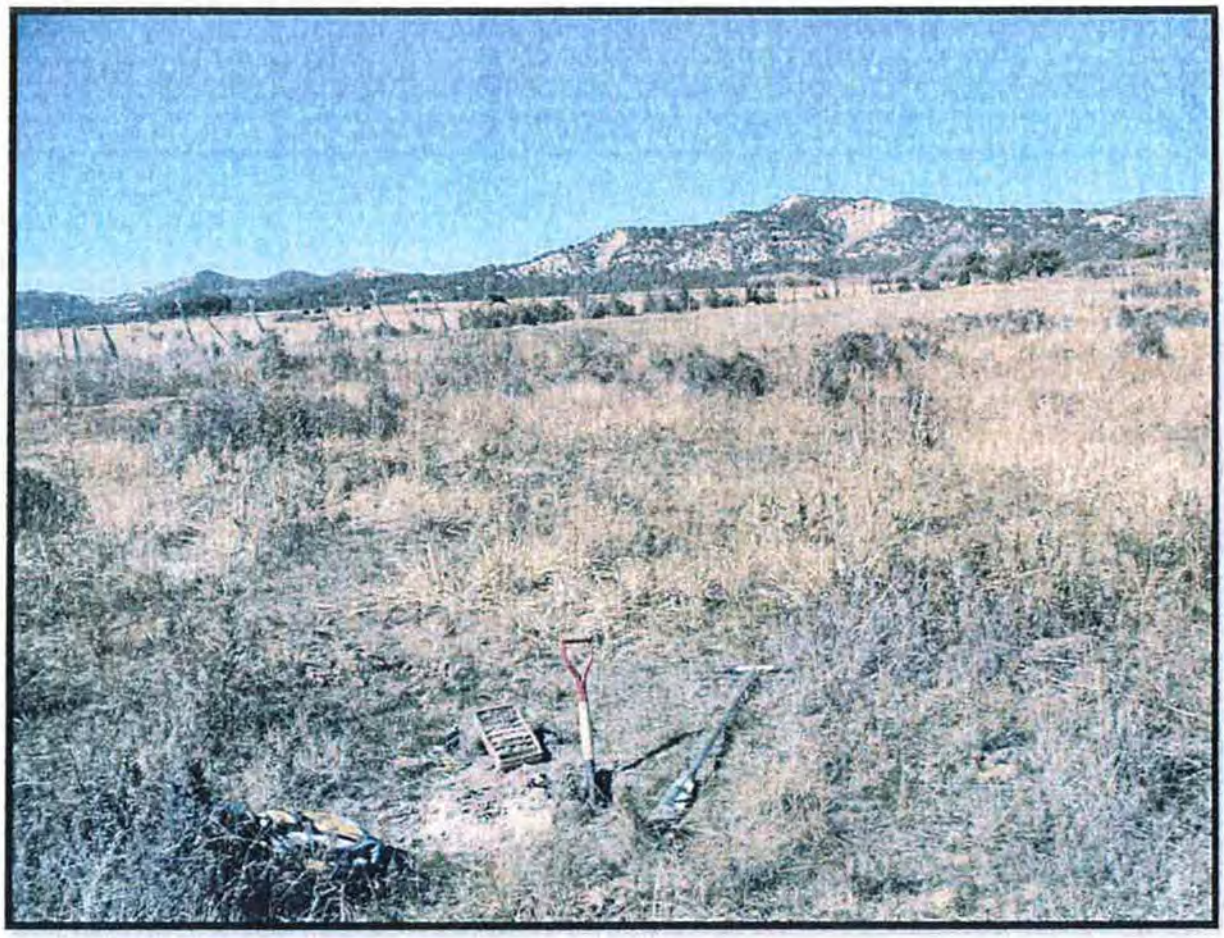
Appendix B

Soil Profile Location Photos

Profile 51. No photo is available of the profile location. Brumley soil - *Calcidic Haplustalfs fine-loamy, mixed, superactive, mesic*

Profile 52. I Family soil. *Aquic Calciustepts fine-loamy, mixed, superactive, mesic.*

Profile 53. Disturbed area. Soil is similar to the I Family soil.
Aeric Epiaquents coarse-loamy, carbonatic, superactive

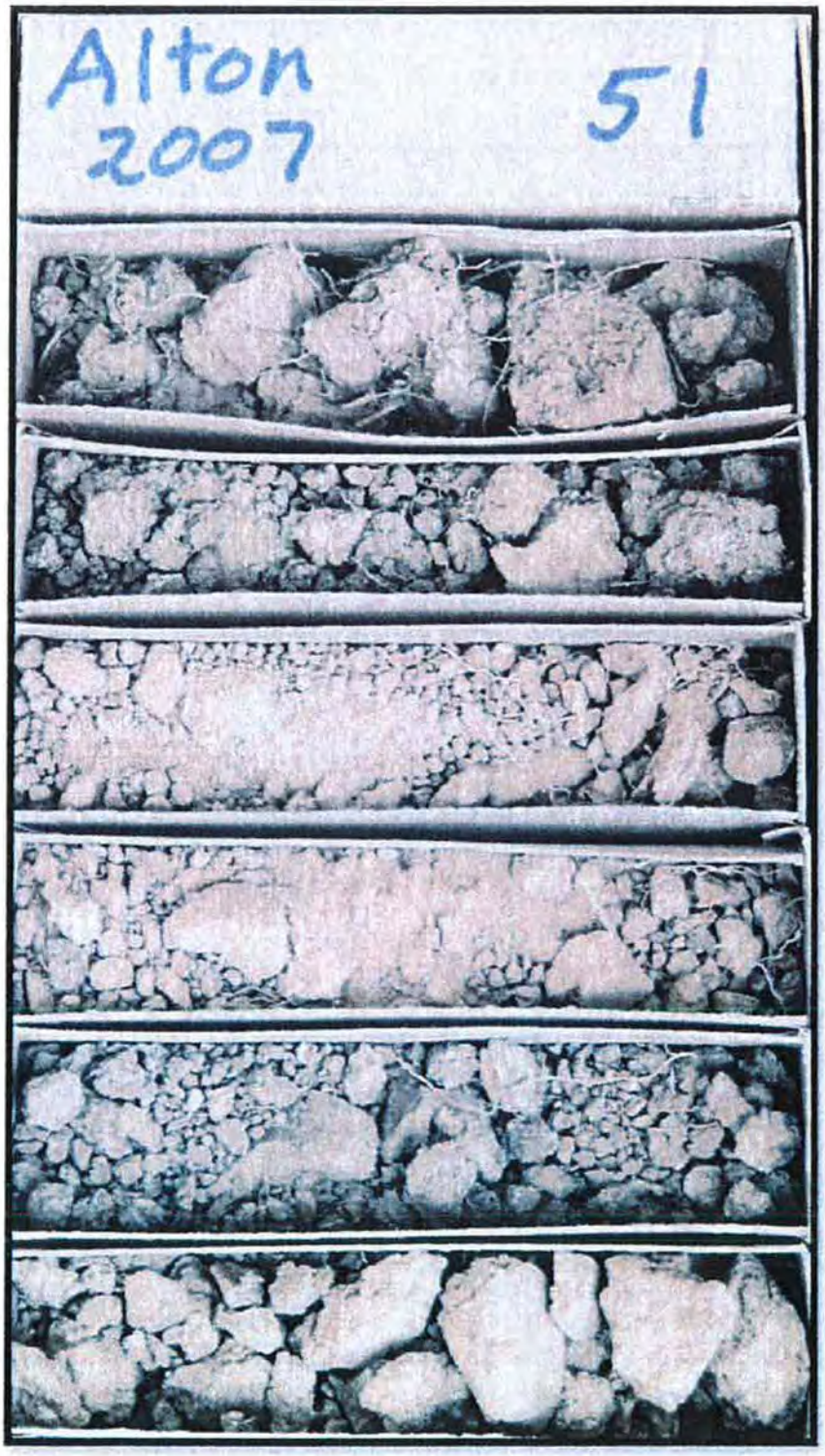


Profile 54. Happyhollow Family - similar. *Oxyaquic Haplustalfs fine, smectitic, mesic*

Profile 55. A Family soil. *Aridic Calciustepts fine, smectitic, mesic*

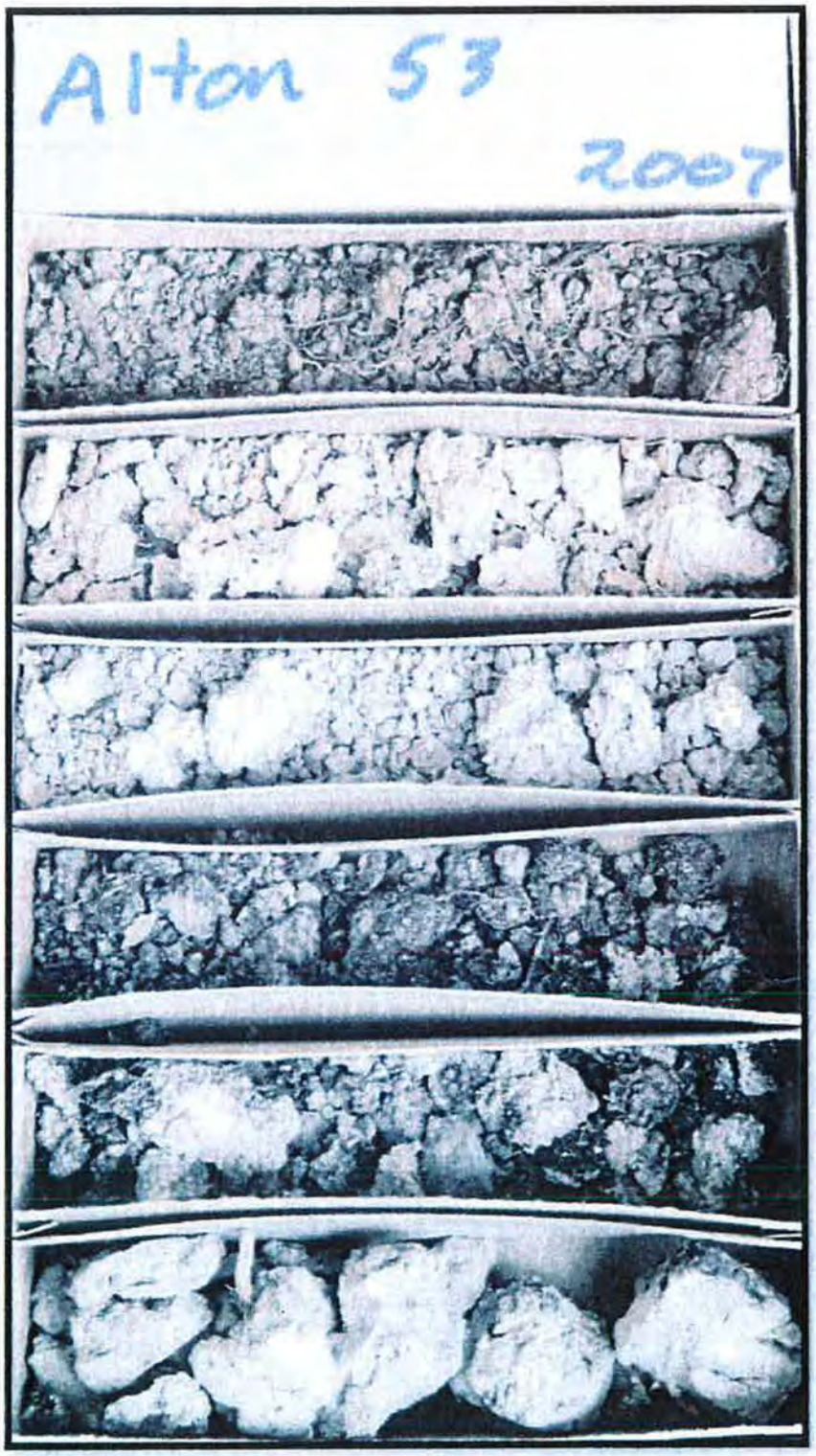
Appendix C

Soil Profile Box Photos

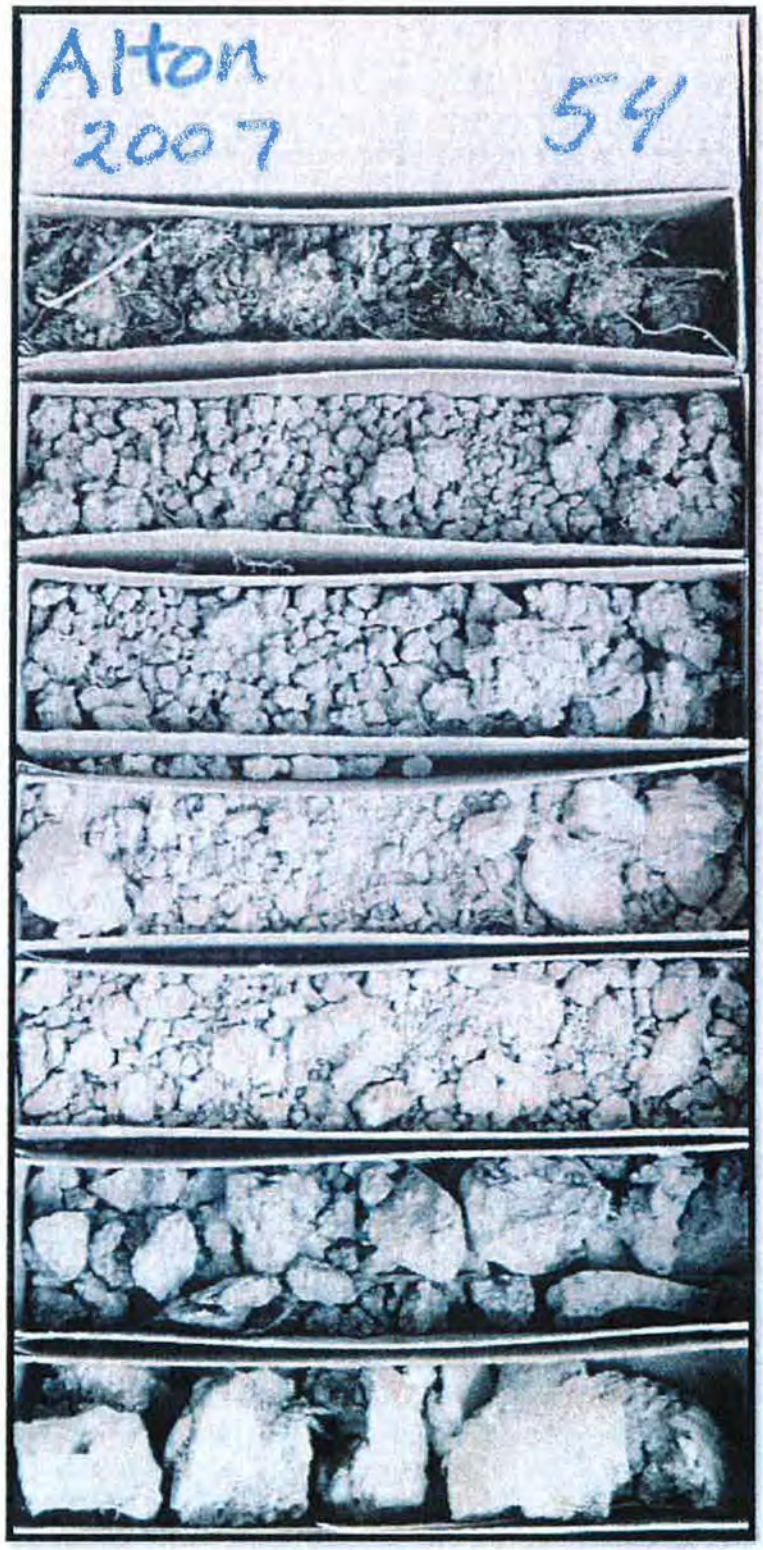


Profile 51. Brumley soil - *Calcidic Haplustalfs fine-loamy, mixed, superactive, mesic*

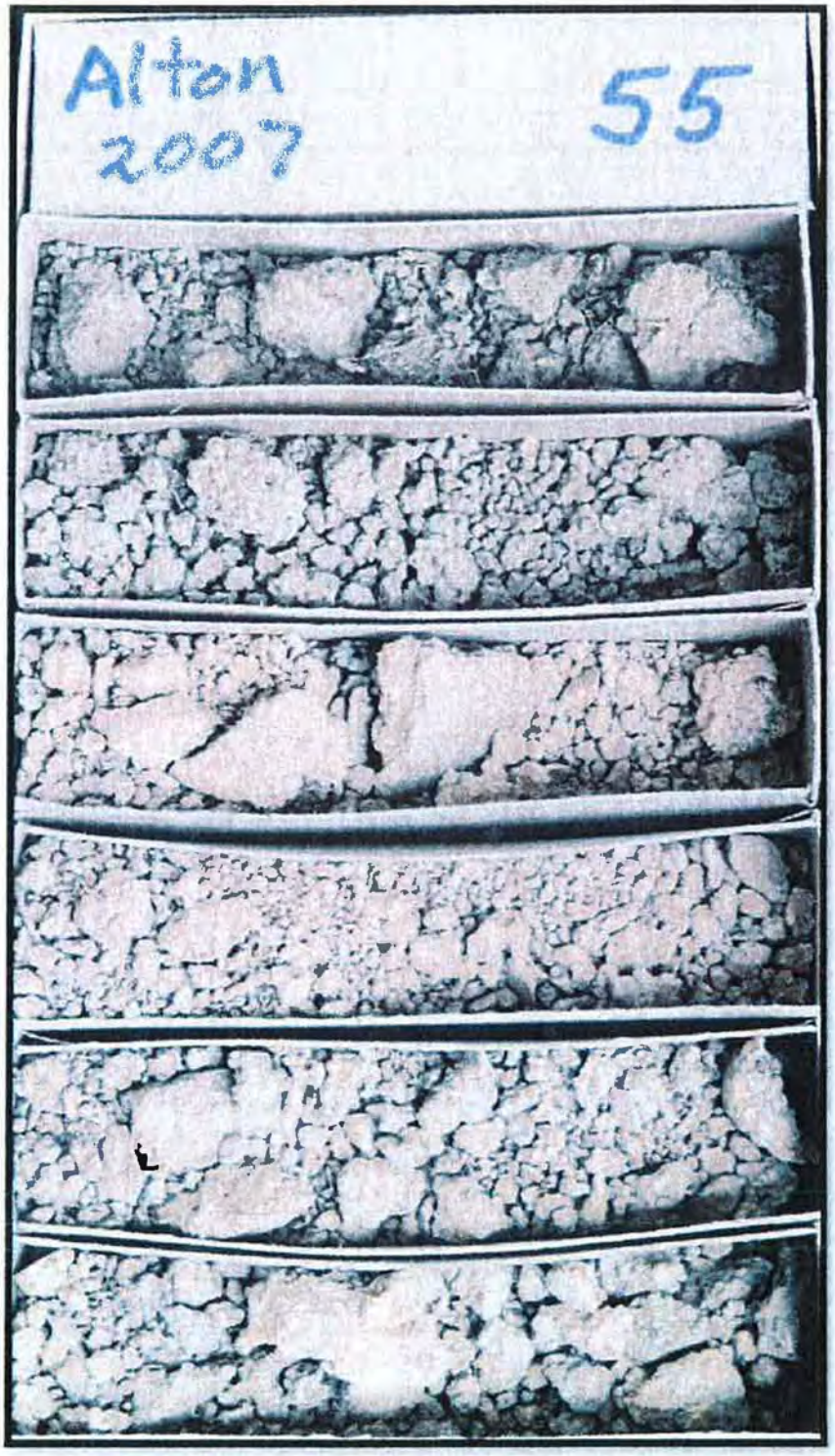
Profile 52. I Family soil. *Aquic Calciustepts fine-loamy, mixed, superactive, mesic*



Profile 53. Disturbed area. Soil is similar to the I Family soil.
Aeric Epiaquents coarse-loamy, carbonatic, superactive



Profile 54. Happyhollow Family - similar. *Oxyaquic Haplustalfs fine, smectitic, mesic*



Profile 55. A Family soil. *Aridic Calciustepts fine, smectitic, mesic*

320. ENVIRONMENTAL DESCRIPTION

321. VEGETATION INFORMATION

321.100. Vegetation Mapping and Plant Community Data in the Permit Area
The first vegetation map prepared for the Coal Hollow Project delineated the plant communities that existed within the permit area. The plant communities for the permit area on this early map were drafted on a USGS quadrangle map using information from an existing vegetation map that was prepared from previous work in the area. The earlier work was accomplished in the late-1980s.

A new flight was conducted for the Coal Hollow Project in 2006 that provided aerial photography and more detailed information than had previously been available. This aerial photography and photogrammetric mapping has been used in preparation of many updated maps of the project area, including a revised vegetation map where the plant communities were delineated on the new aerial photographs. Also, new quantitative data were recorded in 2006 in some of the first plant communities proposed for disturbance along with reference areas that would *not* be disturbed. This next version of the vegetation map for the Coal Hollow project also provided sample locations of these recently studied areas. This map was submitted to DOGM in the last MRP submittal (*dated May 25, 2007*) along with the first vegetation quadrangle map, because it continued to provide support for some of the older vegetation data also submitted in the MRP at that time.

Like the earlier vegetation mapping information, and because the area has been studied previously, existing quantitative data sets were also available for the plant communities of the Coal Hollow Project area. These data were recorded in the late-1980s. The aforementioned earlier quadrangle vegetation map corresponded to this early vegetation information. The early datasets were included in the MRP provided to DOGM (*submittal date: May 25, 2007*). Although this information was valuable at that time because it provided initial baseline data for that time period, plans to re-sample the same plant communities to update the existing data were made. Consequently, new quantitative sampling was accomplished later in 2007 to provide updated information about the plant communities within the permit area. The updated data have been summarized and included in this MRP. Therefore, with the 2006 and 2007 quantitative data for the plant communities submitted in the MRP, the dataset for those plant communities proposed for disturbance in the current mine plan for the entire permit area is complete. **Therefore, the older vegetation datasets and maps created using information from the late- 1980s were replaced by the updated datasets and maps in the MRP**.

Reference areas chosen to represent future revegetation success standards were also chosen and sampled during the same sample periods in 2006 and 2007 as those proposed for disturbance by the mining operations. The meadow reference area and the Dame Meadow Sample Area (another potential reference area was included into the permit boundary in 2014. Although coal is to be removed from this area by undermining

only and the surface will not be disturbed, the meadow reference area will be relocated during the 2014 growing season to a representative area due south of the permit boundary that does not contain coal and will not be disturbed by mining operations.

Acreage of each plant community and map symbols shown on the revised Vegetation Map *(Drawing 3-1, dated 12/26/07)* for the Coal Hollow Project permit and adjacent areas are shown below.

Vegetation Communities of the Coal Hollow Permit Area			
MAP SYMBOL (see *Vegetation Map*, Drawing 3-1)	PLANT COMMUNITY	TOTAL ACREAGE	PERCENT OF TOTAL
S/G	Sagebrush/Grass	212.00	33.64
P	Pasture Land	192.00	30.48
P-J	Pinyon-Juniper	114.00	18.10
M	Meadow	69.00	10.95
OB	Oak Brush	40.00	6.35
RB/SB	Rabbitbrush/Sagebrush (Disturbed; previously Sagebrush/Grass)	3.00	0.48
	Total*	**630.00**	100.00

Color photographs of the plant communities within the Coal Hollow Project permit area are shown in **PHOTOGRAPHS** section near the end of this chapter.

The above plant communities exist within the boundaries of the Coal Hollow Project permit area and will be disturbed by the coal mining and related activities. Consequently, quantitative and qualitative data were recorded by sampling the plant communities in 2006 and 2007. For general, wide-angle views of the plant communities in the permit area, refer to Photographs 3-1, 3-2, 3-3 and 3-4.

[**NOTE**: The rabbitbrush/sagebrush community was not sampled for baseline data information. This small area represented less that one-half of one percent of the permit area. Moreover, it was a *previously disturbed* sagebrush/grass community. Therefore, standards of revegetation success at final reclamation will be the same as those outlined for the *undisturbed* sagebrush/grass plant communities described in this document].

The total living cover of the pinyon-juniper community was 43.00%, of which 25.00% was from understory and 18.00% was from overstory species [Table 3-14 (A)]. The understory composition by lifeform in this community was comprised of 95.88 % woody species [Table 3- 14 (B)]. Woody species density was measured at 2,657 individuals per acre (Table 3-15).

Pinyon-Juniper Reference Area

A reference area, or an area chosen to represent future revegetation success standards, was chosen and sampled in another pinyon-juniper plant community (see Photograph 3-10). This reference area will *not* be disturbed by the mining operations so it could be used for data comparisons following final reclamation at the mine site. The pinyon-juniper reference area was located near the *north* proposed disturbed pinyon-juniper community (see *Vegetation Map, Drawing 3-1*).

Like the above proposed disturbed community, the overstory cover of the reference area was dominated by Utah juniper followed by pinyon pine. Understory was also dominated by black sagebrush, Utah juniper and pinyon pine (Table 3-16). Again forbs were not present in the quadrats; grasses present were slender wheatgrass and squirreltail (*Elymus elymoides*).

The total living cover of the pinyon-juniper reference area was estimated at 39.00%, 11.50% of it was composed of overstory and 27.50% was understory cover [Table 3-17 (A)]. The composition of the understory in the pinyon-juniper reference area was calculated as 89.56% trees and shrubs and 10.44% grasses [Table 3-17 (B)]. Woody species density was dominated by black sagebrush and Utah juniper, but the total of all species was 4,215 individuals per acre (Table 3-18).

Proposed Disturbed Pasture Land Community

The areas called "pasture lands" in the text and maps of this document were plant communities that have been disturbed previously to artificially increase herbaceous cover and productivity for domestic livestock. Prior to pasture lands, these communities were probably native sagebrush/grass plant communities similar to those sampled and described in the 2006 report (*Vegetation of the Sagebrush/Grass & Meadow Areas: 2006*). Although differences occur between pastures due to grazing practices and species planted, representative pastures were sampled for this report (see Photographs 3-11 and 3-12). The sample areas were located near the center of the permit area (see *Vegetation Map, Drawing 3-1*). Again, different locations within this community were sampled, a *north* and a *south* area; and the data were combined for the summary tables in this report. The proposed disturbed pasture land (*north*) was an area proposed for disturbance by open pit mining during the first year of mining activities. The proposed disturbed pasture land (*south*) was an area proposed for disturbance by open pit mining in the second year of mining activities. The alternate Highwall mining would reduce the proposed surface disturbance whenever this type of mining is used.

• In 2007 the team has continued studies of the sage-grouse with biologists from DWR, the BLM, Southern Utah University (SUU), and the Coal Hollow Project by capturing, taking blood samples, and placing radio transmitters on several birds from March through May.

• In April 2007, two helicopter flights, arranged by Coal Hollow Project, were conducted to search for satellite leks of the sage-grouse.

• In May 2007, another raptor survey by helicopter was conducted by DWR that included the permit area and adjacent areas.

• In September 2007, sensitive plant species surveys were conducted during quantitative sampling of additional proposed disturbed and reference areas for mining years one through three of the project.

• In September 2007, additional quantitative sampling was conducted in meadow areas outside the permit area to be used as a companion study with other areas.

• In 2007, an excavator was used to remove over 10,000 invading juniper trees from the conservation area to reduce potential perching sites for raptors that can reduce the sage-grouse populations.

• Private land owners from Alton have been working to reestablish a migratory corridor between Hoyts Ranch and Alton by clearing juniper and Gambel oak and reseeding open areas with a seed mix consisting of perennial grasses and forbs. Preliminary monitoring results in 2009 indicate that the sage-grouse are beginning to use this corridor. This project was completed in 2011 consisting of 885 acres. Verification was documented in a letter from Director Baza addressed to Denise A. Dragoo, Esq dated May 16, 2012.

• To date, an ongoing monitoring program for radio-collared sage-grouse has been conducted with collaborations with DWR, the BLM, SUU and ACD.

- In 2012 habitat improvement work for sage-grouse was completed on 146 acres to the east of the property that included lop and scatter of pinyon/juniper and chemical treatment of Rabbitbrush.

- In 2012, two helicopter flights, arranged by Coal Hollow Mine, were conducted to search for satellite leks of the sage-grouse.

- Cronquist's phacelia (*Phacelia cronquistiana*; BLM sensitive) was identified as having potential to occur in the area of the mine. Surveys of potential habitats for this species were conducted in June 2012, and no individuals were found.

In 2013 habitat improvement work for sage-grouse was completed on 355 acres adjoining the west boundary of the Coal Hollow mine that included lop and scatter of pinyon/juniper.

322.200. Site-Specific Resource Information

A review of the Utah Heritage Program database for sensitive species in the proposed mine site and adjacent areas has been accomplished. Field maps with locations of these species have been prepared and have been used for additional surveys and will continue to be used for future biological studies.

Due to the sensitivity of these species, specific location information is considered confidential and has not been submitted in this application. However, review of this information by the regulatory authorities can be arranged.

322.210. Threatened, Endangered, and Candidate Plant and Animal Species

Table 3-35 shows a list of the plant and animal species that are federally listed as threatened, endangered, or candidates for this designation for Kane County, Utah.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah

SCIENTIFIC NAME	COMMON NAME	STATUS*	NOTES SPECIFIC TO PROJECT AREA
PLANTS			
Asclepias welshii	Welsh's Milkweed	T	Welsh's milkweed, occurs in Kane County, Utah, as well as in immediately adjacent Coconino County, Arizona. This plant grows on dunes derived from Navajo Sandstone. This formation and habitat is not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine
Cycladenia humilis var. jonesii	Jones Cycladenia	T	Jones' cycladenia,is a Federally listed threatened plant found only in the canyonlands of the Colorado Plateau in Emery County, Garfield County, Grand County, and Kane County, Utah (also found in adjacent Coconino County, Arizona). This plant occurs in gypsiferous soils that are derived from the Summerville, Cutler, and Chinle formations; they are shallow, fine textured, and intermixed with rock fragments. These formations and habitats are not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine.
Lesquerella tumulosa	Kodachrome Bladderpod	E	Kodachrome bladderpod, is a federally listed endangered plant that is an endemic found only in Kane County, Utah. This species is found on shallow soils that are fine textured, intermixed with shale fragments, and derived from the Winsor Member of the Carmel Formation, where it grows on bare shale knolls and slopes in scattered pinyon-juniper communities. These formations and habitats are not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine.
Pediocactus sileri	Siler Pincushion Cactus	T	This plant is federally listed as threatened. It occurs in Kane and Washington counties in Utah, plus adjacent Coconino and Mohave counties in Arizona The cactus is usually found on the white, occasionally red, gypsiferous and calcareous sandy or clay soils derived from the various members of the Moenkopi Formation, but it is sometimes found on the Kaibab Formation. Siler pincushion cactus occurs in warm desert shrub, sagebrush-grass, and at its upper limits, in pinyon-juniper communities, at lower elevations that area present in the Alton area. Additionally, these formations and habitats are not found within the permit area or adjacent areas. There should be no impacts to this species as a result of Alton Coal Mine.
ANIMALS			
Cicindela limbata albissima	Coral Pink Sand Dunes Tiger Beetle	C Removed from candidate species list in 2013	The only known populations in the world for this species are located at the Coral Pink Sand Dunes in the extreme southwest corner of Kane County, Utah. The species occupies dune habitat, which is not found in the Alton area. There should be no impacts to this species as a result of Alton Coal Mine.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah			
Strix occidentalis lucida	Mexican Spotted Owl	T	In Utah the Mexican spotted owl is rare, but when it does occur it is sometimes in various forest types, but more commonly in steep rocky canyons, nesting in caves or cliffs of steep walled canyons. This habitat does not occur in the permit area, but does occur in the Dixie National Forest to the east and west of the Alton area. DWR has conducted raptor surveys for all potential raptor species in the project area and did not find habitat for the Mexican spotted owl. There should be no impacts to this species as a result of Alton Coal Mine.
Centrocercus urophasianus	Greater Sage-grouse	C	Sage-Grouse were abundant in pioneer times, but sagebrush eradication and intensive use of lands by domestic livestock have reduced their numbers. Sage-Grouse range is declining in Utah in both quantity and quality. Sage-Grouse range has declined 50 percent from historical times. Greater Sage-Grouse are native to Utah and are listed as a sensitive species by the DWR. A Sage-grouse conservation plan has been implemented to offset potential impacts to this species as a result of Alton Coal Mine.
* T=Threatened, E=Endangered C=Candidate, Exp=Experimental			

In summary, based on the information provided above and studies conducted to-date, no threatened or endangered species have been located in the permit area.

323. MAPS AND AERIAL PHOTOGRAPHS

323.100. Reference Area Maps

Several vegetation maps have been prepared for the Coal Hollow Project. A revised vegetation map has been prepared that includes all vegetation sample areas, plus other updated map information [Vegetation Map, Drawing 3-1, (12/26/07)]. The new map replaces the previous vegetation maps. This new map includes reference areas, or plant communities sampled that are similar to those that have been proposed for disturbance by mining activities. These reference areas will be compared to those areas proposed for disturbance during the initial studies for the mine site and will consequently be used as revegetation success standards at the time of final reclamation of mined areas. reclamation is planned immediately after portions of the land are mined (see Chapter 5).

323.200. Sample Area Maps

Elevations, locations of monitoring stations, proposed disturbed areas, reference areas, and other areas used to gather data for fish and wildlife, and any special habitat features, have been delineated on the aforementioned new vegetation map. Due to the Dame Incidental Boundary Change, the Meadow area reference will be relocated to an area that will have no potential impacts from mining. This relocation will occur during the growing season of 2014 in consultation with DOGM.

323.300. Protection and Enhancement of Fish & Wildlife Maps

Each facility to be used to protect and enhance fish and wildlife and related environmental values have been represented on the new maps.

323.400. Plant Communities Map

An initial vegetation map was prepared that delineated the plant communities that existed within the Coal Hollow Project permit area. This **first** map was prepared by delineating the plant communities from an existing vegetation map to a permit quadrangle map (see Section 321.100 for more details). However, a new flight was conducted in 2006 that provided aerial photography with more detailed information to be used to update many maps of the project area. Consequently, a **second** vegetation map was prepared using the new aerial photography (along with groundtruthing), and submitted along with the first map to DOGM (MRP submittal dated May 25, 2007). Finally, a **third** vegetation map was prepared to reflect information and to show new sample areas within the plant communities of the permit and adjacent areas [see *Vegetation Map, Drawing 3-1, (12/26/07)*]. This map **replaced** the first and second maps and was submitted to DOGM (MRP submittal dated January 15, 2008.

332. **SUBSIDENCE**

Because mining in the Coal Hollow Project area will be a surface operation, either open pit or highwall mining, and subsidence is usually associated more with underground mining, it is not considered a factor for the Coal Hollow Project. The alternate Highwall mining is designed such that subsidence does not occur to the surface with nonyieldable webs and barriers.

However, current elevation of the existing topography may be slightly altered in the mining and reclamation operations with open pit mining. The alternate Highwall mining will have only the disturbance associated with the trench for placement of the highwall miner and will have no impact on the surface above the highwall panels

Reclamation has been planned to minimize the impact to the renewable resources identified in this section by promptly reclaiming each mine segment contemporaneously by controlling erosion and re-seeding with a mixture of native plant species that will re-establish the plant communities to vegetative cover that will be diverse, effective, permanent, and consistent with the postmining land use. More details regarding postmining land and topography have been provided in Chapter 4 and Chapter 5 of this document, respectively.

The mine plan is not expected to negatively impact the plants and wildlife in the Coal Hollow Project area. Onsite revegetation research and sage-grouse mitigation plans have been designed. Details of this work have been made available to DOGM specialists for their comments and participation in the process.

340. RECLAMATION PLAN

341. REVEGETATION

This document contains the revegetation plan for final reclamation of all lands disturbed by coal mining and reclamation operations, except water areas and the surface of roads approved as part of the postmining land use, as required in R645-301-353 *through* R645-301-357. It also shows how the Coal Hollow Project will comply with the biological protection performance standards of the State Program.

341.100. Reclamation Timetable

A detailed schedule and timetable for the completion of each major step in the mine plan has been included in Chapter 5 of the MRP. Briefly, the mine will conduct operations in one area (segment) at a time. No more than 40 acres will be disturbed at one time for mining. Once mined, the plan includes redistributing subsoil and topsoil followed by seeding this segment with the final seed mix contemporaneously, or at the same time the mining of the next segment begins. However, seeding will be accomplished only in appropriate periods (usually late-fall, but early-spring could also be an option). The mine plan has been engineered to disturb the smallest practicable area at any one time. The Alternate highwall mining will reduce the practicable area to be reclaimed. With prompt establishment and maintenance of vegetation, immediate stabilization of disturbed areas will minimize surface erosion. Details of the plan has been included in Chapter 5 of this document.

341.200. Reclamation Description

The Coal Hollow Project will be reclaimed and revegetated to meet the appropriate postmining land use. Most areas will be reclaimed to the native plant communities that existed prior to mining conditions. Other areas will be reclaimed to enhance habitat for sage-grouse or other wildlife species. Finally, in those areas where the landowner requests a change in the plant community to increase productivity for domestic livestock, they will be reclaimed accordingly.

341.210. Seed Mixtures

Revegetation seed mixtures for each plant community disturbed by mining activities in the Coal Hollow Project area are given in this section. Table 3-36 shows the plant communities that may eventually be disturbed by mining operations at the Coal Hollow Project area.

Table 3-36: Vegetation Communities of the Coal Hollow Permit Area Proposed for Disturbance

MAP SYMBOL (see *Vegetation Map*, Drawing 3-1)	PLANT COMMUNITY
S/G	Sagebrush/Grass
P	Pasture Land
P-J	Pinyon-Juniper
M	Meadow
OB	Oak Brush
RB/SB	Rabbitbrush/Sagebrush (Disturbed; previously Sagebrush/Grass)

Seed mixtures for each disturbance type are shown on Tables 3-37 *through* 3-42. These rates have been based on drill seeding methods described in this document. When broadcast seeding is employed these rates will be doubled.

358.300. Removal of a Threatened & Endangered Species

No regulations in the R645 Rules authorizes the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973 or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq.

358.400. Riparian & Wetland Areas

There are some riparian and wetland areas associated with springs and seeps in the Coal Hollow permit area (including the 85.88-acre Dame Lease IBC area) (see Chapter 7). The habitat in the vicinity of springs SP-8, SP-14, SP-20, SP-22, and SP-40, and wells C4, C2, C3, C5, and Y-61 will be protected through the use of highwall mining techniques in the 85.88-acre Dame Lease IBC. Unlike coal mining using conventional mine pit surface mining techniques (utilized elsewhere at the Coal Hollow Mine), mining using highwall mining techniques does not result in disturbance to the land surface above coal extraction areas (the coal is extracted through a series of excavated horizontal holes, with sufficient coal left in place between holes to fully support the overlying land surface). The highwall mining plan for the 85.88-acre Dame Lease IBC, including the spacing and dimensions of the excavated holes, has been engineered to prevent subsidence of the land surface. The highwall mining will occur in the Smirl coal seam, which is separated from overlying shallow alluvial groundwater systems by a thickness of soft, low-permeability Tropic Shale bedrock. The presence of the Tropic Shale bedrock between the coal seam and the overlying alluvium minimizes the potential for downward migration of alluvial groundwaters into the excavated coal holes. Accordingly, impacts to water quantity in the overlying and adjacent shallow alluvial groundwater systems are not anticipated (Appendix 7-14). Similarly, as no surface disturbance is anticipated over highwall mined areas, impacts to water quality in the overlying alluvial groundwater systems are not anticipated. For these reasons, impacts to ecosystems in and around the monitoring sites mentioned above are not anticipated and the habitat will be protected.

In the event that diminution of discharge rates from seeps and springs does occur as a consequence of mining and reclamation activities, any lost water will be replaced according to all applicable Utah State laws and regulations using the water replacement source specified in R645-301-727. The quantity and quality of replacement water detailed in R645-301-727 will be suitable for the existing premining uses and approved postmining land uses.

Additionally, the coal mining and reclamation operations at the Coal Hollow Project will avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife (see Section 333, Procedures to Minimize Adverse Impacts to Fish & Wildlife in this document).

358.500. Best Technology Available

The Coal Hollow Project will apply the best technology currently available in all disciplines of the coal mining and reclamation activities.

358.510. Powerline & Transmission Facilities

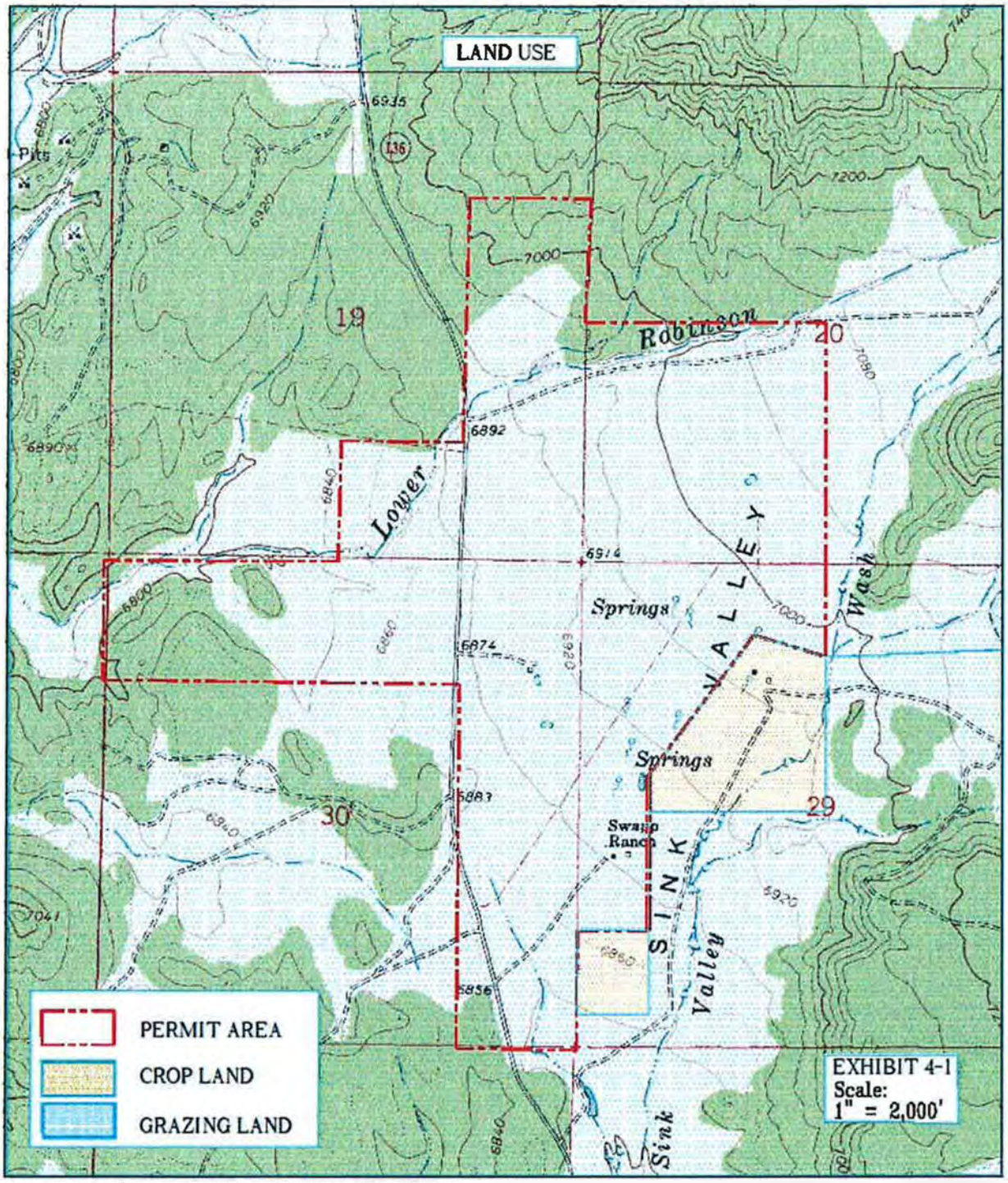
The Coal Hollow Project will ensure that electric powerlines and other transmission facilities used for, or incidental to, coal mining and reclamation operations on the permit area are designed and constructed to minimize electrocution hazards to raptors, except where DOGM determines that such requirements are unnecessary.

358.520. Fences & Conveyers

The Coal Hollow Project will design fences, overland conveyers, and other potential barriers to permit passage for large mammals, except where the DOGM determines that such requirements are unnecessary.

358.530. Toxic-Forming Areas

The Coal Hollow Project has no plans for ponds that contain hazardous concentrations of toxic-forming materials.



Acreage of crop land under production:

Sorensen: 90 acres (approximate)
Johnson: None currently
Dame: None currently
Pugh: None currently

411.110 Surface Land Status/Mine Plan Area

Ownership of the surface rights within and contiguous to the mine plan and permit area is shown on Drawing 1-3. The surface within the permit area is privately owned and leased by Alton Coal Development, LLC. The contiguous lands, outside the permit area, are administered by Bureau of Land Management, along with other private owners, as reflected on Drawing 1-3.

Alton Coal Development believes that the mining of the permit area will enhance the post-mining use of the land. Some gullies and rills will be eliminated. Drainages will be enhanced allowing a better use of land. Wildlife habitat will benefit from the planting and reclamation of lands for that purpose. Reclamation will be constructed to the final landform shown on Drawings 5-35 and 5-36. The alternative highwall mining will reduce surface disturbance. Mining disturbance to the surface will be reduced along with reclamation needs. Surface areas that will not be affected by any mining will remain in the existing pre-mining state.

411.120 Land Capability

The Coal Hollow Project Area has several land uses ranging from wildlife habitat to pasture land. Current vegetative cover and productivity of the plant communities in the permit area are shown in Chapter 3 (321.100 *through* 321.200). Soil resources information of the permit area is provided in Chapter 2 (222.100 *through* 222.400). Topography of the area is described in several chapters, but specifically in Chapter 6. Current hydrologic conditions of the permit and adjacent areas to the project are provided in Chapter 7.

411.130 Existing Land Uses/Land Use Classifications

Kane County has zoned the area within the permit boundaries and surrounding area as Agriculture.

411.140 Cultural and Historic Resource Information

A cultural resource inventory was conducted by Montgomery Archaeological Consultants Inc. (MOAC) in June 2005 for Alton Coal Development, LLC. The project area is located in the Sink Valley area in the Alton Amphitheater. This survey covers the entire permit area, approximately 433 acres, all of which are on private property. The additional 85.88 acres of surface, Dame Property (plot 9-5-29-2), added as part of this permit will not be impacted by operations and will not be affected by mining. See Drawing 1-3.

The inventory resulted in the documentation of one previously recorded historic/prehistoric site, five previously recorded prehistoric sites, and nine new prehistoric sites. Five eligible sites will be affected by mining operations. These five locations will require a data recovery treatment plan.

Appendix 4-1, Cultural resource inventory of Alton Coal Developments Sink Valley-Alton Amphitheater Project Area, Kane County, Utah, reflects maps, photographs, and results of the inventory.

411.141 Cultural and Historic Resources Maps

Other than improvements to the existing land described above, the land will be returned to its pre-mining conditions.

420 AIR QUALITY

421 CLEAN AIR ACT

Coal mining and reclamation operations will be conducted in compliance with the requirements for the Clean Air Act and Any other applicable Utah or Federal statutes and regulations containing air quality standards.

422 UTAH BUREAU OF AIR QUALITY

Alton Coal Development, LLC has retained JBR Environmental Consultants to prepare a Notice of Intent (NOI) for a new source at the Coal Hollow Project. The original NOI was submitted to the Utah Division of Air Quality (UDAQ) on May 8, 2007. This NOI provided an initial assessment of air emissions for the project based on the MRP prior to being determined Administratively Complete. JBR coordinated preparation of the original NOI with Tom Bradley and Jon Black of the UDAQ. In September 2008, JBR began development of a revised NOI to include air dispersion modeling. This air dispersion modeling was coordinated with Dave Prey of UDAQ. A conference call was conducted with representatives of UDAQ, JBR and Alton Coal on December 8th, 2008 to discuss modeling inputs, background emissions and preliminary modeling results. The revised NOI was submitted on April 20, 2009 . UDAQ responded to the NOI on June 23, 2009 by asking for additional information. The Fugitive Dust Control Plan is provided as Appendix 4-5. Alton Coal was issued by the Executive Secretary of the Utah Air Quality Board Approval Order DAQE-AN0140470002-10 for a new source on November 10, 2010. After consultation Jon Black, an NOI dated August 22, 2013 was submitted to UDAQ, Alton Coal requested addition of a highwall miner to list of mobile equipment in use at the Coal Hollow Mine.

423.100- 200 AIR POLLUTION CONTROL PLAN

Production rates at the Coal Hollow Mine are expected to exceed 1,000,000 tons of coal per year. Appendix 4-5 provides a Fugitive Dust Control Plan (FDCP). This plan includes controls and monitoring measures that will be taken to minimize air pollution related specifically to fugitive dust.

424 PLAN FOR FUGITIVE DUST CONTROL PRACTICES

Proposed mining will exceed 1,000,000 tons annually. A Fugitive Dust Control Plan is provided as Appendix 4-5.

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CHAPTER 5

R645-301-500. ENGINEERING

510. INTRODUCTION.

The engineering section of the Mining and Reclamation Plan (MRP) is divided into the operation plan, reclamation plan, design criteria, and performance standards. 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.

511. GENERAL REQUIREMENTS

511.100 - 511.300. Contents

The operation and reclamation permit application includes descriptions of the coal mining and reclamation operations with attendant Drawings, plans, and cross sections. and its potential impacts to the environment as well as methods and calculations utilized to achieve compliance with design criteria.

All this information can be viewed in this section, Drawings 5-1 through 5-44 and Appendices 5-1 through 5-7.

512. CERTIFICATIONS

512.100. Cross Sections and Drawings.

All cross sections and Drawings required under applicable portions of sections 512.100 through 512.150 have been prepared by, or under the direction of, and certified by: a qualified, registered, professional engineer; a professional geologist; or a qualified, registered, professional land surveyor, with assistance from experts in related fields such as hydrology, geology and landscape architecture.

Compliance with this section has been completed and certifications are available on all cross sections and Drawings.

512.200. Plans and Engineering Designs.

All plans for excess spoil, durable rock fills, coal mine waste, impoundments, primary roads and variances from approximate original contour will be certified by a qualified registered professional engineer.

Plans for excess spoil, sediment impoundments, primary roads, and a variance from approximate original contour have been certified by a qualified registered professional engineer. These certifications can be viewed on Drawings 5-22 through 5-37. No coal mine waste or durable rock fills are planned.

512.210 Excess Spoil Disposal Areas

A professional engineer experienced in the design and construction of earth and rock fills will certify the design of Excess Spoil Disposal Areas according to 535.100.

A professional engineer with experience in design and construction of earth and rock fills has certified the design of the Excess Spoil Disposal according to 535.100. An expert in the field of slope stability and geotechnical analysis has provided a thorough review of the design. This analysis can be viewed in Appendix 5-1.

512.220 - 230 Durable Rock Fills and Coal Mine Waste Structures

The MRP does not contemplate the construction of any permanent Durable Rock Fills or Coal Mine Waste structures. If such structures become part of the plan, a professional engineer experienced in the design of earth and rock fills and or disposal facilities will certify the design according to 535.100 - 536.

512.240. Impoundments.

A professional engineer experienced in the design and construction of impoundments will use current, prudent, engineering practices and will certify the design of the impoundment according to 743.

A professional engineer experienced in the design and construction of impoundments with assistance from a geotechnical expert has used current, prudent, engineering practices to design the proposed impoundments. The plans have been certified and a detailed geotechnical analysis has been provided. The certifications and drawings can be viewed in Drawings 5-25 through 5-31 and Appendices 5-1 and 5-2.

512.250. Primary Roads.

A professional engineer will certify the design and construction or reconstruction of primary roads as meeting the requirements of 742.420.

Designs of primary roads have been certified as meeting the requirements of 742.420.

512.260. Variance From Approximate Original Contour.

In areas of the MRP where a variance from the approximate original contour is required, a professional engineer will certify the design for the proposed variance from the approximate original contour, as described under 270, in conformance with professional

standards established to assure the stability, drainage and configuration necessary for the intended use of the site.

A variance from the approximate original contour has been certified in conformance with professional standards to assure the stability, drainage and configuration necessary for the intended use of the site.

513. COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS.

513.100. Coal Processing Waste Dams and Embankments

The MRP does not contemplate the construction of any coal processing waste dams and embankments.

513.200. Impoundments and Sedimentation Ponds

No impoundments or sedimentation ponds meeting the size or other qualifying criteria of MSHA, 30 CFR 77.216(a) exist or are planned within the proposed Mine Permit Area. Should impoundments and sedimentation ponds meeting the size or other qualifying criteria of MSHA, 30 CFR 77.216(a) become necessary, compliance with the requirements of MSHA, 30 CFR 77.216 will be met.

513.300. Disposal of Underground Development Waste, Coal Processing Waste and Excess Spoil in underground mine workings.

The MRP does not contemplate any underground development waste, coal processing waste, or excess spoil being disposed of in underground mine workings.

513.400. Refuse Piles

The MRP does not contemplate the construction of any refuse piles.

513.500. Capping, Sealing and Backfilling Openings to the Surface from the Underground.

Each shaft, drift, adit, tunnel, exploratory hole, entryway 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

All wells will be managed to comply with R645-301-748 and R645-301-765. Water monitoring wells will be managed on a temporary basis according to R645-301-738.

Wells constructed for monitoring groundwater conditions in the proposed Coal Hollow Mine permit and adjacent area, including exploration holes and boreholes used for water

wells or monitoring wells, will be designed to prevent contamination of groundwater and surface-water resources and to protect the hydrologic balance. A diagram depicting typical monitoring well construction methods is shown in Figure 7-11. Monitoring wells will include a protective hydraulic seal immediately above the screened interval, an annular seal plugging the borehole above the hydraulic seal to near the ground surface, and a concrete surface seal extending from the top of the hydraulic seal to the ground surface which is sloped away from the well casing to prevent the entrance of surface flows into the borehole area. Well casings will protrude above the ground surface a sufficient height so as to minimize the potential for the entrance of surface water or other material into the well. A steel surface protector with a locking cover will be installed at monitoring wells to prevent access by unauthorized personnel. Where there is potential for damage to monitoring wells, the wells will be protected through the use of barricades, fences, or other protective devices. These protective devices will be periodically inspected and maintained in good operating conditions. Monitoring wells will be locked in a closed position between uses.

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State of Utah, Division of Water Rights or other applicable state regulations. Abandonment of wells will be performed by a licensed water well driller. The wells to be abandoned will be completely filled using neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout, or other materials approved by the Utah State Engineer's office. Alternatively, the well may be abandoned using a different procedure upon approval from the Utah State Engineer's office.

Abandonment materials will be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the State Engineer by the responsible licensed driller giving data related to the abandonment of the well. This shall include the name of the licensed driller or other person(s) performing abandonment procedures, name of well owner at the time of

abandonment, the address or location of the well by section, township, and range, abandonment materials and equipment used, water right or file number covering the well, the final disposition of the well, and the date of completion.

Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance. Exploration holes and boreholes will be managed to ensure the safety of people, livestock, fish and wildlife, and machinery.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

If any exploration boreholes are to be used as monitoring wells or water wells, these will meet the provisions of R645-301-731

Boreholes will be backfilled to within 1 foot of the land surface with concrete or other materials approved by the Division as necessary to prevent contamination of groundwater or surface-water resources or to protect the prevailing hydrologic balance. The upper approximately 1 foot will be backfilled with native materials to facilitate reclamation (see Drawing 6-11). Exploration holes and boreholes that may be uncovered during mining and reclamation activities will be permanently closed unless approved for water monitoring or otherwise managed in a manner approved by the Division.

513.600. Discharges into an underground mine

The MRP does not contemplate discharges into an underground mine.

513.700. Surface Mining Closer than 500 Feet to an Active Underground Mine

The MRP does not contemplate mining within 500 feet of an active underground mine.

513.800. Coal Mine Waste Fires

The MRP does not contemplate the generation of any coal mine waste.

514. **INSPECTIONS**

All engineering inspections, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

514.100 Excess Spoil.

The professional engineer or specialist will be experienced in the construction of earth and rock fills and will periodically inspect the fill during construction. Regular inspections will also be conducted during placement and compaction of fill materials.

The construction method for the excess soil specified in 528.310 is expected to meet the 85% compaction standard. As verification, the fill compaction will be periodically field tested using method(s) as directed by the qualified registered professional engineer. A description of the test method and the test results will be provided to the Division as part of the quarterly inspection reports.

514.110. Such inspections will be made at least quarterly throughout construction and during critical construction periods. Critical construction periods will include at minimum:

514.111. Foundation preparation, including the removal of all organic material and topsoil;

514.112. Placement of underdrains and protective filter systems.

No underdrains or protective filter systems are planned as part of the excess spoil.

514.113. Installation of final surface drain systems; and

514.114. The final graded and revegetated fill.

514.120. The qualified registered professional engineer will provide a certified report to the Division promptly after each inspection that the fill has been constructed and maintained as designed and in accordance with the approved plan and the R645-301 and R645-302 Rules. The report will include appearances of instability, structural weakness, and other hazardous conditions.

514.200 - 250. Refuse Piles.

The MRP does not contemplate the construction of any refuse piles.

514.300. Impoundments.

514.310 - 313. Certified Inspection.

A professional engineer or specialist experienced in the construction of impoundments will inspect impoundments. Inspections will be made regularly during construction, upon completion of construction, and at least yearly until removal of the structure or release of the performance bond. The qualified registered professional engineer will promptly, after each inspection, provide to the Division, a certified report that the impoundment has been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules. The report will include discussion of any appearances of instability, structural weakness or other hazardous conditions, 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. A copy of the report will be retained at or near the mine site.

514.320. Inspection Standard and Frequency

The MRP does not contemplate construction of any impoundments meeting the NRCS Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR Sec. 77.216. If such impoundments become necessary, they will be examined in accordance with 30 CFR Sec. 77.216-3. Impoundments not meeting the NRCS Class B or C Criteria for dams in TR-60, or subject to 30 CFR Sec. 77.216, will be examined at least quarterly. A qualified person designated by Alton Coal Development LLC will examine impoundments for the appearance of structural weakness and other hazardous conditions.

515. REPORTING AND EMERGENCY PROCEDURES

515.100. Slides

Any time a slide occurs which may have a potential adverse effect on public, property, health, safety, or the environment, Alton Coal Development LLC will notify the Division by the fastest available means and comply with any remedial measures required by the Division.

515.200. Impoundment Hazards.

If any examination or inspection of an impoundment discloses that a potential hazard exists, the person who examined the impoundment will promptly inform the Division of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the Division will be notified immediately.

515.300. Temporary Cessation

515.312.

During a temporary cessation, surface facilities in areas in which there are no current operations, but in which operations are to be resumed under an approved permit will be effectively secured.

515.320.

Before temporary cessation of coal mining and reclamation operations for a period of 30 days or more, or as soon as it is known that a temporary cessation will extend beyond 30 days, a notice of intention to cease or abandon operations will be submitted to the division. This notice will include:

- A statement of the exact number of acres which have been affected in the permit area prior to such temporary cessation,
- The extent and kind of reclamation of those areas which has been accomplished, and
- Identification of the backfilling, regrading, revegetation, environmental monitoring, and water treatment activities that will continue during the temporary cessation.

516. PREVENTION OF SLIDES

The moderate topography in the area of the planned Coal Hollow Mine will minimize the potential for unplanned slides. A natural barrier will, however, be left undisturbed except as necessary for roads, sedimentation control, temporary topsoil and spoil storage and similar features, beginning at the elevation of the coal seam and extending from the outslope for a distance of at least 50 ft. The barrier will be retained in place to prevent slides and erosion.

520. OPERATION PLAN.

521. GENERAL.

The proposed Coal Hollow Mine is located approximately 2.5 miles south of Alton, Utah. In order to maximize the use and conservation of the coal resource, coal will be recovered using large hydraulic excavators, front end loaders, off-road trucks, and highwall miner. Mined coal will be hauled to a central coal area for crushing and placement into a stockpile. Coal from the stockpile will be transferred into a bin and loaded into over the road trucks for transport.

The plan, with Drawings, cross sections, narrative, descriptions, and calculations indicates how the relevant requirements will be met. The lands subject to coal mining and reclamation operations over the estimated life of the operations are identified and briefly described. All appropriate information is located in the subsequent sections and Drawings 5-1 through 5-44 and Appendices 5-1 through 5-. Topsoil piles and removal sequencing is shown on Drawing 2-2.

521.100. Cross Sections and Drawings.

The application includes cross sections, Drawings and plans showing all the relevant information required by the Division. Appropriate information is provided in Drawings and cross sections 5-1 through 5-44.

521.110. Previously Mined Areas.

Historically, there has been some underground mining of coal within the Alton Amphitheater. The following underground mines are known to have historically existed within the Amphitheater:

- Seaman Mine
- Smirl Mine
- Alton Mine
- Johnson Mine
- Silver Mine

There are not any known mines that existed or currently exist within the permit area or the adjacent area as defined in R645-100-200. There is also not any active coal mining operations in the area.

521.120. Existing Surface and Subsurface Facilities and Features.

521.121. Buildings

The location of all buildings in and within 1,000 feet of the proposed permit area, with identification of the current use of the buildings is shown on Drawings 1-5 and 1-6.

521.122. Surface and Subsurface Man-Made Features

The only known surface and subsurface manmade features that exist within the permit area are:

- County Road 136 (location shown on Drawing 5-3)
- Water pipeline to Pond 20-1 (location shown on Drawing 7-7)

521.123. Public Roads

One Class B public road, Kane County Road 136 (K3900) is located in or within 100 feet of the proposed permit area and is shown on Drawing 5-3. This road will be temporarily relocated outside the permit area until mining is complete and then reconstructed. In addition, Kane County has recently made a claim on the two-track road located adjacent to Lower Robinson Creek which is also located within the permit boundary. This road has mostly been closed to the public since it crosses private land and ACD has worked with Kane County to develop an access agreement which includes access through the permit area by mine personnel escort only. This agreement is included as Appendix 1-8 in Chapter 1. The County has named this Class D public road K3993.

The details for reestablishing road K3900 is shown on Drawings 5-22E, 5-22F and 5-22H. The details related to reestablishing K3993 following mining is shown on Drawing 5-22C.

521.124. Existing areas of spoil, waste, coal development waste, and noncoal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities.

There are three impoundments currently located within the permit area which are Pond 20-1, Pond 29-3 and Pond 29-5 shown on Drawing 7-7. The area of these impoundment are approximately 3,400, 10,500 and 6963square feet respectively.

There no other areas of existing spoils, waste, coal development waste, and noncoal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities within the permit area.

521.125. Ponds and Other Impoundments

The MRP does not contemplate construction of any permanent water impoundments; coal processing waste banks and coal processing waste dams or embankments. The planned location of each sedimentation pond is shown on Drawing 5-3.

521.130. Landowners and Right of Entry and Public Interest Drawings.

All boundaries of lands and the names of present owners of record of both surface and subsurface within the Mine Permit Area are shown on Drawing 1-3 (Surface) and Drawing 1-4 (Subsurface).

521.132. Permit Boundary

The boundaries of land within the proposed permit area are shown on all applicable Drawings.

521.133. Public Roads

No mining or reclamation operations are planned within 100 ft. of a public road. However mine vehicles may cross the right-of-way of Kane County Road #136 for a short period early in the operation's life. Appropriate measures, including signage and mine operating practices and training will be implemented to protect the public.

521.133.2 Relocating a Public Road:

The design of any relocated road will be approved by Kane County authorities, or such other authorities as have jurisdiction. Appropriate measures will be taken to prevent entrance into the mining area via the pre-existing road, and appropriate signage and barriers will be installed to protect the public.

521.140. Mine Drawings and Permit Area Drawings.

521.141 The boundaries of all areas proposed to be affected over the estimated total life of the coal mining and reclamation operations, with a description of size, sequence and timing of the mining, the coal mining and reclamation operations to be conducted, the lands to be affected throughout the operation, and changes in facilities or features to be caused by the proposed operations;

These items are depicted on Drawings 5-1 through 5-44.

Two options are provided for final reclamation of the permit area. The Preferred option is shown on Drawings 5-35 and 5-36. The anticipated time schedule for this option is shown on Drawing 5-38. This option includes mining operations transitioning into the adjacent federal coal reserves. In the case that these reserves are not acquired by ACD, an alternative plan is provided in Drawing 5-37 and 5-37A which requires rehandling much of the fill above original contour to fill in the final pits.

If a circumstance occurs where mining of the permit area is complete and ACD has acquired the federal lease but permit approval has not yet been acquired to continue mining in the federal coal reserves; ACD requests that the Division consider a temporary cessation of operations at that time rather than requiring implementation of the alternate reclamation scenario. This temporary cessation could be granted for a sufficient period of time to allow ACD to acquire approval for transitioning mining operations into the adjacent federal coal reserves. The Division does have the authority to grant such an allowance based on R645-301-515.300. Should the alternative reclamation scenario be implemented prematurely, reclamation along the western side and south end of the permit area will either be excavated to recover coal or these coal reserves beneath and adjacent to the reclamation will be unrecoverable. Also, an additional excess spoil structure will have be constructed for the boxcut for the federal reserves. A detailed description of the two reclamation scenarios and how each scenario would apply is provided in Section 528.200 Overburden and 553 Backfilling and Grading of this Chapter.

If ACD does not acquire the federal coal lease by the time that the final pit is complete, ACD will then immediately transition the reclamation plan to the alternative scenario.

Additionally, two options are provided for surface mining of the permit area. The Preferred option is shown on Drawings 5-2, 5-9, 5-10, and 5-16. The anticipated time schedule for this option is shown on Drawing 5-38. This option shows coal recovery through traditional open pit operations with coal being recovered by hydraulic excavators or loader and off-road trucks. In the case that ACD acquires a highwall mining system, an optional plan is provided in Drawing 5-2A, 5-9A, 5-10A and 5-16A. The estimated time schedule for this option is shown on Drawing 5-38A. This option shows coal recovery through traditional open pit operations with coal being recovered by a highwall mining system, loader and off-road trucks. Under this option surface disturbance will be considerably less.

The optional plan is provided with the anticipation that a highwall mining system will be employed. The stage at which it begins will be determined by the arrival date of the highwall miner and conditions favorable to highwall mining.

521.143 The proposed disposal sites for placing excess spoil generated at surface areas affected by surface operations and facilities for the purposes COAL MINING and RECLAMATION ACTIVITIES according to:

- *R645-301-211: The applicant will present a description of the premining soil resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be separately removed and segregated from other material.*

  The soil resources for the proposed excess spoil disposal area are described in Appendix 2-1. A plan has been developed for removal of topsoil and suitable

subsoil based on the soil descriptions in this appendix. The handling plan can be viewed on Drawing 2-2. Topsoil and acceptable subsoil will be separately removed and segregated from other material prior to placement of any spoil.

- *R645-301-212: After removal, topsoil will be immediately redistributed in accordance with R645-301-242, stockpiled pending redistribution under R645-301-234, or if demonstrated that an alternative procedure will provide equal or more protection for the topsoil, the Division may, on a case-by case basis, approve an alternative;*

  Excess spoil will have topsoil and subsoil redistributed in an approximately uniform, stable thickness with the approved post mining land use, contours and surface water drainage systems. Material handling practices will prevent excess compaction of these materials. Handling practices will also protect the materials from wind and water erosion before and after seeding and planting.

- *R645-301-412.300: Criteria for Alternative Postmining Land Uses.*

  The MRP does not contemplate alternative postmining land uses.

- *R645-301-512.210: Excess Spoil. The professional engineer experienced in the design of earth and rock fills will certify the design according to R645-301-535.100.*

  A professional engineer experienced in the design of earth and rock fills with assistance from a geotechnical expert has certified the design according to R645-301-535.100. These certifications can be viewed on Drawings 5-35, 5-36 and 5-17 through 5-19.

- *R645-301-512.220: Durable Rock Fills*

  No durable rock fills are planned.

- *R645-301-514.100: Excess Spoil. The professional engineer or specialist will be experienced in the construction of earth and rock fills and will periodically inspect the fill during construction. Regular inspections will also be conducted during placement and compaction of fill materials.*

  A professional engineer or specialist that is experienced in the construction of earth and rock fills will inspect the fill during construction and regular inspections will also be conducted during placement and compaction of fill materials.

- *R645-301-528.310: Excess spoil will be placed in designated disposal areas within the permit area, in a controllable manner to ensure mass stability and prevent mass movement during and after construction. Excess spoil will meet the design criteria of R645-301-535. For the purposes of SURFACE COAL MINING*

AND RECLAMATION ACTIVITIES, the permit application must include a description of the proposed disposal site and the design of the spoil disposal structures according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.100, R645-301-745.300, and R645-301-745.400.

Excess spoil will be placed in the area designated on Drawing 5-3 and 5-35. This fill will be placed in lifts not to exceed 4 feet. The material will be transported from the overburden removal area to the fill by end dump haul trucks and a dozer(s) will spread the spoil to this lift thickness. The fill will meet at minimum 85% compaction as related to the standard Procter. Final slopes will be regraded to a maximum slope of 3h:1v. The top of the fill will be sloped to approximately 2% to prevent pooling of water and to reestablish drainage similar to original flow patterns. The excess spoil placed on the non-mined areas is approximately 32 acres and varies in height from 35 to 110 feet. The area of excess fill over mined out areas (variance from approximate original contour) is an extension of the fill placed on the non-mined area and is approximately 55 acres. Combined acreage of the excess fill placed on mined and non-mined areas is 87 acres and varies in height from 60 to 100 feet above original contour. Total excess fill is 8.6 million yards. Design of this fill can be viewed in Drawings 5-35 through 5-36 and the geotechnical study can be viewed in Appendix 5-1.

- *R645-301-535.100 through R645-301-130: Disposal of Excess Spoil*

  A geotechnical analysis of the excess spoil structure design has been completed by an expert in this field. The long term static safety factor for this structure design is estimated at 1.6 to 1.7. Lifts will be placed in thicknesses not to exceed 4 feet. The lifts will meet 85% compaction by the standard Procter. The fill will be graded to allow for drainage similar to original patterns and to prevent excessive infiltration of water. Fill will be covered with subsoil and topsoil as specified in Chapter 2 to provide conditions suitable for revegetation of the area. The geotechnical study can be viewed in Appendix 5-1.

- *R645-301-535.300 through R645-301-535.500: Disposal of Excess - Spoil Durable Rock Fills.*

  No durable rock fills are planned.

- *R645-301-536.300: Disposal of Coal Mine Waste in Excess Spoil*

  No coal mine waste is planned in the excess spoil area.

- *R645-301-542.720: Excess spoil will be placed in designated disposal areas within the permit area, in a controlled manner to ensure that the final fill is*

suitable for reclamation and revegetation compatible with the natural surroundings and the approved postmining land use. Excess spoil that is combustible will be adequately covered with noncombustible material to prevent sustained combustion. The reclamation of excess spoil will comply with the design criteria under R645-301-553.240.

The excess spoil as shown in Drawing 5-35 and 5-36 will be suitable to the surrounding area and for the postmining land use of primarily grazing. No combustible excess spoil will be placed in the proposed structure. The reclamation of the spoil does not include any terraces and the slopes will not exceed 3h:1v.

- *R645-301-553.240: The final fill configuration of the fill (excess spoil) will be suitable for the approved postmining land use. Terraces may be constructed on the outslope of the fill if required for stability, control of erosion, to conserve soil moisture, or to facilitate the approved postmining land use. The grade of the outslope between terrace benches will not be steeper than 2h:1v (50 percent).*

  The excess spoil as shown in Drawings 5-35 and 5-36 will be suitable to the surrounding area and for the postmining land use of primarily grazing. The reclamation of the spoil does not include any terraces and the slopes will not exceed 3h:1v. The long term static safety factor for these slopes is estimated to be 1.6 to 1.7.

- *R645-301-745.100: General Requirements.*

  745.110: Excess Spoil will be placed in designated disposal areas within the permit area, in a controlled manner to:

  745.111: Minimize the adverse effects of leaching and surface water runoff from the fill on surface and underground water;

  Reclamation of the excess spoil will include topsoil and a subsoil layer. Infiltration through the reclamation is expected to be minimal based on the high clay content of these soils. In addition, laboratory data for the overburden shows that there is minimal potential for leaching of pollutants should infiltration rates become higher than expected.

  The foundation of the excess spoil area also has high clay content with minimal potential for infiltration. This will provide an additional, natural barrier to protect ground water present beneath the proposed structure.

  745.112: Ensure permanent impoundments are not located on the completed fill. Small depressions may be allowed by the Division if they are needed to retain moisture or minimize erosion, create and enhance wildlife habitat or assist revegetation, and if they are not incompatible with the stability of the fill; and

Permanent impoundments are not planned on the excess spoil area. Small depressions may be constructed as allowed by the Division to retain moisture, minimize erosion, create and enhance wildlife habitat or assist revegetation.

745.113: Adequately cover or treat the excess spoil that is acid- and toxic forming with nonacid nontoxic material to control the impact on the surface and ground water in accordance with R645-301-731.300 and to minimize adverse effects on plant growth and approved postmining land use.

Laboratory data representative of the overburden planned for disposal in the excess spoil area does not show acid- and toxic forming characteristics.

745.120: Drainage Control. If the disposal area contains springs, natural or manmade water courses, or wet weather seeps, the fill design will include diversions and underdrains as necessary to control erosion, prevent water infiltration into the fill and ensure stability.

A spring and seep survey available in Chapter 7 has identified no springs or wet weather seeps in the proposed excess spoil area. The final surface will be regraded to a contour that will route water from snowmelt and rainfall around the excess spoil as shown on the final contours Drawing 5-35. There are no manmade water courses present in the excess spoil area. No underdrains are planned for the excess spoil structure.

745.121: Diversions will comply with the requirements of R645-301-742.300

No diversions are planned in the excess spoil area.

745.122 : Underdrains

No underdrains are planned in the excess spoil area.

745.300: Durable Rock Fills

No durable rock fills are planned in the excess spoil area.

745.400: Preexisting Benches

Excess spoil will not be disposed of through placement on preexisting benches.

521.150. Land Surface Configuration Drawings.

Surface contours representing the existing land surface configuration of the proposed permit area are shown on Drawing 5-1 and the post mining land configuration is shown on 5-35. Cross sections with both these landforms are shown on Drawing 5-36.

521.160. Maps and Cross sections of the Proposed Features for the Proposed Permit Area. These maps and cross sections will clearly show:

521.161 Buildings, utility corridors, and facilities to be used:

These items are shown on Drawings 5-3 through 5-8C.

521.162 The area of land to be affected within the proposed permit area, according to the sequence of mining and reclamation:

A yearly and overall disturbance sequence for the permit area is provided on Drawing 5-2 for open pit mining and on Drawing 5-2A for the alternative method of highwall mining.

521.163 Each area of land for which a performance bond or other equivalent guarantee will be posted under R645-301-512;

The area of land that will have a performance bond posted is shown on Drawing 5-3.

521.164 Each coal storage, cleaning and loading area. The map will be prepared and certified according to R645-301-512;

These facilities can be viewed on Drawings 5-3 through 5-5.

521.165 Each topsoil, spoil, coal preparation waste, underground development waste, and noncoal waste storage area. The maps will be prepared and certified according to R645-301-512;

Topsoil storage areas and handling can be viewed on Drawing 2-2. Spoil placement and the excess spoil structure can be viewed on Drawings 5-3, 5-17, 5-18, 5-19, 5-35 and 5-36.

521.166 Each source of waste and each waste disposal area relating to coal processing or pollution control;

Only sizing of the coal is proposed. This process will not produce any waste.

521.167 Each explosive storage and handling facility;

Need for these facilities are not anticipated at this time. Should these facilities become necessary, appropriate drawings will be provided to the Division.

521.168 For the purposes of SURFACE COAL MINING AND RECLAMATION ACTIVITIES, each air pollution collection and control facility; and

There are no specific air pollution collection or control facilities proposed.

521.169 Each proposed coal processing waste bank, dam or embankment. The map will be prepared and certified according to R645-301-512.

The MRP does not contemplate processing of coal that will produce waste.

521.170. Transportation Facilities Drawings.

Transportation facilities for the Coal Hollow Mine include seven primary roads, a conveyor system, and miscellaneous ancillary/temporary roads. Numerous drawings detail the designs and specifications for each one of the proposed facilities. The following is a description of each facility and a reference for the associated drawings:

- Roads: Two primary mine haul roads are planned within the permit area. The first road extends from the coal unloading area to the first series of pits along the west side of the property. This road will be utilized for access to the pits (pits shown on Drawing 5-10). This road will be approximately 2,800 feet in length and will be utilized throughout mining. There will be three culverts installed along this road all sized for a 100 year, 24 hour storm event. The first culvert will be across a tributary of Lower Robinson Creek and will be a 36 inch corrugated steel pipe. The second culvert is the main crossing over Lower Robinson Creek and is a 96 inch corrugated steel pipe. Both of these culverts have been sized based on analysis of the Lower Robinson Creek watershed. This analysis can be viewed in Appendix A5-3. The third culvert is crossing over a diversion ditch that will route water mainly from disturbed areas along the south side of Lower Robinson Creek to a sediment impoundment. This culvert will be a 24 inch corrugated steel pipe.

  The second road extends from an intersection with the first road, located just south of the Lower Robinson Creek crossing, and proceeds southeast to long term topsoil stockpile 2 and subsoil stockpile pile 1. This road is approximately 1,300 feet in length. There is one culvert crossing along this road to cross a diversion ditch. This culvert will be a 24 inch culvert sized for maximum anticipated flows in the diversion.

  The following specifications apply to these Primary mine haul roads:
  1) Roads will be approximately 80' in width
  2) Approximately a 2% crown
  3) Approximately one foot deep cut ditches along shoulders for controlling storm water
  4) 18" of crushed rock or gravel for road surfacing

5) Cut and fill slopes of 1.5 h:1v
6) Minimum fill over each culvert will be 2 times diameter of culvert
7) Berms placed as necessary along fills

The ancillary roads will have similar specifications except surfacing will occur only as needed and may be narrowed to a 40 foot road width. A typical cross section for the ancillary roads can be viewed on Drawing 5-24.

The location and details for Primary Mine Haul roads can be viewed on Drawings 5-3 and 5-22 and 5-23.

In addition to the two roads primary Mine Haul roads, the road located within the facilities area is also classified as a primary road. This road is planned to be 24 feet wide with 24 inches of compacted sub base and 8 inches of compacted 1 inch minus gravel as surfacing. This road is referred to as "Facilities Roadway" and more details are described in 527.200 along with Drawings 5-22A and 5-22B.

In addition to the primary roads that will be present during active mining, four additional roads are planned to exist postmining and are also classified as primary roads for this reason.

Roads that will remain postmining are the following:

- Road to Water Well with details shown on Drawing 5-22D
- Road to east C. Burton Pugh property (K3993) with details shown on Drawing 5-22C. Kane County has claimed this road as County Road K3993.
- County Road 136 (K3900) with details on Drawing 5-22E, 5-22F and 5-22H. This County road will be reconstructed within the permit area by Kane County. This reconstruction will occur concurrently with the final phase of reclamation as scheduled on Drawing 5-38 and is expected to be completed by 2017.
- Road to Swapp Ranch (same specification as the Water Well Road)

The location of these roads is shown on Drawings 5-35 and 5-37 along with the post mining topography.

The ramps, benches and equipment travel paths within the active surface mining area are temporary in nature and will be relocated frequently as mining progresses. These temporary travelways are considered part of the pit due to their short term use, and are not individually designed nor engineered. They will be built and maintained to facilitate safe and efficient mine and reclamation operations.

- Conveyors: A conveyor system will be used to stockpile coal and to load highway approved haul trucks for transportation to market. The first conveyor is mainly a stacker system for the coal stockpile which will be located at the coal unloading area

and will be approximately 451' in length. This conveyor is estimated to be a 48" solid frame system.

The second conveyor is a coal reclaim belt that will be loaded by an above ground reclaim feeder from the coal stockpile and will convey coal to the loadout chute which will load the highway approved coal haulage trucks. This section will be approximately 290' in length. Similar to the first section, this conveyor is estimated to be a 48" solid frame system.

Drawings of this system can be viewed on Drawings 5-3 through 5-5.

521.180. Support facilities.

Description of the support facilities is provided in Section 526.220. Drawings 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-8A, 5-8B, and 5-8C provide the maps, appropriate cross sections, design drawings and specifications to demonstrate compliance with R645-301-526.220 through R645-301-526.222 for each facility.

521.200. Signs and Markers Specifications.

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

521.240. Mine and Permit Identification Signs.

Identification signs showing the name, business address, and telephone number of Alton Coal Development LLC and the identification number of the permanent program permit authorizing coal mining and reclamation operations will be displayed at each point of access to the permit area from public roads, and will be retained and maintained until after the release of all bonds for the permit area;

521.250. Perimeter Markers.

The perimeter of a permit area will be clearly marked before the beginning of surface mining activities;

521.260. Buffer Zone Markers.

Buffer zones will be marked along their boundaries as required under 731.600521.270. Topsoil Markers.

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

522. **COAL RECOVERY**.

The MRP is designed to maximize recovery of the coal resource within technological, safety and legal limitations. Coal will be recovered from the Smirl Seam which ranges in thickness from 13.5 to 18.5 feet averaging approximately 16 feet in the planned mining area. The Smirl Seam is the only surface mineable seam in the permit area. Isopach maps of the coal thickness and strip ratio can be viewed on Drawings 5-13 and 5-14

Some coal along the boundaries of the mine area will not be recovered in conjunction with the proposed operation. This includes coal underlying the pit highwalls and areas where drainage or sedimentation control structures (diversions, ditches, ponds, etc) are located. The mine is designed to minimize such losses by locating haulage ramps in the spoil rather than on the pit wall, by oversteepening the coal face at the pit edges, and by minimizing the use of out of pit ancillary roads. Coal which is left in place in these areas may be recovered in the future when adjacent property rights are secured. Current plans are for a planned maximum mining depth of approximately 200 ft. and a strip ratio of 10:1; however, the ultimate mining depth will depend on cost related factors.

A detailed mine plan has been developed for the proposed permit area and the following table along with Drawing 5-9 summarize the coal extraction for the permit area for open pit mining.

Description	Extraction Status	Average Coal Thickness (ft)	Average Strip Ratio* (yd^3/Ton)	Quantity (**Ton)
Total Coal within Permit Boundary	N/A	16.3	7.7	12,092,000
High Strip Ratio Area (NE corner of permit area)	Not Mined	16.0	13.5	4,268,000
Coal under highwalls and sedimentation structures	Not Mined	17.2	4.8	3,011,000
Coal under Robinson Creek Diversion	Not Mined	15.5	3.9	172,000
Recoverable Coal	Mined	16.3	6.4	4,641,000

*All strip ratios are bank cubic yards of overburden to tons of coal

**All coal tons are based on a 95% recovery factor

A detailed mine plan has been developed for the proposed permit area and the following table along with Drawing 5-9A summarize the coal extraction for the permit area for the alternate option, highwall mining:

Description	Extraction Status	Average Coal Thickness (ft)	Average Strip Ratio* (yd^3/Ton)	Quantity (**Ton)
Total Coal within Permit Boundary	N/A	16.3	7.7	12,092,000
High Strip Ratio Area (NE corner of permit area)	Not Mined	16.0	13.5	4,268,000

Coal under highwalls and sedimentation structures	Not Mined	17.2	4.8	900,000
Coal under Robinson Creek Diversion	Not Mined	15.5	3.9	172,000
Recoverable Coal	Mined	16.3	6.4	4,471,000

*All strip ratios are bank cubic yards of overburden to tons of coal
**All coal tons are based on a 95% recovery factor for open pit mining and 45% for highwall mining

Once approval is received to progress with mining on the adjacent federal coal reserves, an additional 57% of the coal under the highwalls will be recovered as part of the progression into these adjacent reserves.

With open pit mining, the application of highly flexible, open pit truck/shovel techniques will minimize losses of coal due to pit geometry or spoil support requirements, allowing the maximum possible exposure of the coal resource. The full seam section will be loaded primarily using large hydraulic backhoes. The backhoes, which can work from the top of the seam, provide the ability to efficiently and cleanly excavate the lower part of the coal seam without disturbing the pit floor. This, along with the machine's high degree of bucket horizon control will minimize floor losses. The backhoes can also work safely from the top of the seam to oversteepen the loading face along the pit walls, thus recovering the maximum amount of coal.

Where pit geometry or operational factors preclude the use of backhoes for loading, a large rubber tire front end loader will be used. These machines provide similar horizon control, can operate on the floor of the pit or on an intermediate bench, and can recover coal from confined areas such as the ends of the pits.

With the alternative option, the application of a highwall mining system will be employed to recover coal from the exposed face. In this method of mining, an unmanned cutter module is driven underground and operated in front of the highwall. The highwall mining machine stands on the pit floor or on a bench, directly in front of the exposed seam and makes long parallel rectangular drives into the coal seam. A remote-operated cutter module is pushed into the seam by a string of push beams (unmanned coal-conveying elements) that transport the mined coal back to the entry of the drive onto a stockpile.

Rear dump haul trucks, loaded by the backhoes or front end loader, will be used to move the coal from the pit via inpit roads and the primary haulroad to the crusher and stockpile. The trucks will be equipped with "combo" beds suitable for hauling both coal and overburden, and configured to minimize coal spillage.

A net recovery of 95% (including the effects of in-pit coal losses and out-of-seam dilution) of the coal exposed in the open pit is anticipated. A net recovery of 45% of the coal mined by the alternative highwall system is anticipated. Normal coal losses are expected due to cleaning of the top of the seam, loading losses at the seam floor, and coal oxidation near the outcrop.

No coal washing is contemplated at this time, thus there will be no coal processing losses.

Maps and cross sections providing detailed information related to coal recovery activities can be viewed on Drawings 5-9 through 5-14.

523. MINING METHOD(s).

The Coal Hollow Mine will be a surface coal mining operation using open pit mining methods to produce up to 2 million tons of coal per year. Primary mining equipment will include hydraulic excavators, a highwall miner and end-dump mining trucks. The coal will be crushed at the mine site, and hauled to market in over-the-road coal trucks.

The mine is planned to produce approximately 4.64 million tons of coal over a life of approximately 6 years for the preferred option and approximately 4.2 million tons of coal over a life of approximately 7 years for the alternate option. The estimated production schedule is summarized below for the two options:

Preferred option		
		Tons Produced
Year		(000)
1		542
2		505
3		750
4		1,000
5		1,000
6		844
Total		4,641

Alternative option		
		Tons Produced
Year		(000)
1		542
2		505
3		567
4		792
5		789
6		802
7		153
Total		4,150

Initial mine development will involve removal and storage of topsoil from mine infrastructure locations. Facilities for equipment maintenance/warehouse, coal handling, and offices will be constructed. During the development and initial mining period, facilities temporary in nature may be used until permanent facilities can be built.

Construction of sedimentation ponds, diversion ditches, and mine roads accessing the initial mining areas will also be ongoing.

Mining will employ typical open pit methods using truck/loader type equipment to remove overburden and recover the coal. Mining will advance across the property in successive cuts approximately 250 ft. in width and 800 to 1,300 ft. long (generally equal to the width of the property less property barriers). Layout of these pits can be viewed on Drawing 5-10. The overburden will be removed in layers or lifts approximately 20 to 40 feet deep. In practice, these overburden lifts are mined in a stairstep fashion ahead of the coal removal operation to provide adequate working room for the equipment and stable advancing slopes. Once mining is complete, excavated overburden (spoil) from a successive cut is used to backfill the excavation. General cross sections of this process can be viewed on Drawings 5-11 and 5-12.

Prior to beginning mining, the area will be cleared of vegetation, and the topsoil will be recovered and either stockpiled or live hauled to regraded areas. It is not anticipated that blasting of the overburden will be necessary based on drilling data. Should this process become necessary, this is the phase where it would be implemented. Overburden will then be removed using large hydraulic excavator(s) or front end loaders and off-road trucks which will haul the spoil and place it in parts of the pit where the coal has been removed, or in the excess spoil area shown on Drawings 5-3, 5-35 and 5-36. Overburden is removed in successively deeper benches until the coal seam is exposed. Some overburden in lower lifts may be moved by direct dozing into the mined out pit by large bulldozers.

When overburden removal is finished in a particular pit, the top of the coal will be cleaned (removal of any roof rock or other non-coal material on top of the seam) using a motor grader, dozer or front end loader. The material removed will be placed in the adjacent mined out pit. For the open pit mined coal, if necessary, the coal seam will be loosened by drilling and blasting or ripping prior to loading. Drilling and blasting of the coal is not expected to be necessary. The cleaned, exposed coal is then excavated by backhoe or front end loader and placed into off-road rear dump trucks. Coal mined with a highwall miner would not require blasting.

Once the coal is removed, the pit will be backfilled by spoil from adjacent mine pits. Spoil will be placed in lifts and spread with a dozer. Once the pit is backfilled to the planned final surface contour, suitable topsoil and subsoil will be replaced, and the area reseeded. Revegetation work will proceed seasonally as appropriate for planting.

Overburden excavation and coal mining at Coal Hollow will begin near the subcrop of the coal seam at the western end of the permit area in the NW ¼ NE ¼ of Section 30, T39S, R5W. Topsoil will be removed and stored separately in topsoil stockpiles as shown on Map 2-2. Overburden from the initial pits will be hauled to the excess spoil pile east of the mining area. Once the initial pits are established, as much spoil as possible will be placed directly in the pit backfill, allowing reclamation to closely follow mining. This

initial phase includes pits 1 through 8 as shown on Drawing 5-10. The mining and reclamation process for this phase can be viewed on Drawing 5-17.

From the initial mining area, operations will proceed eastward through the NE ¼ of Section 30 to the NW ¼ of Section 29 (as shown on Drawing 5-10) and from the southeast ¼ of Section 30, beginning with pit 28 and proceeding north. The mining and reclamation process for this phase can be viewed on Drawing 5-18. As shown on Drawing 5-19, the final pits, pit 17 through 21, will not be backfilled at this stage. The proposed method for filling these pits back to approximate original contour will be accomplished by utilizing overburden from the pit(s) in the adjacent federal reserves located immediately west of this area. Alton Coal Development, LLC is currently in the process of an Environmental Impact Study for these reserves with the intent of acquiring the rights to mine. It is expected that these rights will be acquired prior to the completion of the final phase in the proposed Permit Area. The final landform for the Permit Area is shown on Drawings 5-35 and 5-36.

In the case that Alton Coal Development, LLC is not successful with acquiring the rights to the adjacent federal coal reserves, spoil will be rehandled from the excess spoil and variance from the approximate original contour to fill the remaining pits. The final landform for this alternate scenario is shown on Drawing 5-37 and 5-37A.

An estimate of the primary mining equipment planned for use at the Coal Hollow Mine is listed below:

Diesel - Hydraulic Excavators (15 to 38 cu. yd. capacity)
Highwall Mining System (CAT HW300 or equivalent)
Rubber Tired Front End Loaders (8 to 20 cu. yd. capacity)
End Dump Trucks (100 to 240 ton capacity class)
Track Dozers (Caterpillar D7 through D11 Class)
Motor Graders (Caterpillar 16H to 24H Class)
Water Trucks (8,000 to 20,000 Gallon Class)

A variety of other equipment will also be used to support the mining operation.

Proposed engineering techniques for meeting the proposed mining methods will include:

- Design support for roads, pits, sediment impoundments etc…
- Field staking of designs utilizing high precision GPS survey systems.
- Weekly field engineering support to view and provide guidance related to designs and environmental controls.
- Ongoing geotechnical support for ensuring highwall stability
- As additional information becomes available, update geological models to ensure full recovery of resource.
- Weekly mine plans that specify appropriate engineering and environmental specifications.

There are no known underground mines within 500 feet of the permit boundary; therefore, no surface mining or reclamation activities will take place within 500 feet of any underground mine.

524. BLASTING AND EXPLOSIVES

As a result of the 2005 drilling program and overburden characterization, it was determined that the soil over the coal seam is void of any solid structure and that the overburden is extremely homogenous consisting of soft clay and soft shale. As results of this cursory investigation, it is anticipated that there would be no need to drill and blast the overburden to facilitate the removal of the spoil above the coal seam. Also, due to the fact that the coal will have to be mined from on top of the seam due to wet clay zone beneath the coal seam it is anticipated that there would be no need to drill and blast the coal seam to facilitate coal removal.

As a safeguard or fallback position if mining condition should change, all blasting and explosive criteria will be addressed.

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Though not anticipated, explosives may be utilized as necessary at Coal Hollow Mine to break the overburden over the coal and may be used to break the coal for loading if necessary. In accordance with the requirements of this section, a blasting plan is provided to the Division in Appendix 5-4. Blasts that use more than five pounds of explosives or blasting agents will be conducted according to the schedule provided in 524.400.

524.100 Blaster Certification

Alton Coal Development, LLC (ACD) will, prior to conducting any surface blasting operations, ensure that all surface blasting incident to surface mining in Utah is conducted under the direction of a Utah Certified Blaster. Certificates of blaster certification will be carried by the blasters or will be on file at the mine permit area during blasting operations. A blaster and at least one other person will be present at the firing of a blast.

Persons responsible for blasting operations at a blasting site will be familiar with the blasting plan 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 Blast Design

There are no dwellings, public buildings, schools, churches, or community or institutional building within 1,000 feet of the planned blasting area in the initial (year 1) mining period. There are also no underground mines within 500 feet of the permit. The

anticipated blast design can not be reasonably estimated at this time since ACD is not sure what geologic conditions exist that may require blasting. If conditions are encountered that require blasting, ACD will provide the Division with the designed pattern prior to conducting blasting.

Blasts conducted within 1000 ft. of a dwelling, public building, school, church, or community or institutional building will be submitted for Division and MSHA approval, prior to blasting. The blast design will contain sketches of the drill and delay patterns, decking, type and amount of explosives required per blast, critical dimensions, design factors utilized to protect the public, general location drawings of protected structures, which meet the applicable airblast, flyrock, and ground vibration standards in 524.600.

The blast design will be prepared and signed by a Utah certified blaster.

524.300 - 350 Preblasting Survey

A preblasting survey will be conducted prior to commencement of blasting operations. As part of the preblasting survey Alton Coal Development LLC will:

- Notify, in writing, all residents or owners of dwellings or other structures located within one-half mile of the permit area how to request a preblasting survey at least 30 days before initiation of blasting.
- Prepare a written report of any preblasting survey. A resident or owner of a dwelling or structure within one-half mile of any part of the permit area may request a preblasting survey. This request will be made, in writing, directly to Alton Coal Development LLC or to the Division, who will promptly notify Alton Coal Development LLC. Alton Coal Development LLC will promptly conduct a preblasting survey of the dwelling or structure and promptly prepare the written report. An updated survey of any additions, modifications, or renovation will be performed by Alton Coal Development LLC if requested by the resident or owner.
- Determine the condition of the dwelling or structure and will document any preblasting damage and other physical factors that could reasonably be affected by the blasting. Structures such as pipelines, cables, transmission lines, and cisterns, wells, and other water systems warrant special attention; however, the assessment of these structures may be limited to surface conditions and other readily available data.
- Require the written report of the survey be signed by the person who conducted the survey. Copies of the report will be promptly provided to the Division and to the person requesting the survey. If the person requesting the survey disagrees with the contents and/or recommendations contained therein, he or she may submit to both Alton Coal Development LLC and the Division a detailed description of the specific areas of disagreement.

- Complete any survey requested more than ten days before the planned initiation of blasting, before blasting occurs.

524.400 Blasting Schedule

524.420. Timing of Blasting

All blasting will be conducted between sunrise and sunset unless nighttime blasting is approved by the Division. Alton Coal Development LLC will conduct blasting operations at times approved by the Division and announced in the blasting schedule.

524.410. Unscheduled Blasts

Unscheduled blasts will be conducted only where public or operator health and safety so requires and for emergency blasting actions. When an unscheduled surface blast incidental to coal mining and reclamation operations is conducted, Alton Coal Development LLC, using audible signals, will notify residents within one-half mile of the blasting site and document the reason in accordance with 524.760.

524.450 - 453. Blasting Schedule Publication and Distribution.

Alton Coal Development, LLC will:

- Publish the blasting schedule in a newspaper of general circulation in the locality of the blasting site at least ten days, but not more than 30 days, before beginning a blasting program;
- Distribute copies of the schedule to local governments and public utilities and to each local residence within one-half mile of the proposed blasting site described in the schedule; and
- Republish and redistribute the schedule at least every 12 months and revise and republish the schedule at least ten days, but not more than 30 days, before blasting whenever the area covered by the schedule changes or actual time periods for blasting significantly differ from the prior announcement; and

524.460 - 465. Blasting Schedule Contents.

The blasting schedule will contain, at a minimum:

- Name, address, and telephone number of operator;
- Identification of the specific areas in which blasting will take place;
- Dates and time periods when explosives are to be detonated;
- Methods to be used to control access to the blasting area; and

- Type and patterns of audible warning and all-clear signals to be used before and after blasting.

524.500 - 532 Blasting and Warning Signs, Access Control

Blasting signs will read **"Blasting Area"** and be conspicuously placed along the edge of any blasting area that comes within 100 feet of any public right-of-way, and at the point where any other road provides access to the blasting area. At all entrances to the mine permit area from public roads or highways, signs will be conspicuously placed which read **"Warning! Explosives in Use"**, clearly list and describe the meaning of the audible blast warning and all-clear signals in use, and explain the identification of blasting areas where charged holes await firing at the blasting site in the mine permit area.

Warning and all-clear signals of different character or pattern that are audible within a range of one-half mile from the point of the blast will be given. Each person within the permit area and each person who resides or works regularly within one-half mile of the blast site in the mine permit area will be notified of the meaning of the signals in the blasting schedule and notification.

Access within the blasting areas will be controlled to prevent presence of livestock or unauthorized persons during blasting and until an authorized representative of Alton Coal Development LLC has reasonably determined that no unusual hazards exist, such as imminent slides or un-detonated charges; and access to and travel within the blasting area can be safely resumed.

524.600 - 610 Adverse Effects Of Blasting

Blasting will be conducted to prevent injury to persons, damage to public or private property outside the mine permit area, and changes in the course, channels, or availability of surface or ground water outside the mine permit area.

524.620 Airblast Limits

Airblast will not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building outside the mine permit area, except for those structures and facilities owned by Alton Coal Development LLC as approved by the Division. Maximum airblast limits are as follows:

Lower Frequency Limit of Measuring System, HZ (+3dB)		Maximum Level dB
0.1 Hz or lower – flat response (1)		134 peak
2 Hz or lower – flat response		133 peak
6 Hz or lower – flat response		129 peak
C-weighed – slow response (1)		105 peak dBC

(1) Only when approved by the Division.

524.630. Monitoring:

Periodic monitoring will be conducted to ensure compliance with the airblast standards. Airblast measurements and will be taken as required by the Division at locations specified by the Division. The measuring system used will have an upper-end flat frequency response of at least 200 Hz.

524.633. Flyrock:

Flyrock traveling in the air or along the ground will not be cast from the blasting site more than one-half the distance to the nearest dwelling or other occupied structure; beyond the area of blasting access control or beyond the mine permit area boundary.

524.640 - 662. Ground Vibration.

In all blasting operations, except as otherwise authorized by the Division, the maximum ground vibration will not exceed the values approved by the Division. The maximum ground vibration for protected structures will be in accordance with either the maximum peak-particle velocity limits, the scaled-distance equation, the blasting-level chart, or by the Division. All other structures in the vicinity of the blasting area such as water towers, pipelines and other utilities, tunnels, dams, impoundments, and underground mines will be protected from damage by establishment of a maximum allowable limit on the ground vibration. These limits will be submitted by Alton Coal Development LLC and approved by the Division prior to blasting. A seismographic record will be provided for each blast. **Maximum Peak-Particle Velocity Method:** The maximum ground vibration will not exceed the following limits at the location of any dwelling, public building, school, church, or community or institutional building outside the mine permit area in accordance with the following:

Distance (D) from Blast Site in feet	Maximum allowable Particle Velocity (Vmax) for ground vibration, in inches/second [1]	Scaled distance factor to be applied without seismic monitoring (Ds) [2]
0 to 300	1.25	50
301 to 5,000	1.00	55
5,001 and beyond	0.75	65

(1) Ground vibration will be measured as the particle velocity. Particle velocity will be recorded in three mutually perpendicular directions. The maximum allowable peak particle velocity will apply to each of the three measurements.
(2) Applicable in the scale-distance equation of 524.651.

Scaled Distance Equation Method: Alton Coal Development LLC will use the scaled-distance equation, $W=(D/Ds)^2$, to determine the allowable charge weight of explosives to be detonated in any eight-millisecond period, without seismic monitoring: where W = the maximum weight of explosives, in pounds: D = the distance, in feet, from the blasting

site to the nearest protected structure: and Ds = the scaled-distance factor, which may initially be approved by the Division using the values for scaled-distance factor listed in 524.642.

The development of a modified scaled-distance factor may be authorized by the Division on receipt of a written request by Alton Coal Development LLC, supported by seismographic records of blasting at the mine site. The modified scaled-distance factor of the predicted ground vibration will not exceed the prescribed maximum allowable peak particle velocity of 524.642 at a 95% confidence level.

Blasting-Level-Chart. Alton Coal Development LLC may use the ground-vibration limits in Figure 1 (Figure 1, showing maximum allowable ground particle velocity at specified frequencies, is incorporated by reference. Figure 1 may be viewed at 30 CFR 817.67 or at the Division of Oil, Gas and Mining State Office.) to determine the maximum allowable ground vibration. If the Figure 1 limits are used, a seismographic record including both particle velocity and vibration-frequency levels will be provided for each blast. The method for the analysis of the predominant frequency contained in the blasting records will be approved by the Division before application of this alternative blasting criterion.

524.690. Standards not Applicable

The maximum airblast and ground-vibration standards of 524.620 through 524.632 and 524.640 through 524.680 will not apply at the following locations: At structures owned by Alton Coal Development LLC and not leased to another person; and at structures owned by Alton Coal Development LLC and leased to another person, if a written waiver by the lessee is submitted to the Division before blasting.

524.700 Records of Blasting Operations:

Blasting records will be maintained at the mine site for at least three years and upon request, records will be available for inspection by the Division or the public. A blasting record will contain the name of Alton Coal Development LLC; location, date, and time of the blast; name, signature, and Utah certification number of the blaster conducting the blast. It will also include the identification, direction, and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area, except those described in 524.690 and weather conditions, including those which may cause possible adverse blasting effects.

The blasting record will include: The type of material blasted; sketches of the blast pattern including number of holes, burden, spacing, decks, and delay pattern; diameter and depth of holes; types of explosives used; total weight of explosives detonated in an eight-millisecond period; initiation system; type and length of stemming; and mats or other protection used.

If required, a record of seismographic and airblast information will include: type of instrument, sensitivity, and calibration signal or certification of annual calibration; exact location of instrument and the date, time, and distance from the blast; name of the person and firm analyzing the seismographic record; and the vibration and/or airblast level recorded; and the reasons and conditions for each unscheduled blast.

524.800 Use of Explosives:

Alton Coal Development LLC will comply with all appropriate Utah and federal laws and regulations in the use of explosives.

525. SUBSIDENCE CONTROL PLAN

Highwall mining or Auger mining, as defined in the definitions in R645-100-200 is Surface Mining, thus Underground regulations do not apply. Therefore, highwall mining in this plan have been addressed using the regulations contained in R645-302-240, Special Categories of Mining. The alternate highwall option has limited extraction with no subsidence. Refer to Appendix 5-8 (Feasibility of highwall mining the Smirl seam) for geotechnical and design information. Do to the design and mining method of highwall mining in this plan, no subsidence is projected and no monitoring is planned. Appendix 1-2 Right of Entry, Exhibit 5 contains the New Dame Lease. In this document, under Article 7 Section 7.03, provisions have been made if the is material damage as a result of subsidence.

526. **MINE FACILITIES**:

526.110-115 Existing Structures.

There are no existing structures within the permit area.

526.116. Public Roads:

526.116.1. Operations Within 100 ft. of a Public Road

Initial mining operations at the Coal Hollow Mine will be on the western edge of the property, and will require rerouting Kane County Road #136 (K3900) so that operations do not come within 100 feet of this road. During the initial development phase (topsoil removal, diversion construction, etc..), equipment traffic may cross the county road right-of-way to access the necessary area. see Drawing 5-3. Details related to the road relocation and reestablishment can be viewed on Drawings 5-3, 5-22E, 5-22F, 5-22H and in Appendix 1-7.

In addition, the road adjacent to Lower Robinson Creek (K3993) has been claimed by Kane County as a public road. An agreement has been developed with the County to restrict access on this road to escort by mine personnel only. Details for the reestablishment of this road following mining are provided on Drawing 5-22C.

526.116.2 Relocating a Public Road:

Following the initial development period, Kane County will temporarily relocate County Road #136 (K3900) to federal lands located west of the permit area which are managed by the BLM. This relocation will bypass the permit area for the duration of mining operations and is shown on Drawing 5-3. Details of agreements and appropriate approvals for this road relocation are located in Appendix 1-7. The relocated road is not within 100 ft. of mining or reclamation operations. The design and route of the relocated road has been approved by Kane County authorities and the BLM. Kane County will continue to have sole jurisdiction and will maintain it as a public road. Following completion of mining operations within the permit area, Kane County will reestablish the road to the approximate original location and will also reclaim the temporary road as required by the BLM. The existing road from the north relocation diversion point to the permit boundary will also continue to be maintained as a public road by Kane County. Once the road intersects the permit boundary, appropriate signs and barricades will be installed to protect the public. This road will be reestablished following mining as provided in the agreements in Appendix 1-7 and shown on Drawings 5-22E, 5-22F and 5-22H.

526.200 Utility Installation and Support Facilities

526.210 Existing Utilities.

There are no known oil, gas, and water wells; oil, gas, and coal-slurry pipelines, railroads; electric and telephone lines; and water and sewage lines passing over, under, or through the permit area. Should such facilities be installed, mining and reclamation operations will be conducted in a manner that minimizes damage, destruction, or disruption of services provided by such facilities unless otherwise approved by the owner of those facilities and the Division.

526.220 Support Facilities

The mine support facilities will include an office, shop, wash bay, oil containment, fuel containment, coal stacking system, coal loadout system and an equipment parking area These facilities will be constructed on an isolated section of the permit area that is approximately 34 acres. This area is located immediately north of Lower Robinson Creek, in Township 39 South, Range 5 West, Section 19. A diversion ditch will route water from the upgradient area immediately east of the area around the facilities and into a tributary of Lower Robinson Creek as shown on Drawing 5-3. Storm water and snow melt that occurs within the facilities area will be routed to an impoundment that will contain sediment. This impoundment will have a drop-pipe spillway installed that will

allow removal of any oil sheens that may result from parking lots or maintenance activities by using absorbent materials to remove the sheen. In addition to this pond, an additional small impoundment will also be located in the southwest corner of the facilities area to control drainage from the mine access road. Details for these impoundments can be viewed on Drawings 5-28 and 5-28B.

The following is a detailed description of each proposed facility and a reference to where detailed drawings can be found:

- Office: The office will be located on the northwest corner of the facilities area, immediately adjacent to the facilities access road. This building will be a steel structure with concrete footers. This structure will be 150 feet long by 100 feet wide and will be two stories in height. The office will provide working space for administrative and technical personnel. Details for the office can be viewed of Drawings 5-3 and 5-6.
- Shop: The shop will be located on the northeast side of the facilities area. This building will be a steel structure with concrete floors and foundation. The structure will be approximately 200 feet long by 100 feet wide and 50 feet high. This building will be used for maintenance of equipment, parts storage, tool storage, and office space for maintenance personnel. Details for this building can be viewed on Drawings 5-3 and 5-7.
- Wash Bay: The wash bay will be located immediately east of the shop. This building will be a steel structure with a concrete foundation. The structure will be 50 feet long by 60 feet wide and 50 feet high. Included will be a closed circuit water recycle system. This system will eliminate and store water impurities and reroute water back through the wash bay for cleaning equipment. Details for this structure can be viewed on Drawings 5-3, 5-8, and 5-8A.
- Oil and Fuel Containments: The oil and fuel containments will be concrete structures appropriately sized for containing metal tanks. The oil containment will contain 55 gallon barrels and up to 2,000 gallon totes. This containment will be 80 feet long by 30 feet wide and 3 feet deep. The fuel containment will store 3 fuel tanks. Included will be a 4,000 gallon unleaded fuel tank and two 12,000 gallon diesel tanks. This structure will 50 feet long by 30 feet wide and 3 feet deep. Details for this structure can be viewed on Drawings 5-3 and 5-8.
- Coal Stacking System: The coal stacking system will be located in the central part of the facilities area. This system will include a coal hopper, coal feeder breaker, feed conveyor, crusher, and an inclined conveyor belt. Trucks will dump coal into the coal hopper which will funnel coal through the feeder breaker onto a short feed conveyor belt. This conveyor belt will transport the coal approximately 195 feet to a crusher that will size the coal appropriately for market. Once the coal is sized through the crusher it will enter an inclined stacker conveyor belt that is angled at approximately 16 degrees and is 186 feet long. This system will be a radial conveyor which will feed a coal stock pile with a live storage of approximately 50,000 tons. This system can be viewed on Drawings 5-3 through 5-5.
- Coal Loadout System: The coal loadout system will be located in the central part of the facilities area. This system will include an above ground reclaim feeder, a coal

reclaim conveyor and an inclined conveyor. The reclaim feeder will be loaded by a dozer pushing the coal onto the feeder. One inclined conveyor that is approximately 290 feet in length will convey the coal from the feeder to the loadout hopper. This loadout hopper will load highway approved haul trucks that transport coal to market.

- Minor Facilities: The minor facilities will include a septic vault at the office (Drawing 5-6), a power washing and water recycle system in the Wash Bay (Drawing 5-8A), conduit with electrical lines running from generators to various facilities (Drawing 5-8B), Water System (Drawing 5-8C), an Equipment Hotstart Area (Drawing 5-3, 5-8B) and a Field Hydrant (Drawing 5-4, 5-5, 5-8B).
- Electrical System: The electrical system for the facilities at Coal Hollow will consist of two diesel fuel powered generators. One generator is a 750 KVA unit that will provide electricity to all the buildings. The other generator is a 1200 KVA unit that will be used to supply electricity to the coal conveying, sizing, stockpiling and loading system. The anticipated layout of the electrical system is shown on Drawing 5-8B.
- Dust Control Structures: A water system will be constructed to provide water for non-potable uses at the facilities and also for fugitive dust control measures. This system will consist of a water well, 6" water transport pipe, and two 16,000 gallon water tanks. The first water tank will be placed near the mining area and will be used specifically to load the water truck which will spray water on the active roads within the permit area to control dust. The second tank is located at the facilities area to provide a water supply to the facilities for non-potable uses (cleaning equipment, restrooms, etc...). Further details related to this water system can be viewed on Drawing 5-8C.

During mine development and the initial mining period, some facilities of a temporary nature such as mobile buildings and crusher/stacking conveyors may be utilized.

Support facilities to provide lighting at night will be kept to a minimum but will need to be sufficient enough to provide safe operating conditions in the dark. The following lighting equipment is anticipated to be used to provide safe working conditions:

- Two to three mobile light plants: Each light plant will have up to four 1,000 watt lights.
- Four to six exterior lights at the facilities area for lighting walkways and miscellaneous work areas: Each of these is expected to be 250 watt lights.
- Lights on mobile mining equipment, support vehicles and building lights

The support facilities will be located, maintained, and used in a manner that prevent or control erosion and siltation, water pollution, and damage to public or private property; and to the extent possible use the best technology currently available to minimize damage to fish, wildlife, and related environmental values; and minimize additional contributions of suspended solids to stream flow or runoff outside the mine permit area. Any such contributions will not be in excess of limitations of Utah or Federal law.

The facilities will be fully reclaimed at the end of mining operations with the exception of the water well. The final contour for this area can be viewed on Drawing 5-35 and 5-37 and an anticipated timetable is shown on Drawing 5-38.

526.300 Water Pollution Control Facilities:

Water pollution associated with mining and reclamation activities within the permit areas will be controlled by:

- Construction of berms and/or diversion ditches to control runoff from all facilities areas.
- Roads will be constructed with ditches to capture runoff
- Diversion ditches will be constructed as necessary around active mining and reclamation areas to capture runoff from those areas.
- Sedimentation impoundments will be constructed to control discharges
- In areas where impoundments or diversions are not suitable to the surrounding terrain, silt fence or other appropriate structures will be utilized to control sediment discharge from the permit area.

In order to accomplish these objectives, watershed analysis of the permit and adjacent areas has been completed and specific designs are established for each water pollution control structure. Primary control structures include five sediment impoundments, four diversion ditches and miscellaneous berms. The locations of these structures can be viewed on Drawing 5-3. The detailed analysis for these structures and specific designs can be viewed on Drawings 5-25 through 5-34. In addition, a geotechnical analysis of the impoundments to ensure stability can be viewed in Appendix 5-1. The watershed and structure sizing analysis can be viewed in Appendix 5-2.

In addition to these primary structures, temporary diversions and impoundments may also be implemented, as necessary, in mining areas to further enhance pollution controls.

All these facilities will be reclaimed to approximate original contour. The reclamation sequence and final landform can be viewed on Drawings 5-35 and 5-38.

526.400 Air Pollution Control Facilities:

Air pollution (fugitive dust) emissions from mining and reclamation operations in the permit area will be controlled by a number of means, including:

- Haul roads will be maintained and will have water or other dust suppressants applied as appropriate.
- Road surfaces will be graded to stabilize/remove dust-forming debris as required.
- Areas adjoining primary roads will be stabilized and vegetated as required.
- Mobile equipment speeds will be controlled to minimize dusting conditions.

- Cleared vegetation debris within the mine area will be disposed of by placement in pit backfills.

A water system will be constructed to provide water for non-potable uses at the facilities and also for fugitive dust control measures. This system will consist of a water well, 6" water transport pipe, and two 16,000 gallon water tanks. The first water tank will be placed near the mining area and will be used specifically to load the water truck which will spray water on the active roads within the permit area to control dust. The second tank is located at the facilities area to provide a water supply to the facilities for non-potable uses (cleaning equipment, restrooms, etc...). Further details related to this water system can be viewed on Drawing 5-8C.

For details related to air pollution control and monitoring, refer to Chapter 4 and Appendix 4-2 and 4-5.

527. TRANSPORTATION FACILITIES

527.100 Classification of Roads

Primary roads are any road that is used to transport coal or spoil and is frequently used for access or other purposes for a period in excess of six months; or is to be retained for an approved postmining land use. The following is the roads that meet the classification of a primary road based on this standard:

Roads used to transport coal or spoil in excess of six months

There are two roads that will be used to transport coal or spoil in excess of six months and are referred to as "Year 1 and 2 Mine Haul Road" and "Year 2 and 3 Mine Haul Road". These two roads will be the main accesses for the pits throughout the life of the mine. Details for these two roads are provided in Section 527.200 and on Drawings 5-22 and 5-23. In addition to these two roads, the road located within the facilities area is also classified as a primary road. This road is referred to as "Facilities Roadway" and details are described in 527.200 along with Drawings 5-22A and 5-22B.

Roads retained for an approved postmining land use

Roads retained for an approved postmining land use include the following: Access to East Pugh Property (K3993), County Road 136 (K3900), Access to Water Well and Road to Swapp Ranch. Details and locations for these roads are shown on Drawings 5-35, 5-37, 5-22A, 5-22B, 5-22C, 5-22D, 5-22E, 5-22F and 5-22H.

All other roads planned for construction within the permit area will be classified as ancillary. These will include temporary ramps, benches and equipment travel paths within the active mining area.

527.200 Description of Roads

Roads for the Coal Hollow Mine include seven primary roads, a conveyor system, and miscellaneous ancillary/temporary roads. Numerous drawings detail the designs and specifications for each one of the proposed facilities. The following is a description of each facility and a reference for the associated drawings:

- Roads: Two primary mine haul roads are planned within the permit area. The first road extends from the coal unloading area to the first series of pits along the west side of the property. This road will be utilized for access to the pits (pits shown on Drawing 5-10). This road will be approximately 2,800 feet in length and will be utilized throughout mining. There will be three culverts installed along this road all sized for a 100 year, 24 hour storm event. The first culvert will be across a tributary of Lower Robinson Creek and will be a 36 inch corrugated steel pipe. The second culvert is the main crossing over Lower Robinson Creek and is a 96 inch corrugated steel pipe. Both of these culverts have been sized based on analysis of the Lower Robinson Creek watershed. This analysis can be viewed in Appendix A5-3. The third culvert is crossing over a diversion ditch that will route water mainly from disturbed areas along the south side of Lower Robinson Creek to a sediment impoundment. This culvert will be a 24 inch corrugated steel pipe.

  The second road extends from an intersection with the first road, located just south of the Lower Robinson Creek crossing, and proceeds southeast to long term topsoil stockpile 2 and subsoil stockpile 1. This road is approximately 1,300 feet in length. There is one culvert crossing along this road to cross a diversion ditch. This culvert will be a 24 inch culvert sized for maximum anticipated flows in the diversion.

  The following specifications apply to these Primary mine haul roads:
  1) Roads will be approximately 80' in width
  2) Approximately a 2% crown
  3) Approximately one foot deep cut ditches along shoulders for controlling storm water
  4) 18" of crushed rock or gravel for road surfacing
  5) Cut and fill slopes of 1.5 h:1v
  6) Minimum fill over each culvert will be 2 times diameter of culvert
  7) Berms placed as necessary along fills

  The ancillary roads will have similar specifications except surfacing will occur only as needed and may be narrowed to a 40 foot road width. A typical cross section for the ancillary roads can be viewed on Drawing 5-24.

The location and details for Primary Mine Haul roads can be viewed on Drawings 5-3 and 5-22 and 5-23.

In addition to the two roads primary Mine Haul roads, the road located within the facilities area is also classified as a primary road. This road is planned to be 24 feet wide with 24 inches of compacted sub base and 8 inches of compacted 1 inch minus gravel as surfacing. This road is referred to as "Facilities Roadway" and more details are described in 527.200 along with Drawings 5-22A and 5-22B.

In addition to the primary roads that will be present during active mining, four additional roads are planned to exist postmining and are also classified as primary roads for this reason.

Roads that will remain postmining are the following:

- Road to Water Well with details shown on Drawing 5-22D
- Road to east C. Burton Pugh property (K3993) with details shown on Drawing 5-22C
- County Road 136 (K3900) with details on Drawing 5-22E, 5-22F and 5-22G. This County road will be reconstructed within the permit area by Kane County. This reconstruction will occur concurrently with the final stage of reclamation as scheduled on Drawing 5-38 and is expected to be completed by the end of Year 4.
- Road to Swapp Ranch (same specification as the Water Well Road)

The location of these roads is shown on Drawings 5-35 and 5-37 along with the post mining topography.

The ramps, benches and equipment travel paths within the active surface mining area are temporary in nature and will be relocated frequently as mining progresses. These temporary travelways are considered part of the pit due to their short term use, and are not individually designed nor engineered. They will be built and maintained to facilitate safe and efficient mine and reclamation operations.

- Conveyors: A conveyor system will be used to stockpile coal and to load highway approved haul trucks for transportation to market. The first conveyor is mainly a stacker system for the coal stockpile which will be located at the coal unloading area and will be approximately 451' in length. This conveyor is estimated to be a 48" solid frame system.

  The second conveyor is a coal reclaim belt that will be loaded by an above ground reclaim feeder from the coal stockpile and will convey coal to the loadout chute which will load the highway approved coal haulage trucks. This section will be approximately 290' in length. Similar to the first section, this conveyor is estimated to be a 48" solid frame system.

  Drawings of this system can be viewed on Drawings 5-3 through 5-5.

527.220 Alteration or Relocation of Natural Drainageways.

As currently planned, no natural drainageways will be altered or relocated due to road construction, though a temporary diversion of Lower Robinson Creek will be constructed to allow for maximum recovery of coal. This temporary diversion of Lower Robinson Creek is not being constructed to facilitate road construction. If any other alterations or relocations are necessary, appropriate measures will be taken to obtain Division approval for such alterations or relocations.

Mine development work will include a temporary diversion of Lower Robinson Creek away from the mining area. This diversion has been designed for a flow capacity of a 100 year, 24 hour storm event. The sides will be graded to a 3h:1v slope and rip-rap will be appropriately placed to minimize erosion of the channel beyond current channel conditions. All specifications required to meet the requirements for such a diversion have been included in this diversion design. Appendix 5-2 details the analysis/specifications for this diversion and Drawings 5-20 and 5-21 show the details of this design.

As part of the reclamation process, Lower Robinson Creek will be reconstructed to its approximate original location. The design for this reconstruction is shown on Drawings 5-20A and 5-21A. This design includes considerable improvements to the channel compared to the channel's current condition. The current condition is such that less than 25% of the channel within the disturbed area has a flood plain present and most of the slopes are near the angle of repose with fair to poor vegetative cover. The reconstructed channel includes stable slope angles that will be revegetated with a flood plain on both sides of the channel for the entire length reconstructed. Sharp corners in the original alignment have been rounded to sinuous curve shapes and rip-rap will be installed in the bottom section of the channel to minimize erosion. The flood plain will seeded and covered with erosion matting to control erosion until a natural vegetative condition can be attained.

527.230 Road Maintenance

All roads will be maintained on an as needed basis using motor graders, water trucks for dust suppression, and other equipment as necessary. Crushed stone and/or gravel will be used as a surface course for primary roads outside the active mining area, and may be used as needed for ramps and travelways within the pit. Should the roads be damaged by a catastrophic event, such as an earthquake or a flood, repairs will be made as soon as possible after the damage has occurred or the road will be closed and reclaimed.

527.250. Geotechnical Analysis

No alternative specifications or steep cut slopes associated with roads are anticipated outside the active mine area. A report of appropriate geotechnical analysis will be provided should such alternative specifications or steep cut slopes where approval of the Division is required, become necessary.

528. HANDLING AND DISPOSAL OF COAL, OVERBURDEN, EXCESS SPOIL, AND COAL MINE WASTE:

528.100. Coal removal, handling, storage, cleaning, and transportation areas and structures;

Coal handling activities are confined to the active pit, and the coal sizing/loading areas located north of the pit. All areas and facilities will be designed and constructed, utilized and maintained in conformance with industry standards and all applicable regulations. At the conclusion of mining, the facilities will be removed as part of final mine reclamation activities. Material from coal stockpile areas, and other areas of potential coal accumulation will be excavated and the excavated material placed in the final mined out pit.

528.200. Overburden;

Overburden will be excavated after the removal of topsoil and subsoil as defined in Chapter 2. The overburden excavation will be accomplished by utilizing hydraulic excavators with end dump haul trucks and dozers. This process will include excavating this material in a stairstep fashion that will include benches approximately every 40 feet in depth. These benches are planned to be approximately 40 feet in width and will create an overall 2h:1v slope for the highwalls to create a stable and safe working area. This is a conservative approach for initial mining and once mining begins, ongoing geotechnical studies and monitoring will be used to further define the proper slope angle to ensure slope stability while maximizing resource recovery.

Based on the overburden isopach map (Drawing 5-15), the overburden removal has been separated into three major stages. The first stage of overburden removal is the initial mining area, Pits 1-8. These pits have a relatively low strip ratio, approximately 5:1 (refer to Drawing 5-13). In order to efficiently remove overburden for this phase, spoil from the first three pits will be placed in an excess spoil area. This excess spoil structure will hold approximately 2.7 million loose cubic yards (LCY) of material. Once the excess spoil pile is filled, overburden from the next 4 pits can then be used as pit backfill as the mining progresses through Pit 8. The completion of this phase is shown on Drawing 5-17.

Phase 2 requires mining to occur in two areas of the permit alternately. As mining progresses through Pits 9-13, the isopach (Drawing 5-15) shows that the overburden significantly increases. This increase and the shape of the mining boundary for the Permit Area requires a fill above approximate original contour. Material from Pits 9-13 significantly exceeds the backfill capacity available from the preceding pits (Pits 1-8). The fill above approximate original contour blends in with the excess spoil structure from Phase 1 and extends an additional 2,000 feet to the east as the mining sequence proceeds to Pit 15.

Also, mining begins with Pit 28 and proceeds alternately with Pits 9-13, north to Pit 23. The isopach shows that Pits 28 -23 have a relatively low strip ratio, approximately 4.2:1 increasing to 4.9:1 respectively. Overburden from Pit 28 will all be hauled to the excess spoil structure, with overburden from the successive pits to north back filling the previously mined. In this stage, the fill above original contour is approximately 3.0 million LCY. Drawing 5-18 (Phase 2) shows the details of this stage of the overburden removal and resulting landform.

Phase 3 overburden removal begins in Pit 14 and proceeds alternately with Pit 22 coming from the south to meet at Pit 18, the last pit to be mined. During this stage, the strip ratio reduces significantly from Phase 2 as mining progresses to Pit 18. As the strip ratio reduces to the south, significant backfill capacity is available in the preceding pits. This results in the distance between the backfill and the active coal face increasing. At the end of mining, an area will not be completely backfilled that is approximately 1,600 feet in length and 875feet wide and will require 3.3 million yards of fill to complete reclamation to approximate original contour. The backfill configuration at the end of this stage is shown in Drawing 5-19.

The proposed plan for backfilling these final pits includes acquiring the right to mine the adjacent federal coal reserves, located immediately west of this area. This plan provides an efficient method for transitioning operations into the federal reserves. At the time that this transition occurs, overburden will be removed from the federal reserves and placed in the final pits to approximate original contour. This final landform can be viewed on Drawing 5-35 and 5-36.

In the case that Alton Coal Development is not successful with acquiring the adjacent federal coal reserves, all the fill above approximate original contour and part of the excess spoil structure will be rehandled and placed back in the remaining backfill area. The final landform for this scenario is shown on Drawing 5-37. This step requires rehandle of approximately 3.3 million yards of spoil.

If the alternative highwall mining is selected, it is anticipated when pit 26 is completed, Highwall Trench 1 (HWT1) will be excavated. Dependent upon the arrival of the highwall machine, another option would be to utilize it in an active pit, for example Pit 9 is currently active with an exposed highwall. Highwalling would begin from this pit and surface disturbance of the successive pit (pits 10-15 going east) would not occur. Otherwise, the mining process, is for coal to be removed from the area of excavation. At this point a highwall miner is brought in. In this method of mining, an unmanned cutter module is driven underground and operated in front of the highwall. The highwall mining machine stands on the pit floor or on a bench, directly in front of the exposed seam and makes long parallel rectangular drives into the coal seam. A remote-operated cutter module is pushed into the seam by a string of push beams (unmanned coal-conveying elements) that transport the mined coal back to the entry of the drive onto a stockpile. Coal is then removed to the sizing/loading area. The miner is moved along the face making successive pushes into the coal face. Once coal is removed from the

southern panels of a Highwall Trench, overburden from excavation of the next Highwall Trench is used to backfilled the mined out area continuing with the progression of the trench.

The anticipated coal removal sequence for the Highwall mining is shown on drawing 5-10A. Depending on the approval of the alternative and the delivery of the highwall miner, the highwall miner could be deployed on an exposed coal face. As is depicted, each Highwall Trench consists of Panels, each panel consisting of 10 holes. The spacing between the holes and the spacing between the panels are dictated by the amount of overburden over the panels. The alternate Highwall mining is designed such that subsidence does not occur to the surface with nonyieldable webs and barriers. Specific information concerning these design are found in Appendix 5-8. Highwall mining will have only the disturbance associated with the trench for placement of the highwall miner and will have no impact on the surface above the highwall panels.

The following tables show the material balance during the different phases of overburden removal for each scenario:

Preferred Scenario (Adjacent Federal Reserves Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Federal)	3,300,000	3,300,000	0	5,782,000
Total	40,035,000	34,253,000	5,782,000	5,782,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

Alternate Scenario (Adjacent Federal Reserves Not Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Rehandle)	0	3,300,000	-3,300,000	2,482,000
Total	36,735,000	34,452,000	2,482,000	2,482,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

Alternative Scenario (Highwall mining)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	7,381,000	7,277,000	104,000	2,845,000
3	5,257,000	5,257,000	0	2,845,000
4 (Federal)	3,300,000	3,300,000	0	2,845,000
Total	23,874,000	21,029,000	2,845,000	2,845,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

The Preferred scenario for overburden removal will minimize overall disturbance and maximize resource recovery by providing a transition into the adjacent federal reserves with minimal effect to existing reclamation and backfill in the Permit Area. This scenario will also minimize variances from approximate original contour on the federal lands by eliminating the need for an excess spoil structure from the initial boxcut once operations are transitioned into these reserves.

During the course of mining, some additional excavated overburden may be placed temporarily on mined over and backfilled areas due to operational considerations. This material will be re-excavated and moved to it's final placement location as operations allow.

All maps related to the overburden removal process can be viewed on Drawings 5-15 through 5-19.

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

528.310. Excess Spoil. Excess spoil will be placed in designated disposal areas within the permit areas, in a controllable manner to ensure mass stability and prevent mass movement during and after construction. Excess spoil will meet the design criteria of R645-301-535. For the purposes of SURFACE COAL MINING AND RECLAMATION ACTIVITIES, the permit application must include a description of the proposed disposal site and the design of the spoil disposal structures according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.100, R645-301-745.300, and R645-301-745.400.

Excess spoil will be placed in the area designated on Drawing 5-3 and 5-35. This fill will be placed in lifts not to exceed 4 feet in thickness. The material will be transported from the overburden removal area to the fill by end dump haul trucks and a dozer(s) will spread the spoil to this lift thickness. The fill will meet at minimum 85% compaction as related to the standard Procter. Final slopes will be regraded to a maximum slope of 3h:1v. The top of the fill will be sloped to

approximately 2% to prevent pooling of water and to reestablish drainage similar to original flow patterns. The excess spoil placed on the non-mined areas is approximately 32 acres and varies in height from 35 to 120 feet. The area of excess fill over mined out areas (variance from approximate original contour) is an extension of the fill placed on the non-mined area and is approximately 35 acres. Combined acreage of the excess fill placed on mined and non-mined areas is 67 acres and varies in height from 60 to 100 feet above original contour. Total excess fill is 5.8 million yards. Design of this fill can be viewed in Drawings 5-35 through 5-36 and the geotechnical study can be viewed in Appendix 5-1.

- *R645-301-211: The applicant will present a description of the premining soil resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be separately removed and segregated from other material.*

  The soil resources for the proposed excess spoil disposal area are described in Appendix 2-1. A plan has been developed for removal of topsoil and suitable subsoil based on the soil descriptions in this appendices. The handling plan can be viewed on Drawing 2-2. Topsoil and acceptable subsoil will be separately removed and segregated from other material prior to placement of any spoil.

- *R645-301-212: After removal, topsoil will be immediately redistributed in accordance with R645-301-242, stockpiled pending redistribution under R645-301-234, or if demonstrated that an alternative procedure will provide equal or more protection for the topsoil, the Division may, on a case-by case basis, approve an alternative;*

  Excess spoil will have topsoil and subsoil redistributed in an approximately uniform, stable thickness with the approved post mining land use, contours and surface water drainage systems. Material handling practices will prevent excess compaction of these materials. Handling practices will also protect the materials from wind and water erosion before and after seeding and planting. These practices include seeding and grading stockpiles that will exist for more than year to stabilize the soil.

- *R645-301-412.300: Criteria for Alternative Postmining Land Uses.*

  The MRP does not contemplate Alternative Postmining Land Uses.

- *R645-301-512.210: Excess Spoil. The professional engineer experienced in the design of earth and rock fills will certify the design according to R645-301-535.100.*

  A professional engineer experienced in the design of earth and rock fills with assistance from a geotechnical expert has certified the design according to R645-

301-535.100. These certifications can be viewed on Drawings 5-35, 5-36 and 5-17 through 5-19.

- *R645-301-512.220: Durable Rock Fills*

  No durable rock fills are planned.

- *R645-301-514.100: Excess Spoil. The professional engineer or specialist will be experienced in the construction of earth and rock fills and will periodically inspect the fill during construction. Regular inspections will also be conducted during placement and compaction of fill materials.*

  A professional engineer or specialist that is experienced in the construction of earth and rock fills will inspect the fill during construction and regular inspections will also be conducted during placement and compaction of fill materials.

- *R645-301-535.100 through R645-301-130: Disposal of Excess Spoil*

  A geotechnical analysis of the excess spoil structure design has been completed by an expert in this field. The long term static safety factor for this structure design is estimated at 1.6 to 1.7. Lifts will be placed in thicknesses not to exceed 4 feet. The lifts will meet 85% compaction by the standard Procter. The fill will be graded to allow for drainage similar to original patterns and to prevent excessive infiltration of water. Fill will be covered with subsoil and topsoil as specified in Chapter 2 to provide conditions suitable for revegetation of the area. The geotechnical study can be viewed in Appendix A5-1.

- *R645-301-535.300 through R645-301-535.500: Disposal of Excess - Spoil Durable Rock Fills.*

  No durable rock fills are planned.

- *R645-301-536.300: Disposal of Coal Mine Waste in Excess Spoil*

  No coal mine waste is planned in the excess spoil area.

- *R645-301-542.720: Excess spoil will be placed in designated disposal areas within the permit area, in a controlled manner to ensure that the final fill is suitable for reclamation and revegetation compatible with the natural surroundings and the approved postmining land use. Excess spoil that is combustible will be adequately covered with noncombustible material to prevent sustained combustion. The reclamation of excess spoil will comply with the design criteria under R645-301-553.240.*

  The excess spoil as shown in Drawing 5-35 and 5-36 will be suitable to the surrounding area and for the postmining land use of primarily grazing. No

combustible excess spoil will be placed in the proposed structure. The final reclamation of the spoil does not include any terraces and the slopes will not exceed 3h:1v.

- *R645-301-553.240: The final fill configuration of the fill (excess spoil) will be suitable for the approved postmining land use. Terraces may be constructed on the outslope of the fill if required for stability, control of erosion, to conserve soil moisture, or to facilitate the approved postmining land use. The grade of the outslope between terrace benches will not be steeper than 2h:1v (50 percent).*

  The excess spoil as shown in Drawings 5-35 and 5-36 will be suitable to the surrounding area and for the postmining land use of primarily grazing. The reclamation of the spoil does not include any terraces and the slopes will not exceed 3h:1v. The long term static safety factor for these slopes is estimated to be 1.6 to 1.7.

- *R645-301-745.100: General Requirements.*

  745.110: Excess Spoil will be placed in designated disposal areas within the permit area, in a controlled manner to:

  745.111: Minimize the adverse effects of leaching and surface water runoff from the fill on surface and underground water;

  Reclamation of the excess spoil will include a topsoil cover and subsoil layer. Infiltration through the reclamation is expected to be minimal based on the high clay content of these soils. In addition, laboratory data for the overburden shows that there is minimal potential for leaching of pollutants should infiltration rates become higher than expected.

  The foundation of the excess spoil area also has high clay content with minimal potential for infiltration. This will provide an additional, natural barrier to protect ground water present beneath the proposed structure.

  745.112: Ensure permanent impoundments are not located on the completed fill. Small depressions may be allowed by the Division if they are needed to retain moisture or minimize erosion, create and enhance wildlife habitat or assist revegetation, and if they are not incompatible with the stability of the fill; and

  Permanent impoundments are not planned on the excess spoil area. Small depressions may be constructed as allowed by the Division to retain moisture, minimize erosion, create and enhance wildlife habitat or assist revegetation.

  745.113: Adequately cover or treat the excess spoil that is acid- and toxic forming with nonacid nontoxic material to control the impact on the surface and

ground water in accordance with R645-301-731.300 and to minimize adverse effects on plant growth and approved postmining land use.

Laboratory data representative of the overburden planned for disposal in the excess spoil area does not show acid- and toxic forming characteristics.

745.120: Drainage Control. If the disposal area contains springs, natural or manmade water courses, or wet weather seeps, the fill design will include diversions and underdrains as necessary to control erosion, prevent water infiltration into the fill and ensure stability.

A spring and seep survey available in Chapter 7 has identified no springs or wet weather seeps in the proposed excess spoil area. The final surface will be regraded to a contour that will route water from snowmelt and rainfall around the excess spoil as shown on the final contours Drawing 5-35. There are no manmade water courses present in the excess spoil area. No underdrains are planned for the excess spoil structure.

745.121: Diversions will comply with the requirements of R645-301-742.300

No diversions are planned in the excess spoil area.

745.122 : Underdrains

No underdrains are planned in the excess spoil area.

745.300: Durable Rock Fills

No durable rock fills are planned.

745.400: Preexisting Benches

The MRP does not contemplate disposal of excess spoil on preexisting benches.

528.320. Coal Mine Waste.

The MRP does not contemplate processing coal that would produce coal mine waste.

528.322. Refuse Piles.

The MRP does not contemplate the construction of any refuse piles,

528.323. Burning and Burned Waste Utilization.

The MRP does not contemplate processing coal that would produce coal mine waste, eliminating the any potential for coal mine waste fires.

528.330. Noncoal Mine Waste.

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 temporarily stored in appropriate containers and removed from the permit area and will be properly disposed of according to applicable State and Federal regulations.

528.332.

Final disposal of noncoal mine wastes will be in a State-approved solid waste disposal site not located within the permit area. One exception to the removal of all noncoal mine waste from the permit area is perforated piping used in the construction of Alluvial Ground Water Drains will be left in place as mining advances. This perforated piping will be covered in place approximately 20' to 30' below the final reclaimed surface. All other waste materials (ie. metal culvert) associated with the Alluvial Ground Water Drains will be removed and disposed of in a State-approved solid waste disposal site.

528.333.

At no time will any noncoal mine waste be deposited in a refuse pile or impounding structure, nor will any excavation for a noncoal mine waste disposal site be located within eight feet of any coal outcrop or coal storage area.

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.

528.350. Acid-Forming and Toxic Materials

If coal, having qualities that make it unmarketable, are to be left in the pit backfill in quantities greater than 5,000 tons: a minimum of 1 composite sample per 5,000 Tons of coal will be analyzed for the parameters list in Table 3 and 7 of the "Soil and Overburden Guidelines". A record of the volume of coal remaining and laboratory analytical results will be kept onsite. Debris, acid-forming, toxic-forming materials and materials constituting a fire hazard will be identified and 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. Appropriate measures will be implemented to preclude sustained combustion of such materials; and

528.400. Dams, embankments and other impoundments.

Plans do not include using dams, embankments or other impoundments for disposal of coal, overburden, excess spoil or coal mine waste

529. **MANAGEMENT OF MINE OPENINGS.**

Alternative highwall mining will produce openings (holes) in the coal at the bottom of trenches specifically constructed for highwall mining. Trench depth to the holes range from 60 feet to 200 feet. After highwall mining is completed in a given trench, that trench will be completely backfilled, burying any openings made by highwall mining.

All wells will be managed to comply with R645-301-748 and R645-301-765. Water monitoring wells will be managed on a temporary basis according to R645-301-738.

Wells constructed for monitoring groundwater conditions in the proposed Coal Hollow Mine permit and adjacent area, including exploration holes and boreholes used for water wells or monitoring wells, will be designed to prevent contamination of groundwater and surface-water resources and to protect the hydrologic balance. A diagram depicting typical monitoring well construction methods is shown in Drawing 7-11. Monitoring wells will include a protective hydraulic seal immediately above the screened interval, an annular seal plugging the borehole above the hydraulic seal to near the ground surface, and a concrete surface seal extending from the top of the hydraulic seal to the ground surface which is sloped away from the well casing to prevent the entrance of surface flows into the borehole area. Well casings will protrude above the ground surface a sufficient height so as to minimize the potential for the entrance of surface water or other material into the well. A steel surface protector with a locking cover will be installed at monitoring wells to prevent access by unauthorized personnel. Where there is potential for damage to monitoring wells, the wells will be protected through the use of barricades, fences, or other protective devices. These protective devices will be periodically inspected and maintained in good operating conditions. Monitoring wells will be locked in a closed position between uses.

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State

of Utah, Division of Water Rights or other applicable state regulations. Abandonment of wells will be performed by a licensed water well driller. The wells to be abandoned will be completely filled using neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout, or other materials approved by the Utah State Engineer's office. Alternatively, the well may be abandoned using a different procedure upon approval from the Utah State Engineer's office.

Abandonment materials will be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the State Engineer by the responsible licensed driller giving data related to the abandonment of the well. This shall include the name of the licensed driller or other person(s) performing abandonment procedures, name of well owner at the time of abandonment, the address or location of the well by section, township, and range, abandonment materials and equipment used, water right or file number covering the well, the final disposition of the well, and the date of completion.

Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance. Exploration holes and boreholes will be managed to ensure the safety of people, livestock, fish and wildlife, and machinery.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

If any exploration boreholes are to be used as monitoring wells or water wells, these will meet the provisions of R645-301-731

Boreholes will be backfilled to within 1 foot of the land surface with concrete or other materials approved by the Division as necessary to prevent contamination of groundwater or surface-water resources or to protect the prevailing hydrologic balance. The upper approximately 1 foot will be backfilled with native materials to facilitate reclamation (see Drawing 6-11). Exploration holes and boreholes that may be uncovered during mining and reclamation activities will be permanently closed unless approved for water monitoring or otherwise managed in a manner approved by the Division.

530 OPERATIONAL DESIGN CRITERIA AND PLANS:

531 GENERAL:

There are five sediment impoundments proposed for the permit area. These structures will be constructed using a combination of dozers and backhoes. The structures have been designed to contain the required storm events as specified in Appendix 5-2. The structures will have sediment removed as necessary to ensure the required capacities. Details for these structures can be viewed on Drawings 5-25, 5-26 and 5-28 through 5-32. Calculations and supporting text can be viewed in Appendix 5-2.

There are no other coal processing waste banks, dams or embankments proposed within the permit area.

Underground mining has not occurred within the permit area.

532 SEDIMENT CONTROL:

Four diversion ditches along with five sediment impoundments are proposed for the permit area. In addition, miscellaneous controls such as silt fence and berms are also proposed for specific areas. The proposed locations for these structures are shown on Drawing 5-3. Details associated with these structures can be viewed on Drawings 5-25 through 5-34 and Appendix 5-2.

Mulch will be placed on the seedbed surface once soil amendments have been incorporated and seeding has been accomplished in areas that will be reclaimed to native plant communities. The mulch should control erosion by wind and water, decrease evaporation and seed predation, and increase survivability of the seeded species. Like the seeding methods, mulch will be applied with a variety of techniques and materials depending on the reclaimed area.

532.100 Disturbed Area:

The smallest practicable area, consistent with reasonable and safe mine operational practices will be disturbed at any one time during the mining operation and reclamation phases. This will be accomplished through progressive backfilling, grading, and prompt revegetation of disturbed areas. An estimated reclamation schedule is shown on Drawing 5-38 or 5-38A for alternative mining.

532.200 Backfill Stabilization:

The backfilled material will be stabilized by grading to promote a reduction of the rate and volume of runoff in accordance with the applicable requirements. The excess spoil and fill above approximate original contour will be graded to a maximum angle 3h:1v slope and revegetated to minimize erosion. This area is designed with concave slopes

and slope irregularities that will also assist in minimizing erosion. A geotechnical analysis of this configuration has been completed and the factor of safety is estimated at 1.6 to 1.7. This analysis can be viewed in Appendix A5-1. The remaining backfill will be placed in the mined out pit, and thus confined on all sides. The backfill will be inherently stable.

Mulch will be placed on the seedbed surface once soil amendments have been incorporated and seeding has been accomplished in areas that will be reclaimed to native plant communities. The mulch should control erosion by wind and water, decrease evaporation and seed predation, and increase survivability of the seeded species. Like the seeding methods, mulch will be applied with a variety of techniques and materials depending on the reclaimed area.

533. IMPOUNDMENTS.

533.100.

No impoundments meeting the NRCS Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR Sec. 77.216(a) are planned for the Coal Hollow Mine.

533.110

Impoundments not included in 533.100, will be designed and constructed with a minimum static safety factor of 1.3 for a normal pool with steady state seepage saturation conditions or meet the requirements of R645-301-733.210.

The proposed sediment impoundments are expected to impound seasonal water and storms. A geotechnical analysis of these designs has been performed and can be reviewed in Appendix 5-1. Static safety factors for the proposed designs range from 2.2 to 5.3.

533.200. Foundations.

Foundations for temporary and permanent impoundments will be designed so that

- *Foundations and abutments for the impounding structure are stable during all phases of construction and operation. Such foundations for temporary and permanent impoundments will be designed based on adequate and accurate information on the foundation conditions*

  Refer to Appendix 5-1 for information related to foundations of the proposed impounding structures. No permanent impoundments are proposed.

- *All vegetative and organic materials will be removed and foundations excavated and prepared to resist failure. Cutoff trenches will be installed if necessary to ensure stability.*

  All vegetation, topsoil and subsoil as identified in Chapter 2 will be removed from the impoundment areas prior to construction. Cutoff trenches will not be necessary for stability.

- *Slope protection will be provided to protect against surface erosion at the site and protect against sudden drawdown.*

  Slopes of impoundments will be seeded and sloped to protect against erosion at the site. The high clay content and compaction characteristics of the material present at the impoundments will also assist with minimizing erosion of the slopes.

- *Faces of embankments and surrounding areas will be vegetated except that faces where water is impounded may be riprapped or otherwise stabilized in accordance with accepted design practices.*

  Faces of embankments will be vegetated to minimize erosion. Standing water in the ponds is expected to be minimal and therefore these faces will also be seeded for erosion control.

- *The vertical portion of any remaining highwall will be located far enough below the low- water line along the full extent of highwall to provide adequate safety and access for the proposed water users.*

  All highwalls will be fully covered following active use and backfilling of pits.

533.300

A rapid drawdown analysis was completed assuming the spillways are plugged, the basin fills to top of the embankments and then the water is released or pumped down to the base of basins. The soil strengths utilized were based on total stress conditions as determined from the triaxial shear tests completed for this project. It should be noted that rapid drawdown is highly unlikely since spillway and outlet piping will be no more than 4-feet below the top of embankments. The resulting safety factors under these conditions range from 1.2 to 1.9. Based on this analysis, no additional protection measures are needed for the impoundments in relation to rapid drawdown. Details for this analysis are provided in Appendix 5-1, pages 6 through 7 in the main section of the report.

533.600.

The MRP does not contemplate construction of impoundments that meet the criteria of MSHA, 30 CFR 77.216(a).

533.700 - 714. Plans.

Each detailed design plan for structures not included in 533.610 shall:

- *Be prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, except that all coal processing waste dams and embankments covered by R645-301-536 and R645-301- 746.200 shall be certified by a qualified, registered, professional engineer;*

  Designs for the proposed impoundments have been prepared by a qualified, registered, professional engineer, with assistance from a geotechnical expert. These certifications can be viewed on Drawings 5-28 through 5-31.

- *Include any design and construction requirements for the structure, including any required geotechnical information;*

  A geotechnical analysis of the impoundments has been prepared by an expert in this field. This analysis can be viewed in Appendix 5-1. Embankments will be constructed in 2 foot lifts as recommended by the analysis.

- *Describe the operation and maintenance requirements for each structure; and*

  The proposed impoundments are designed to temporarily store water from storm events and snow melt. Long term standing water in the impoundments is anticipated to be seasonal and sediment will be removed as necessary to provide the required storage capacities. Emergency spillways have been included in the designs to provide a non-destructive discharge route should the capacities ever be exceeded. Surveys of these impoundments will be regularly conducted to ensure that design capacities are available.

- *Describe the timetable and plans to remove each structure, if appropriate.*

  All impoundments will be reclaimed at the end of operations. The estimated timeline for removal of these structures are shown on Drawing 5-38. Expected removal is year four of the mining and reclamation process. In areas where soils are not stabilized following the removal of these sediment impoundments, silt fence will be appropriately installed and maintained to provide sediment control until stable conditions are met.

Detailed designs of impoundments can be viewed on Drawings 5-28 through 5-31. Locations can be viewed on Drawing 5-3 and 5-25.

534. ROADS

534.100-200 Roads will be located, designed, constructed, reconstructed, used, maintained, and reclaimed so as to:

- *Prevent or control damage to public or private property;*

  All roads will be reclaimed to approximate original contour as shown on Drawings 5-35, 5-36 and 5-38. These roads are designed to control damage to public and private property.

- *Use nonacid - or nontoxic-forming substances in road surfacing; and*

  There will be no acid or toxic forming substances used in road surfacing.

- *Have, at a minimum, a static safety factor of 1.3 for all embankments.*

  All embankments are designed with static safety factors that exceed 1.3.

- *Have a schedule and plan to remove and reclaim each road that would not be retained under an approved postmining land use.*

  All roads not planned to remain postmining will be removed and reclaimed according to Drawings 5-35 and 5-36. The estimated timetable for removing these roads is shown on Drawing 5-38.

- *Control or prevent erosion, siltation and the air pollution attendant to erosion by vegetating or otherwise stabilizing all exposed surfaces in accordance with current, prudent engineering practices.*

  Cut ditches will be established on the shoulders of all primary roads to control drainage and erosion. Cut and fill slopes along the primary roads will be minimal and are not expected to cause significant erosion. In locations where there are culvert crossings (i.e. Lower Robinson Creek), the fills slopes will be stabilized by utilizing standard methods such as grass matting or straw wattles.

- *To ensure environmental protection and safety appropriate for their planned duration and use, including consideration of the type and size of equipment used, the design and reconstruction of roads will incorporate appropriate limits for grade, width, surface materials, and any necessary design criteria established by the Division.*

The following specifications apply to the Primary Mine Haul roads:

1) Roads will be approximately 80' in width
2) Approximately a 2% crown
3) Approximately one foot deep cut ditches along shoulders for controlling storm water
4) 18" of crushed rock or gravel for road surfacing
5) Cut and fill slopes of 1.5 h:1v
6) Minimum fill over each culvert will be 2 times diameter of culvert
7) Berms placed as necessary along fills

The ancillary roads will have similar specifications except surfacing will occur only as needed and may be narrowed to a 40 foot road width. A typical cross section for the ancillary roads can be viewed on Drawing 5-24.

The location and details for Primary Mine Haul roads can be viewed on Drawings 5-3 and 5-22 and 5-23.

In addition to the two roads primary Mine Haul roads, the road located within the facilities area is also classified as a primary road. This road is planned to be 24 feet wide with 24 inches of compacted sub base and 8 inches of compacted 1 inch minus gravel as surfacing. This road is referred to as "Facilities Roadway" and more details are described in 527.200 along with Drawings 5-22A and 5-22B.

In addition to the primary roads that will be present during active mining, four additional roads are planned to exist postmining and are also classified as primary roads for this reason.

Roads that will remain postmining are the following:

- Road to Water Well with details shown on Drawing 5-22D
- Road to east C. Burton Pugh property (K3993) with details shown on Drawing 5-22C
- County Road 136 (K3900) with details on Drawing 5-22E, 5-22F and 5-22G. This County road will be reconstructed within the permit area by Kane County. This reconstruction will occur concurrently with the final stage of reclamation as scheduled on Drawing 5-38 and is expected to be completed by the end of Year 4.
- Road to Swapp Ranch (same specification as the Water Well Road)

The location of these roads is shown on Drawings 5-35 and 5-37 along with the post mining topography.

The ramps, benches and equipment travel paths within the active surface mining area are temporary in nature and will be relocated frequently as mining progresses. These temporary travelways are considered part of the pit due to their short term use, and are not individually designed nor engineered. They will be built and maintained to facilitate safe and efficient mine and reclamation operations.

534.300-340. Primary Roads.

Primary roads will:

- *Be located, insofar as practical, on the most stable available surfaces;*

  These roads are designed on the most practicable, stable surfaces.

- *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;*

Primary roads haul roads will be surfaced with approximately 18" of crushed rock or gravel to provide a durable surface for the anticipated volume of traffic and equipment.

- *Be routinely maintained to include repairs to the road surface, blading, filling potholes and adding replacement gravel or asphalt. It will also include revegetation, brush removal, and minor reconstruction of road segments as necessary; and*

  All roads will be maintained on an as needed basis using motor graders, water trucks for dust suppression, and other equipment as necessary. Crushed stone and/or gravel will be used as a surface course for primary roads outside the active mining area, and may be used as needed for ramps and travelways within the pit. Should the roads be damaged by a catastrophic event, such as an earthquake or a flood, repairs will be made as soon as possible after the damage has occurred or the road will be closed and reclaimed. Roads will be reclaimed once they are no longer needed for their intended use.

- *Have culverts that are designed, installed, and maintained to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the road.*

  Road fill over culverts will be at minimum two times the diameter of the culvert. This is a conservative standard that has been effectively utilized at mining operations with similar equipment and mining practices.

535. SPOIL

535.100 -150 Disposal of Excess Spoil. *Excess spoil will be placed in designated disposal areas within the permit area in a controlled manner. The fill and appurtent structures will be designed using current, prudent engineering practices and will meet any design criteria established by the Division.*

- *The fill will be designed to attain a minimum long-term static safety factor of 1.5. The foundation and abutments of the fill must be stable under all conditions of construction.*

  A geotechnical analysis has been completed for the proposed excess spoil structure. This analysis estimates the long-term safety factor to be 1.6 to 1.7 based on the proposed design. Following proper construction practices of building the structure in maximum four foot lifts and meeting 85% compaction based on the standard Procter will ensure that the structure will be stable under all conditions of construction. The following earthwork specifications will be followed:

1) Areas to receive fill will be stripped of all vegetation, organic material, and debris. Any existing undocumented or non-structural fill/backfill materials and other unsuitable materials will be excavated in their entirety. All areas that are to receive fill will be observed by a professional engineer experienced in the design of earth and rock fills prior to placement of fill.

2) Fill will be compacted to 85% of the maximum density as compared to ASTM D 698 (standard proctor) for the spoil.

3) Individual lift thickness will not exceed 4 feet, unless approved by both the Division and the professional engineer based on compaction test results during field verification.

4) Saturated soils will be placed in an area that will have minimal effect on the performance of slopes.

5) A qualified professional engineer with experience in the design of earth and rock fills will periodically observe the placement of fill and conduct in-place field density tests on the fill to check for adequate moisture and relative compaction. The compaction tests will be conducted as part of the periodic inspections required in R645-301-514.100, 514.311, and R645-301-514.120. These compaction tests will be conducted using nuclear density (ASTM D2292-9) or equivalent method. If less than the specified relative compaction is obtained, additional compactive effort will be applied and the fill moisture-conditioned as necessary until the specified relative compaction is attained.

6) Wherever, in the opinion of the ACD's representatives, an unstable condition is being created, the work will not proceed in that area until an evaluation has been made and the grading operations revised, if necessary.

7) During unfavorable weather conditions, construction of the fill will not proceed without confirmation from the professional engineer experienced in the design of earth and rock fills.

This construction will occur only in the designated excess spoil area as shown on Drawing 5-3 and 5-35. The fill will be placed with end dump haul trucks and lifts will be constructed using dozers. High precision GPS systems will be regularly utilized to check grades and appropriate lift thickness. The geotechnical analysis for this structure can be viewed in Appendix 5-1.

- *Be located on the most moderately sloping and naturally stable areas available, as approved by the Division, and placed, where possible, upon or above a natural terrace, bench or berm, if such placement provides additional stability and prevents mass movement;*

The excess spoil is planned to be placed in an area where natural grades range from 0 to 5%. This is one of the most moderately sloping locations in the Permit Area. Stability of this structure is estimated to be 1.6 to 1.7 based on the Appendix 5-1.

- *Be subject of sufficient foundation investigations. Any necessary laboratory testing of foundation material, will be performed in order to determine the design requirements for foundation stability. The analyses of foundation conditions will take into consideration the effect of underground mine workings, if any, upon the stability of the fill and appurtent structures; and*

  Geotechnical borings were completed in the foundation of the proposed disposal area. Laboratory analysis of these borings has also been completed. Details of this analysis can be viewed in Appendix 5-1.

- *Incorporate keyway cuts (excavations to bedrock) or rock buttresses to ensure stability where the slope in the disposal area is in excess of 2.8h:1v (36 percent), or such lesser slope as may be designated by the Division based on local conditions. Where the toe of the spoil rests on a downslope, stability analyses will be performed in accordance with R645-301-535.150 to determine the size of rock toe buttresses and keyway cuts*

  Permanent slopes for the proposed excess spoil will not exceed 3h:1v (33 percent), therefore no keyway cuts have been proposed in the design. Appendix 5-1 details the stability analysis for the proposed structure.

- *Excess spoil may be disposed of in underground mine workings,..*

  Excess spoil will not be disposed of in underground mine workings.

- *Placement of Excess Spoil. Excess spoil will be transported and placed in a controlled manner in horizontal lifts not exceeding four feet in thickness; concurrently compacted as necessary to ensure mass stability and to prevent mass movement during and after construction; graded so that surface and subsurface drainage is compatible with the natural surroundings: and covered with topsoil or substitute material in accordance with R645-301-232.100 through R645-301-232.600, R645-301-234, R645-301-242, and R645-301-243. The Division may approve a design which incorporates placement of excess spoil in horizontal lifts other than four feet in thickness when it is demonstrated by the operator and certified by a professional engineer that the design will ensure the stability of the fill and will meet all other applicable requirements.*

  Horizontal lifts will not exceed four feet in thickness unless otherwise approved by the Division. The lifts will be concurrently compacted to meet 85% of the standard Procter. The geotechnical analysis (Appendix 5-1), provides information showing that these construction standards will provide mass stability and will

prevent mass movement during and after construction. The excess spoil will be graded to provide drainage similar to original flow patterns. Topsoil and subsoil as designated in Chapter 2 will be removed and separated from other materials prior to placement of spoil.

- *For the purposes of SURFACE COAL MINING AND RECLMATION ACTIVITIES the design of the spoil disposal structures will include the results of geotechnical investigations as follows:*

  1) *The Character of the bedrock and any adverse geologic conditions in the disposal area;*

     Refer to Appendix 5-1.

  2) *A survey identifying all springs, seepage, and ground water flow observed or anticipated during wet periods in the area of the disposal site;*

     Spring and seep survey information is provided on Drawing 7-1. There are no springs or seeps identified in the excess spoil area.

  3) *A survey of the potential effects of subsidence of the subsurface strata due to past and future mining operations;*

     There no historical underground mining operations in the proposed excess spoil area. There are also no future underground operations proposed.

  4) *A technical description of the rock material to be utilized in the construction of those disposal structures containing rock chimney cores or underlain by a rock drainage blanket; and*

     There are no rock chimneys or drainage blankets proposed.

  5) *A stability analysis including, but not limited to, strength parameters, pore pressures and long-term seepage conditions. These data will be accompanied by a description of all engineering design assumptions and calculations and the alternative considered in selecting the specific design specifications and methods.*

     The stability analysis and all supporting data are available in Appendix 5-1.

- *If for the purposes of SURFACE COAL MINING AND RECLAMATION ACTIVITIES, under R645-301-535.112 and R645-301-535.113, rock-toe buttresses or key-way cuts are required, the will include the following:*

  Neither rock-toe buttresses or key-way cuts are required under R645-301-535.112 or R645-301-535.113.

535.200. Disposal of Excess Spoil: Valley Fills/Head-of-Hollow Fills.

The MRP does not contemplate disposal of excess spoil as valley fill or head-of-hollow fills.

535.300. Disposal of Excess Spoil: Durable Rock Fills.

The MRP does not contemplate disposal of excess spoil as durable rock fill.

535.400. Disposal of Excess Spoil: Preexisting Benches.

The MRP does not contemplate disposal of excess spoil on preexisting benches.

536. Coal Mine Waste.

The MRP does not contemplate processing of coal that would produce coal mine waste.

537 REGRADED SLOPES:

537.100 Geotechnical Analysis:

The excess spoil structure and fill above approximate original contour are the only alternative specifications proposed. A geotechnical analysis has been completed for this proposal and can be viewed in Appendix 5-1. All other mined areas will be restored to approximate original contour.

540 RECLAMATION PLAN:

541.100 - 400 General

When coal mining is completed, all pits will be backfilled and reclaimed in accordance with the R645 rules and this permit. All equipment, structures, and other facilities, unless approved by the Division as suitable for the postmining land use or environmental monitoring, will be removed and the affected land reclaimed.

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State of Utah, Division of Water Rights or other applicable state regulations. Abandonment of wells will be performed by a licensed water well driller. The wells to be abandoned will be completely filled using neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout, or other materials approved by the Utah State Engineer's office. Alternatively, the well may be abandoned using a different procedure upon approval from the Utah State Engineer's office.

Abandonment materials will be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the State Engineer by the responsible licensed driller giving data related to the abandonment of the well. This shall include the name of the licensed driller or other person(s) performing abandonment procedures, name of well owner at the time of abandonment, the address or location of the well by section, township, and range, abandonment materials and equipment used, water right or file number covering the well, the final disposition of the well, and the date of completion.

Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance. Exploration holes and boreholes will be managed to ensure the safety of people, livestock, fish and wildlife, and machinery.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

If any exploration boreholes are to be used as monitoring wells or water wells, these will meet the provisions of R645-301-731

Boreholes will be backfilled to within 1 foot of the land surface with concrete or other materials approved by the Division as necessary to prevent contamination of groundwater or surface-water resources or to protect the prevailing hydrologic balance. The upper approximately 1 foot will be backfilled with native materials to facilitate reclamation (see Drawing 6-11). Exploration holes and boreholes that may be uncovered during mining and reclamation activities will be permanently closed unless approved for water monitoring or otherwise managed in a manner approved by the Division.

542 NARRATIVE, DRAWINGS AND PLANS:

542-100 through 600 Plan and Timetable.

Reclamation at the Coal Hollow Mine includes both ongoing reclamation and final reclamation activities. Ongoing reclamation will follow mining operations as closely as practicable during the mine production phase. Major steps in the ongoing reclamation process are:

- Backfilling and Grading. The planned backfilling and grading operations are described more fully under section 553 below.
- Topsoil and Subsoil Replacement. Following grading, suitable topsoil and subsoil will be replaced on the regraded area. Topsoil may be direct placed from areas ahead of the mine, or may be taken from available stockpiled material. The planned topsoil operation will have topsoil ahead of the operation dozed into windrows, and loaded into trucks by a front end loader. The trucks will haul the topsoil to the regraded area, or to a temporary topsoil stockpile. Subsoil will be handled similar to topsoil. Once dumped on the regraded area, topsoil and subsoil layers will be dozed to a consistent thickness. Approximately 8 inches of topsoil is expected to be removed ahead of mining and replaced over the regraded area. Subsoil removed and replaced will average 40 inches thick and will be placed between the topsoil layer and run of mine spoil. The total profile thickness of topsoil and subsoil in mined areas will average 48 inches. Once in place, the area will be fine graded to remove small erosion features and depressions.
- Revegetation. Following replacement of topsoil the area will be revegetated by seeding. Mulch will be placed on the seedbed surface once soil amendments have been incorporated and seeding has been accomplished in areas that will be reclaimed to native plant communities. The mulch should control erosion by wind and water, decrease evaporation and seed predation, and increase survivability of the seeded species. Like the seeding methods, mulch will be applied with a variety of techniques and materials depending on the reclaimed area.

Generally, mined areas will be backfilled and graded within approximately 180 days following coal removal, or 1,500 feet of the active coal removal face. One exception to this standard is during mining and backfilling of the final pits in the south end of the permit area. During this phase of mining, backfilling will follow approximately 2,000 feet from the active coal face. A detailed description of the reason for this variation are fully described in section 528 (Overburden) and the major steps can be viewed on Drawings 5-17 through 5-19. Areas needed for in-pit roads, ramps, drainage controls or areas which must be left open temporarily for operational reasons will be backfilled and graded when they are no longer needed. The rate of backfilling will depend on the availability of mined out pit areas for backfilling, and the rate of production at the mine. Based on anticipated production rates, Drawing 5-38, or Drawing 5-38A if the alternative highwall mining is selected, provides an estimated sequence and timing for reclamation.

Topsoil will be replaced on the graded areas as soon as operationally practicable. This work will depend on weather and soil conditions in the removal and replacement areas, but is generally anticipated to occur within 90 days of completion of regrading.

Revegetation activities will be seasonal in nature. As currently planned, initial seeding will occur at the first planting opportunity following replacement of topsoil. Supplemental seeding may be done subsequently as needed.

Some delay is unavoidable in reclamation of the initial mining areas due to the time required to establish the initial working pit and backfill area, and to achieve a steady state excavation/backfill operation. As currently planned the initial mining areas will be backfilled to the planned post mining contour, graded, and the topsoil replaced by late in the first year or in the first half of the second year of mining. Reclamation activities will proceed at the regular planned rate thereafter. Proposed final reclamation contours and cross sections can be viewed on Drawings 5-35 and 5-36.

The sequence and timing of reclamation activities is dependent on the coal production rate. Should that rate differ significantly from the current plan, the reclamation schedule will also vary.

Final reclamation includes the following:

- Backfilling and Grading. Backfilling of all final pits will commence at the conclusion of coal production. All highwalls, spoil piles, and depressions will be removed, except that small depressions may be constructed if they are needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation. No permanent final pit impoundments are currently planned. The excess spoil structure will remain. All exposed coal seams, and acidic or toxic-forming strata will be covered with at least five feet of noncombustible material.
- Topsoil and Subsoil Replacement. 8 inches of topsoil underlain by 40 inches of subsoil will be placed on the backfilled pits and excess spoil. Other disturbed areas will have topsoil replaced (including facilities sites, roads etc.).

- Removal of Structures. Before abandoning the permit area or seeking bond release, all structures not needed for the approved post mining land use will be removed and reclaimed. The Lower Robinson Creek diversion is proposed to be temporary. Material from the coal stockpile base area and other areas where coal spillage may accumulate will be excavated and placed in a controlled manner in the final pit and covered with noncombustible material to prevent sustained combustion. The only structure planned to exist postmining is the water well with details shown in Drawing 5-8C and location shown on 5-3, 5-35 and 5-37.

- Removal of Roads. Roads not retained for use under an approved postmining land use will be reclaimed immediately after they are no longer needed for mining and reclamation operations. Roads that are not listed as postmining roads in this section, will be closed to traffic; and all bridges and culverts removed. Prior to reclamation, surface material that is incompatible with the postmining land use and revegetation requirements will be removed from the roads and properly disposed of at the mine site. The roadbeds will be scarified or ripped to break up the surface. Topsoil will be replaced on the roadbed and the surface revegetated in accordance with the standards set forth in R645.

  Roads that will remain postmining are the following:
  - Road to Water Well with details shown on Drawing 5-22D
  - Road to east C. Burton Pugh property (K3993) with details shown on Drawing 5-22C
  - County Road 136 (K3900) with details on Drawing 5-22E, 5-22F and 5-22G. This County road will be reconstructed within the permit area by Kane County. This reconstruction will occur concurrently with the final stage of reclamation as scheduled on Drawing 5-38 and is expected to be completed by 2017.
  - Road to Swapp Ranch (same specification as the Water Well Road)

  The location of these roads is shown on Drawings 5-35 and 5-37 along with the post mining topography.

- Removal of Water Control Structures. All sedimentation control structures, including ditches, berms and sedimentation ponds not retained as part of the approved post-mining land use will be removed, the areas regraded, topsoiled, and revegetated. All water control structures will be removed at final reclamation.

Final pit backfilling, removal of buildings, roads and other facilities, along with replacement of topsoil is expected to require approximately 15 months after the last coal is removed. In the alternate reclamation scenario (Drawing 5-37), the bulk of this period will be required to backfill the final pits.

542.700. Final Abandonment of Mine Openings and Disposal Areas.

Final abandonment of alternative mined highwall panels will be at the time when completed panels are backfilled as described in Section 529.

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State of Utah, Division of Water Rights or other applicable state regulations. Abandonment of wells will be performed by a licensed water well driller. The wells to be abandoned will be completely filled using neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout, or other materials approved by the Utah State Engineer's office. Alternatively, the well may be abandoned using a different procedure upon approval from the Utah State Engineer's office.

Abandonment materials will be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the State Engineer by the responsible licensed driller giving data related to the abandonment of the well. This shall include the name of the licensed driller or other person(s) performing abandonment procedures, name of well owner at the time of abandonment, the address or location of the well by section, township, and range, abandonment materials and equipment used, water right or file number covering the well, the final disposition of the well, and the date of completion.

Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance. Exploration holes and boreholes will be managed to ensure the safety of people, livestock, fish and wildlife, and machinery.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

If any exploration boreholes are to be used as monitoring wells or water wells, these will meet the provisions of R645-301-731

Boreholes will be backfilled to within 1 foot of the land surface with concrete or other materials approved by the Division as necessary to prevent contamination of groundwater or surface-water resources or to protect the prevailing hydrologic balance. The upper approximately 1 foot will be backfilled with native materials to facilitate reclamation (see Drawing 6-11). Exploration holes and boreholes that may be uncovered during mining and reclamation activities will be permanently closed unless approved for water monitoring or otherwise managed in a manner approved by the Division.

542.720. Disposal of Excess Spoil.

A geotechnical analysis has been completed for the proposed excess spoil structure. This analysis estimates the long-term safety factor to be 1.6 to 1.7 based on the proposed design. Following proper construction practices of building the structure in maximum four foot lifts and meeting 85% compaction based on the standard Procter will ensure that the structure will be stable under all conditions of construction. This construction will occur only in the designated excess spoil area as shown on Drawing 5-3 and 5-35. The fill will be placed with end dump haul trucks and lifts will be constructed using dozers. High precision GPS systems will be regularly utilized to check grades and appropriate lift thickness. The geotechnical analysis for this structure can be viewed in Appendix 5-1.

Excess spoil that is combustible will be adequately covered with noncombustible material to prevent sustained combustion.

542.730. Disposal of Coal Mine Waste.

The MRP does not contemplate processing of coal that would produce coal mine waste.

542.740. Disposal of Noncoal Mine Wastes.

Noncoal mine waste 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 temporarily stored in a controlled manner in a designated portion of the permit area and hauled offsite to a state approved recycling or solid waste disposal site. Final disposal of noncoal mine waste will not take place within the permit area. With the exception of removal of perforated piping used in the construction of Alluvial Ground Water Drains that will be left in place as mining advances. This perforated piping will be covered in place approximately 20' to 30' below the final reclaimed surface. All other waste materials (ie. metal culvert) associated with the Alluvial Ground Water Drains will be removed and disposed of in a State-approved solid waste disposal site.

542.800. Reclamation Cost.

The amount of the bond will depend upon the requirements of the ***approved*** permit and reclamation plan (R645-830.120).

A preliminary estimate of reclamation costs is included in Appendix 8-1. This estimate is based upon the proposed plan of open pit mining. The cost for the alternative plan of highwall mining will be considerably less because of reduced surface disturbance with this mining operation. Therefore the cost estimate will remain based on the proposed plan of open pit mining. A final bond estimate will be provided by the applicant to the Division upon completion of the approved permit and reclamation plan.

550. RECLAMATION DESIGN CRITERIA AND PLANS

551. SEALING AND CASING OF UNDERGROUND OPENINGS

When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.

Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", State of Utah, Division of Water Rights or other applicable state regulations. Abandonment of wells will be performed by a licensed water well driller. The wells to be abandoned will be completely filled using neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout, or other materials approved by the Utah State Engineer's office. Alternatively, the well may be abandoned using a different procedure upon approval from the Utah State Engineer's office.

Abandonment materials will be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the State Engineer by the responsible licensed driller giving data related to the abandonment of the well. This shall include the name of the licensed driller or other person(s) performing abandonment procedures, name of well owner at the time of abandonment, the address or location of the well by section, township, and range, abandonment materials and equipment used, water right or file number covering the well, the final disposition of the well, and the date of completion.

Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance. Exploration holes and boreholes will be managed to ensure the safety of people, livestock, fish and wildlife, and machinery.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division.
If any exploration boreholes are to be used as monitoring wells or water wells, these will meet the provisions of R645-301-731

Boreholes will be backfilled to within 1 foot of the land surface with concrete or other materials approved by the Division as necessary to prevent contamination of groundwater or surface-water resources or to protect the prevailing hydrologic balance. The upper approximately 1 foot will be backfilled with native materials to facilitate reclamation (see Drawing 6-11). Exploration holes and boreholes that may be uncovered during mining and reclamation activities will be permanently closed unless approved for water monitoring or otherwise managed in a manner approved by the Division.

552. PERMANENT FEATURES.

552.100

Small depressions may be constructed if they are needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation.

552.200

All impoundments will be reclaimed, no permanent impoundments are proposed.

553 BACKFILLING AND GRADING:

Backfilling and Grading of the mined area will proceed in conjunction with coal recovery operations.

The planned mine will recover approximately 4.64 million tons of coal, and remove approximately 30.1 million Bank Cubic Yards (BCY) of overburden. The following is a description of the overburden removal and backfilling process:

Based on the overburden isopach map (Drawing 5-15), the overburden removal and backfilling process has been separated into three major stages. The first stage of this process is for the initial mining area, Pits 1-8. These pits have a relatively low strip ratio, approximately 5:1 (refer to Drawing 5-13). In order to efficiently remove overburden for this phase, spoil from the first three

pits will be placed in an excess spoil area located immediately west of Pit 1. This excess spoil structure will hold approximately 2.7 million loose cubic yards (LCY) of material and is shown on Drawing 5-17. Once the excess spoil pile is filled, overburden from the next 4 pits can then be used as pit backfill as the mining progresses through Pit 8. The completion of this phase is shown on Drawing 5-17.

Phase 2 requires mining to occur in two areas of the permit alternately. As mining progresses through Pits 9-13, the isopach (Drawing 5-15) shows that the overburden significantly increases. This increase and the shape of the mining boundary for the Permit Area require a fill above approximate original contour that is an extension of the excess spoil pile. Material from Pits 9-13 significantly exceeds the backfill capacity available from the preceding pits (Pits 1-8). The fill above approximate original contour blends in with the excess spoil structure from Phase 1 and extends an additional 2,000 feet to the east as the mining sequence proceeds to Pit 15.

Also, mining begins with Pit 28 and proceeds alternately with Pits 9-13, north to Pit 23. The isopach shows that Pits 28 -23 have a relatively low strip ratio, approximately 4.2:1 increasing to 4.9:1 respectively. Overburden from Pit 28 will all be hauled to the excess spoil structure, with overburden from the successive pits to north back filling the previously mined. In this stage, the fill above original contour is approximately 5.8 million LCY. Drawing 5-18 (Stage 2) shows the details of this stage of the overburden removal and resulting landform.

Stage 3 overburden removal begins in Pit 14 and proceeds alternately with Pit 22 coming from the south to meet at Pit 18, the last pit to be mined. During this stage, the strip ratio reduces significantly from Stage 2 as mining progresses to Pit 18. As the strip ratio reduces to the south, significant backfill capacity is available in the preceding Pit 15. This results in the distance between the backfill and the active coal face increasing because there is a lack of spoil in the lower ratio pits as mining proceeds south to fill the preceding higher ratio area. At the end of mining this phase, an area will not be completely backfilled that is approximately 1,600 feet in length and 875 feet wide and will require 3.3 million yards of fill to complete reclamation to approximate original contour. This remaining pit provides an open pit adjacent to the federal coal reserves for backfilling of overburden so that a smooth transition can be made without developing another boxcut and an excess spoil area. The backfill configuration at the end of this stage is shown in Drawing 5-19.

The proposed plan (Preferred Scenario) for backfilling the final pits is based on the assumption that Alton Coal Development, LLC will be successful with acquiring the adjacent federal coal reserves, located immediately to the west of the project area. This Preferred scenario for backfilling will minimize overall disturbance, and maximize resource recovery by providing a transition into the adjacent federal reserves with minimal effect to existing reclamation and backfill in the Permit Area. This scenario will also minimize variances from approximate original contour on the federal lands by eliminating the need for an excess spoil structure from the initial box cut as operations are transitioned into these reserves. In addition, this scenario provides a method for implementing concurrent reclamation during the project by eliminating temporary stockpiles of spoil that can not be reclaimed and have to be placed in backfilled areas at a later time. Use of temporary spoil stockpiles significantly delay reclamation and this plan eliminates the need for these type of temporary structures.

At the time that the transition occurs into the federal reserves, overburden will be removed from the federal reserves and placed in the final pits to approximate original contour. This final landform can be viewed on Drawings 5-35 and 5-36.

The following is an overburden and backfill balance for this scenario:

Preferred Scenario (Adjacent Federal Reserves Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Federal)	3,300,000	3,300,000	0	5,782,000
Total	43,535,000	34,453,000	5,782,000	5,782,000

*Loose Cubic Yards is estimated based on an overall 22% swell factor (Caterpillar Performance Handbook)

In the case that Alton Coal Development is not successful with acquiring the adjacent federal coal reserves, an alternate scenario has been developed. The Alternate scenario requires that all fill above approximate original contour and part of the excess spoil structure will be rehandled and placed in the remaining backfill area. The final landform for this scenario is shown on Drawing 5-37. This step requires rehandle of approximately 3.3 million yards of spoil. In this scenario, reclamation of the project area will be significantly delayed and the transition into adjacent federal coal reserves at a later date will disturb additional backfill along the west permit boundary approximately 2,000 feet in length by 230 feet wide (10 acres). An additional excess spoil structure would then need to be constructed on the federal lands to place spoil from the initial boxcut. Part of the excess spoil would likely be material removed from the Permit Area to access the coal beneath the Permit Area highwalls and provide the proper layback of the backfill material along the Permit boundary.

If the alternative highwall mining is selected, it is anticipated when pit 26 is completed, Highwall Trench 1 (HWT1) will be excavated. Coal is removed from the area of excavation. At this point a highwall miner is brought in. In this method of mining, an unmanned cutter module is driven underground and operated in front of the highwall. The highwall mining machine stands on the pit floor or on a bench, directly in front of the exposed seam and makes long parallel rectangular drives into the coal seam. A remote-operated cutter module is pushed into the seam by a string of push beams (unmanned coal-conveying elements) that transport the mined coal back to the entry of the drive onto a stockpile. Coal is then removed to the sizing/loading area. The miner is moved along the face making successive pushes into the coal face. Once coal is removed from the southern panels of a Highwall Trench, overburden from excavation of the next Highwall Trench is used to backfilled the mined out area continuing with the progression of the trench.

The anticipated coal removal sequence for the Highwall mining is shown on drawing 5-10A. Depending on the approval of the alternative and the delivery of the highwall miner, the highwall miner could be deployed on an exposed coal face. As is depicted, each Highwall Trench consists of Panels, each panel consisting of 10 holes. The spacing between the holes and the spacing between the panels are dictated by the amount of overburden over the panels. The alternate Highwall mining is designed such that subsidence does not occur to the surface with nonyieldable webs and barriers. Specific information concerning these design are found in Appendix 5-8. Highwall mining will have only the disturbance associated with the trench for placement of the highwall miner and will have no impact on the surface above the highwall panels.

The following tables summarizes the overburden and backfill balance for these two scenarios:

Alternate Scenario (Adjacent Federal Reserves Not Acquired)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	14,168,000	11,127,000	3,041,000	5,782,000
3	14,631,000	14,631,000	0	5,782,000
4 (Rehandle)	0	3,300,000	-3,300,000	2,482,000
Total	36,735,000	34,253,000	2,482,000	2,482,000

Alternate Scenario (Highwall mining)				
Phase	Overburden (LCY)	Available Backfill (LCY)	Excess Spoil (LCY)	Total Excess Spoil (LCY)
1	7,936,000	5,195,000	2,741,000	2,741,000
2	7,381,000	7,277,000	104,000	2,845,000
3	5,257,000	5,257,000	0	2,845,000
4 (Federal)	3,300,000	3,300,000	0	2,845,000
Total	23,874,000	21,029,000	2,845,000	2,845,000

In both scenarios (Preferred and Alternate), Rough backfilling and grading operations will follow coal removal by not more than 60 days or 1500 linear feet except for the exemption in the south end of the mining area (Pits 17 through 21), which is described above in a step by step manner in the Phase 3 overburden removal process, the above tables and Drawings 5-17 through 5-19. This exemption is expected to take place in the last year of the mining process.

Major steps in the backfilling and grading process are:

- Backfilling of the Mined Out Pit. Material from active pits will be used to backfill mined out pits as mining progresses. Material will be placed in the in-pit backfill in lifts, until the approximate planned final elevation is reached. Working stability in the backfill will be achieved by placement of the material, and control of the overall spoil face slope at stable angles. The mined out area will be filled to its planned post-mining elevation, which approximates the pre-mining land contour. The backfill will be inherently stable because the exposed surface will have shallow slopes, and the backfill surface will not be significantly higher than the surrounding undisturbed ground with the exception of the variance shown on Drawing 5-3.
- Backfilling of Ramps. Ramps and travelways within the active mining will be moved as necessary for safe operation and efficient hauling of overburden and coal. When a particular ramp or travelway is no longer needed, it will be backfilled with excavated overburden from the advancing pit.
- Grading. After backfilling is complete in each mined out area, the area will be graded using dozers and motor graders to achieve the planned post-mining contour, facilitate stable positive drainage patterns, and to blend in with the surrounding topography. Postmining slopes will not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long-term static safety factor of 1.3 and prevent slides. A geotechnical analysis has been completed for the excess spoil structure and can be found in Appendix 5-1.

Timing of backfilling and grading operations will depend on the rate of mine advance and the availability of backfill space and material. It is planned that mined areas will be backfilled and graded within approximately 60 days following coal removal, or 1,500 feet of the active coal removal face. As described in the previous text and shown on Drawing 5-19, there will be a variance from this standard in the final pits. Areas needed for in-pit roads, ramps, drainage controls or areas which must be left open temporarily for operational reasons will be backfilled and graded as they become available.

In the initial mining area, pits 1 through 8 (spoil from pit 2 and 3 will be permanently placed in the excess spoil area and pit 1. Part of Pit 3 is placed in the previous pit. All of the 4th pit is placed in the pit 3, beginning the sequential pit backfilling process. By the time coal recovery is complete, rough backfilling and grading will be complete through 7 pits. Rough backfilling and grading will continue and be completed through pit 8. Pits 1, 2, and 3 are defined on drawing 5-10. Pits 4 through 8 will be determined during the mining of pits 1, 2, and 3. At that time, an amendment to this permit reflecting the number and sequence of pits 4 through 8 will be submitted to the division.

553.110

All areas except for the excess spoil pile and the variance from AOC (approximately 85 acres), will be restored to approximate original contour as shown on Drawing 5-35. R645-301-553.800 (Thick Overburden) does apply to this surface mine. In areas where

excess spoil and variance from approximate original contour occur, the slopes will be regraded to a maximum angle of 3h:1v and most slopes are flatter as shown on Drawing 5-35 and 5-36. A geotechnical analysis has been completed to verify that the spoil material will be stable long term. This analysis can be viewed in Appendix 5-1.

553.120
All highwalls will be eliminated in the final landform. Small depressions may be constructed as needed to retain moisture, minimize erosion, create and enhance wildlife habitat or assist vegetation. All spoil piles will be eliminated with the exception of the planned excess spoil and variance from original contour as shown on Drawing 5-35.

553.130
Postmining slopes will not exceed the angle of repose which is expected to be approximately 1.5h:1v as described in Appendix 5-5. This appendix is an analysis by Dr. Ben Seegmiller addressing the safety factor for the post mining slope with the lowest safety factor outside the excess spoil area. This analysis concludes that a minimum safety factor of these slopes will be 1.7 which exceeds the requirement of 1.3. The excess spoil slopes have been analyzed by Alan Taylor, P.E., an expert in geotechnical engineering. These slopes also significantly exceed the required 1.3 safety factor. Details for this analysis by Mr. Taylor can be viewed in Appendix 5-1.

553.140
Slopes will be regraded and vegetated to minimize erosion and water pollution on and off the site.

553.150
Backfilling and grading will be conducted to support the approved post mining land use.

553.200 Spoil and Waste.

Spoil located in the excess spoil area and the variance from approximate original contour will be compacted to 85% of the standard Procter to provide long term stability of these structures. Remaining backfill in mined out areas will be confined and regraded to approximate original contour and will therefore not require compaction for long term stability. Subsoil will be placed over spoils and waste prior to placement of topsoil. This subsoil layer will provide a covering with minimal infiltration rate to prevent leaching of toxic materials.

553.210

Excess spoil from surface mining activities will be disposed of according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.100, R645-301-745.300, and R645-301-745.400. Detail for meeting these standards can be reviewed in the corresponding sections.

553.220

The MRP does not contemplate placing spoil on areas outside the mined-out surface area for the purposes of restoring the approximate original contour.

553.300. Covering of Exposed Coal Seams, and Acid- and Toxic-Forming Materials.

Exposed coal seams, acid- and toxic-forming materials, and combustible materials exposed, used, or produced during mining will be adequately covered with nontoxic and noncombustible materials, or treated, to control the impact on surface and ground water in accordance with R645-301-731.100 through R645-301-731.522 and R645-301-731.800, to prevent sustained combustion, and to minimize adverse effects on plant growth and on the approved postmining land use.

553.400. Cut and Fill Terraces

The MRP does not contemplate constructing cut and fill terraces.

553.500. Previously Mined Areas (PMA's) and Continuously Mined Areas (CMA's).

The MRP does not contemplate operations associated with PMA's, CMA's, or areas with remaining highwalls.

553.600. Highwall Management

The MRP does not contemplate operations associated with PMA's, CMA's, or areas with remaining highwalls.

553.700. Backfilling and Grading: Thin Overburden.

The Coal Hollow project is expected to have approximately 1.8 million loose cubic yards of excess spoil; therefore R645-301-800 applies rather than R645-301-553.700.

553.800. Backfilling and Grading: Thick Overburden.

553.810

The spoil will be placed to attain the lowest practicable grade, and will not exceed the angle of repose for the material. A sequence of the steps for practicable movement of the excess spoil is shown on Drawings 5-17 through 5-19. The slopes on the excess spoil and variance from the approximate original contour will not exceed 3h:1v or flatter, which will provide a long-term, stable structure. The general design of the tall (60'+ vertically) excess spoil slopes is 5h:1v to 4h:1v to 3h:1v, bottom to top. This design creates a concave shape slope that resembles naturally occurring hills in the area and will minimize erosion. In addition, irregularities (flatter areas) have been added to break up long slopes. The overall shape of the pile is also irregular to be similar to hills in the

surrounding area. The final configuration of this excess spoil can be viewed in Drawings 5-35 and 5-36. The rough grading of the excess spoil outlsopes will follow by not more than 60 days after completed construction. The angle of repose for the spoil material is expected to be 1.5h:1v as provided in Appendix 5-5 in the Introductory Overview (page 1) by Dr. Ben Seegmiller, an expert in the field of rock mechanics and slope stability. The design slopes are significantly flatter than the angle of repose expected for the spoil.

553.820 - 553.830

Backfilling and Grading of thick overburden will meet the following requirements:

- *R645-301-211: The applicant will present a description of the premining soil resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be separately removed and segregated from other material.*

  The soil resources for the proposed excess spoil disposal area are described in 2-1. A plan has been developed for removal of topsoil and suitable subsoil based on the soil descriptions in this appendices. The handling plan can be viewed on Drawing 2-2. Topsoil and acceptable subsoil will be separately removed and segregated from other material prior to placement of any spoil.

- *R645-301-212: After removal, topsoil will be immediately redistributed in accordance with R645-301-242, stockpiled pending redistribution under R645-301-234, or if demonstrated that an alternative procedure will provide equal or more protection for the topsoil, the Division may, on a case-by case basis, approve an alternative;*

  Excess spoil will have topsoil and subsoil redistributed in an approximately uniform, stable thickness with the approved post mining land use, contours and surface water drainage systems. Material handling practices will prevent excess compaction of these materials. Handling practices will also protect the materials from wind and water erosion before and after seeding and planting.

- *R645-301-412.300: Criteria for Alternative Postmining Land Uses.*

  Not Applicable

- *R645-301-512.210: Excess Spoil. The professional engineer experienced in the design of earth and rock fills will certify the design according to R645-301-535.100.*

  A professional engineer experienced in the design of earth and rock fills with assistance from a geotechnical expert has certified the design according to R645-301-535.100. These certifications can be viewed on Drawings 5-35, 5-36 and 5-17 through 5-19.

- *R645-301-512.220: Durable Rock Fills*

  No durable rock fills are planned.

- *R645-301-514.100: Excess Spoil. The professional engineer or specialist will be experienced in the construction of earth and rock fills and will periodically inspect the fill during construction. Regular inspections will also be conducted during placement and compaction of fill materials.*

  A professional engineer or specialist that is experienced in the construction of earth and rock fills will inspect the fill during construction and regular inspections will also be conducted during placement and compaction of fill materials.

- *R645-301-528.310: Excess spoil will be placed in designated disposal areas within the permit areas within the permit area, in a controllable manner to ensure mass stability and prevent mass movement during and after construction. Excess spoil will meet the design criteria of R645-301-535. For the purposes of SURFACE COAL MINING AND RECLAMATION ACTIVITIES, the permit application must include a description of the proposed disposal site and the design of the spoil disposal structures according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.100, R645-301-745.300, and R645-301-745.400.*

  Excess spoil will be placed in the area designated on Drawing 5-3 and 5-35. This fill will be placed in lifts not to exceed 4 feet. The material will be transported from the overburden removal area to the fill by end dump haul trucks and a dozer(s) will spread the spoil to this lift thickness. The fill will meet at minimum 85% compaction as related to the standard Procter. Final slopes will be regraded to a maximum slope of 3h:1v. The top of the fill will sloped to approximately 2% to prevent pooling of water and to reestablish drainage similar to the original flow patterns. The excess spoil placed on the non-mined areas is approximately 32 acres and varies in height from 35 to 110 feet. The area of excess fill over mined out areas (variance from approximate original contour) is an extension of the fill placed on the non-mined area and is approximately 55 acres. Combined acreage of the excess fill placed on mined and non-mined areas is 87 acres and varies in height from 60 to 100 feet above original contour. Total excess fill is 8.6 million yards. Design of this fill can be viewed in Drawings 5-35 through 5-36 and the geotechnical study can be viewed in Appendix 5-1.

- *R645-301-535.100 through R645-301-130: Disposal of Excess Spoil*

  A geotechnical analysis of the excess spoil structure design has been completed by an expert in this field. The long term static safety factor for this structure design is estimated at 1.6 to 1.7. Lifts will be placed in thicknesses not to exceed

4 feet. The lifts will meet 85% compaction by the standard Procter. The fill will be graded to allow for drainage similar to original patterns and to prevent excessive infiltration of water. Fill will be covered with subsoil and topsoil as specified in Chapter 2 to provide conditions suitable for revegetation of the area. The geotechnical study can be viewed in Appendix A5-1.

- *R645-301-535.300 through R645-301-535.500: Disposal of Excess - Spoil Durable Rock Fills.*

  Not Applicable

- *R645-301-536.300: Disposal of Coal Mine Waste in Excess Spoil*

  No coal mine waste is planned in the excess spoil area.

- *R645-301-542.720: Excess spoil will be placed in designated disposal areas within the permit area, in a controlled manner to ensure that the final fill is suitable for reclamation and revegetation compatible with the natural surroundings and the approved postmining land use. Excess spoil that is combustible will be adequately covered with noncombustible material to prevent sustained combustion. The reclamation of excess spoil will comply with the design criteria under R645-301-553.240.*

  The excess spoil as shown in Drawing 5-35 and 5-36 will be suitable to the surrounding area and for the postmining land use of primarily grazing. No combustible excess spoil will be placed in the proposed structure. The reclamation of the spoil does not include any terraces and the slopes will not exceed 3h:1v.

- *R645-301-553.240: The final fill configuration of the fill (excess spoil) will be suitable for the approved postmining land use. Terraces may be constructed on the outslope of the fill if required for stability, control of erosion, to conserve soil moisture, or to facilitate the approved postmining land use. The grade of the outslope between terrace benches will not be steeper than 2h:1v (50 percent).*

  The excess spoil as shown in Drawings 5-35 and 5-36 will be suitable to the surrounding area and for the postmining land use of primarily grazing. The reclamation of the spoil does not include any terraces and the slopes will not exceed 3h:1v. This slope angle has been utilized at similar mining operations and found to be suitable for erosion control and revegetation of reclaim slopes. The long term static safety factor for these slopes is estimated to be 1.6 to 1.7.

- *R645-301-745.100: General Requirements.*

  745.110: Excess Spoil will be placed in designated disposal areas within the permit area, in a controlled manner to:

745.111: Minimize the adverse effects of leaching and surface water runoff from the fill on surface and underground water;

Reclamation of the excess spoil will include a topsoil cover and subsoil layer. Infiltration through the reclamation is expected to be minimal based on the high clay content of these soils. In addition, laboratory data for the overburden shows that there is minimal potential for leaching of pollutants should infiltration rates become higher than expected.

The foundation of the excess spoil area also has high clay content with minimal potential for infiltration. This will provide an additional, natural barrier to protect ground water present beneath the proposed structure.

745.112: Ensure permanent impoundments are not located on the completed fill. Small depressions may be allowed by the Division if they are needed to retain moisture or minimize erosion, create and enhance wildlife habitat or assist revegetation, and if they are not incompatible with the stability of the fill; and

Permanent impoundments are not planned on the excess spoil area. Small depressions are also not planned in the excess spoil and are not viewed as a necessary enhancement to final reclamation based on average annual moisture data and the proposed slope configuration of the pile.

745.113: Adequately cover or treat the excess spoil that is acid- and toxic forming with nonacid nontoxic material to control the impact on the surface and ground water in accordance with R645-301-731.300 and to minimize adverse effects on plant growth and approved postmining land use.

Laboratory data representative of the overburden planned for disposal in the excess spoil area does not show acid- and toxic forming characteristics.

745.120: Drainage Control. If the disposal area contains springs, natural or manmade water courses, or wet weather seeps, the fill design will include diversions and underdrains as necessary to control erosion, prevent water infiltration into the fill and ensure stability.

A spring and seep survey available in Chapter 7 has identified no springs or wet weather seeps in the proposed excess spoil area. The final surface will be appropriately regraded to a contour that will route natural water from snowmelt and rainfall around the excess spoil as shown on the final contours Drawing 5-35. There are no manmade water courses present in the excess spoil area. No underdrains are planned for the excess spoil structure.

745.121: Diversions will comply with the requirements of R645-301-742.300

No diversions are planned in the excess spoil area.

745.122 : Underdrains

No underdrains are planned in the excess spoil area.

745.300: Durable Rock Fills

No Durable Rock fills are planned.

745.400: Preexisting Benches

The MRP does not contemplate disposal of excess spoil on preexisting benches.

Alton Coal Development, LLC will provide the Division, as part of the annual report for each calendar year, Drawing 5-38 or if the alternate highwall method is selected Drawing 538-A. The Drawing will provide an as-built of the reclamation sequence, depicting the acres of open pit and /or trench, the acres backfilled, the acres fully reclaimed (topsoiled and seeded) and revisions to the reclamation timetable. This information will be submitted by March 28th of each calendar year with the appropriate C1/C2.

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 5-8

Feasibility of Highwall Mining the Smirl Seam at the Alton Coal Development, LLC Coal Hollow Mine

By: Appalachian Mining & Engineering, Inc.
David Newman, PhD P.E.

Feasibility of Highwall Mining the Smirl Seam at the Alton Coal Development, LLC Coal Hollow Mine

Submitted to:

Mr. Larry Johnson, *Manager*

Alton Coal Development, LLC
Cedar City, Utah

Appalachian Mining & Engineering, Inc.

Geolab Materials Testing

Appalachian Mining & Engineering, Inc.
116 Venture Court, Suite 10
Lexington, Kentucky 40511

Appalachian Mining & Engineering, Inc.

Geolab Materials Testing

September 30, 2013

Mr. Larry Johnson, *Manager*
Alton Coal Development, LLC
463 North 100 West
Cedar City, Utah 84721

Re: Feasibility of Highwall Mining the Smirl Seam at the Alton Coal Development, LLC - Coal Hollow Mine

Dear Mr. Johnson,

The enclosed report is an examination of the geotechnical feasibility of highwall mining the Smirl seam at the **Alton Coal Development, LLC** - Coal Hollow mine. The conclusion is that highwall mining is a viable method. However, the Tropic shale strata is unsuitable as an immediate roof. Three feet of "head coal" should be left in the highwall miner cuts to establish an immediate roof. Suitable web pillar and barrier pillar widths were determined using analytical and numerical methods. The Smirl seam is weak in compression as determined through testing of samples obtained from the mine. Although the analytical methods describe a narrower web and barrier pillar width, the finite element analysis clearly shows that for a 12-foot mining height, 12-foot web pillars and 30-foot barrier pillars should remain stable to permit the SHM (Caterpillar) highwall miner to extract a 1,000-foot deep cut under 100-feet of overburden. For 150-feet of overburden, an 18-foot wide web pillar is recommended with a 30-foot wide barrier pillar. A 15-foot mining height may be possible with a wider barrier pillar.

Larry, if you, Kirk, Tom, or others have any questions or comments after reviewing the enclosed report, please contact me by telephone at 859-263-8899 or by email at dnewman@ame-geolab.com

Sincerely,
Appalachian Mining & Engineering, Inc.

STATE OF KENTUCKY
DAVID ALAN NEWMAN
14891
LICENSED PROFESSIONAL ENGINEER

David Newman Ph.D., P.E.
President

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I. Introduction and Authorization

Alton Coal Development, LLC (**ACD**) operates a surface mine in the Smirl seam at the Coal Hollow mine, located in Alton, Utah. The Smirl seam ranges in height from 12-feet to 18-feet with overburden varying between 80-feet and 200-feet. The Tropic shale and surface alluvium have low cohesion and a low friction angle that require the highwall to be sloped at 45° in the shale and 26° in the alluvium to maintain stable conditions. Although the highwall is sloped to enhance stability, slumps or slips of the overburden material can occur (see Photograph 1). The highwall slope sterilizes significant tonnage, as the coal beneath the highwall is not recoverable.

Photograph 1. View of Mined Smirl Seam Pit at the Coal Hollow Mine

The current surface mine pit configuration (see map in Appendix I) is to sequentially develop pits to the north until the economic stripping ratio is reached. Highwall mining is contemplated as an alternative to surface mining. The advantages of highwall mining include;

1. A north-south oriented pit or trench would be developed from which the highwall miner would drive ten to twenty cut panels to the east against the property boundary and to the west beneath the BLM property.

2. The cuts driven to the west permit the extraction beneath surface that is designated as a sage grouse protection zone and not suitable for surface mining.

3. The pit is reclaimed contemporaneously as surface pit/trench and the highwall miner advance to the north.

4. The pit width is limited to between 125-feet and 150-feet so that a truck can pass behind the highwall miner. The amount of surface disturbance will be less using the highwall miner pit layout as compared to a contour cut surface mine.

5. The highwall pit mine can be extended north to the proposed underground mine face up. The initial entries of the underground mine can be developed using the highwall miner, followed by a continuous miner to establish crosscuts, and a roof bolter.

Mr. Thomas Ungurean of **ACD** contacted Dr. David Newman of **Appalachian Mining & Engineering, Inc.** (**AME**) and authorized the investigation into the feasibility of mining the Smirl seam using a highwall miner and to determine the appropriate widths for the web pillars and barrier pillars.

II. Approach and Methodology

ACD provided **AME** with background information and geotechnical data on the Smirl seam and the overburden. The information includes;

1. The surface pit map and overburden thickness contours as shown in Appendix I,

2. A Seegmiller[1] report in which the cohesion, friction angle, and overburden geotechnical data is documented in the determination of a stable highwall geometry,

3. Geologist and drillers' logs of core holes drilled on the Coal Hollow property, and

4. A **CMT Engineering Laboratories, Inc.** (**CMT**) report on the uniaxial compressive strength test results on the Smirl seam and Tropic shale along with indirect tensile strength of the Tropic shale.

---

[1] Seegmiller International, (2008), "Evaluation/Analysis Initial Mining Slope Stability - Coal Hollow Project Kane County, Utah"

Dr. David Newman of **AME** was on site August 27-28, 2013 during which he met with Mr. Larry Johnson, Manager and Mr. Kirk Nicholes, Environment Specialist for **ACD**. The first day was devoted to reviewing the mine history, geology, mine property, and surface mine and underground mine plans at the **ACD** Cedar City office. The second day was spent inspecting ground control conditions in an active and an abandoned pit at the Coal Hollow mine in Alton.

The laboratory uniaxial compressive strength data conducted on coal cubes by **CMT** was reduced to an in-situ compressive strength using equations 1 and 2 as shown in Table 1. The in-situ compressive strength incorporates the effect of coal cleat and is used in web pillar and barrier pillar design and safety factor calculations. The Smirl seam is weak coal based upon the test results and in comparison with the NIOSH default in-situ strength of 900 lb/in^2.

Reduction of Laboratory Strength to In-Situ Pillar Strength

$$K = \sigma_c * D^{0.5} \qquad \text{Eq. 1}$$

$$\sigma_1 = K/6 \text{ or } K/h^{0.5} \qquad \text{Eq. 2}$$

Where: K = Gaddy's K factor,
σ_c = laboratory uniaxial compressive strength (lb/in^2),
D = the edge dimension of the coal cube (in), and
σ_1 = in-situ coal strength = $K/6$ for $h > 36$ inches
and $K/h^{0.5}$ for $h < 36$ inches.

Table 1. Laboratory and In-Situ Strength of the Smirl Seam

Alton Coal Development, LLC **Smirl Seam - Coal Hollow Mine** **Uniaxial Compressive Strength Tests**							
Specimen No.	**Specimen Length (in.)**	**Specimen Width (in.)**	**Failure Load (lbs.)**	**Uniaxial Compressive Strength (lb/in^2)**	**Gaddy's K Factor**	**In-Situ Coal Strength (lb/in^2)**	**Remarks**
1	2.039	1.567	6,054	1,895	2,544	424	
2	1.988	1.897	7,340	1,946	2,713	452	
3	1.885	1.719	8,115	2,504	3,362	560	
4	2.014	1.782	5,020	1,399	1,927	321	
5	1.756	1.828	8,974	2,796	3,742	624	
6	1.716	1.744	10,014	3,346	4,401	734	
7	1.699	1.944	10,040	3,040	4,103	684	
8	1.750	1.758	10,072	3,274	4,336	723	
9	2.150	1.900	12,480	3,055	4,347	725	
Test Statistics							
		Average		2,584	3,497	583	
		Standard Deviation		691	914	152	

Highwall miner web pillar stability is evaluated by considering each web as a long, narrow pillar and calculating the web pillar strength using the Mark/Bieniawski pillar strength formula (equation 3). The overburden stress on each web is calculated using the well-accepted tributary area formula (equation 4). Both equations are shown in their complete form. However, because the pillar length in a highwall web or barrier pillar is much greater than the pillar width, the length is omitted and the actual equation as used for a highwall miner is shown with a ------ through the omitted terms.

Mark/Bieniawski Pillar Strength Equation

$$\sigma_p = \sigma_1 (0.64 + 0.54(w/h) - \cancel{(0.18*(w^2/hl))}) \qquad \text{Eq. 3}$$

Where:

- σ_p = pillar strength (lb/in^2),
- σ_1 = in-situ coal strength (lb/in^2),
- w = the least pillar dimension or width (feet),
- h = the mining height (feet), and
- l = the greatest pillar dimension or length (feet).

Web Pillar Stress - Tributary Area Equation

$$S_p = \frac{(1.1*H)*(w + B)*(l + B)}{(w)(l)} \qquad \text{Eq. 4}$$

Where: S_p = pillar stress (lb/in^2),
H = rock overburden depth (feet),
w = web pillar width (feet),
B = HWM cut width (feet) = 12-feet, and
l = web pillar length (feet).

The results of the web pillar and barrier stability analysis are shown below in Tables 2 and 3.

Table 2. Web Pillar and Barrier Pillar Widths for a 1.60 Safety Factor

Input Data

Highwall Miner Cut Width (W_E)	12.00	feet
In-Situ Coal Strength	583	lb/in^2
Number of cuts between barriers	10	
Coal Seam Height	15.00	feet
Highwall Mine Cut Depth (L_E)	1,000	feet

Alton Coal Development, LLC. - Coal Hollow Mine
Web Pillar and Barrier Pillar Safety Factors - Smirl Seam

Web Pillar Width W_{WP} (feet)	*Barrier Pillar Width W_{BP} (feet)*	*Web Pillar W/H Ratio*	*Overburden Thickness (feet)*	*Web Pillar Overburden Stress (lb/in^2)*	*Barrier Pillar Overburden Stress (lb/in^2)*	*Web Pillar Strength Formula (lb/in^2)*	*Web Pillar Safety Factor*	*Panel Width (feet)*	*Barrier Pillar Width to Height Ratio*	*Barrier Pillar Strength Formula (lb/in^2)*	*Barrier Pillar Safety Factor*
6.50	27.50	0.43	100	313	934	509	1.63	206	1.83	950	1.02
7.25	30.00	0.48	110	321	989	525	1.63	215	2.00	1,003	1.01
8.00	33.00	0.53	120	330	1,032	541	1.64	225	2.20	1,065	1.03
8.50	35.00	0.57	130	345	1,089	551	1.60	232	2.33	1,107	1.02
9.25	37.00	0.62	140	354	1,154	567	1.60	240	2.47	1,149	1.00
10.00	40.00	0.67	150	363	1,196	583	1.61	250	2.67	1,212	1.01
11.00	43.00	0.73	160	368	1,248	604	1.64	262	2.87	1,275	1.02
11.50	45.00	0.77	170	382	1,303	614	1.61	269	3.00	1,317	1.01

Adequate safety factors
Web pillar SF > 1.60
Barrier pillar SF > 1.00

Table 3. Web Pillar and Barrier Pillar Widths for a 1.80 Safety Factor

Input Data

Highwall Miner Cut Width (W_E)	12.00	feet
In-Situ Coal Strength	583	lb/in^2
Number of cuts between barriers	10	
Coal Seam Height	15.00	feet
Highwall Mine Cut Depth (L_E)	1,000	feet

Alton Coal Development, LLC. - Coal Hollow Mine
Web Pillar and Barrier Pillar Safety Factors - Smirl Seam

Web Pillar Width W_{WP} (feet)	*Barrier Pillar Width W_{BP} (feet)*	*Web Pillar W/H Ratio*	*Overburden Thickness (feet)*	*Web Pillar Overburden Stress (lb/in^2)*	*Barrier Pillar Overburden Stress (lb/in^2)*	*Web Pillar Strength Formula (lb/in^2)*	*Web Pillar Safety Factor*	*Panel Width (feet)*	*Barrier Pillar Width to Height Ratio*	*Barrier Pillar Strength Formula (lb/in^2)*	*Barrier Pillar Safety Factor*
7.25	28.00	0.48	100	292	948	525	1.80	213	1.87	961	1.01
8.25	30.50	0.55	110	297	1,013	546	1.84	225	2.03	1,013	1.00
9.00	33.00	0.60	120	308	1,068	562	1.82	234	2.20	1,065	1.00
9.75	35.50	0.65	130	319	1,123	578	1.81	243	2.37	1,118	1.00
10.50	38.50	0.70	140	330	1,166	593	1.80	253	2.57	1,181	1.01
11.50	41.00	0.77	150	337	1,229	614	1.82	265	2.73	1,233	1.00
12.25	43.50	0.82	160	348	1,284	630	1.81	274	2.90	1,286	1.00
13.00	46.00	0.87	170	360	1,337	646	1.80	283	3.07	1,338	1.00

Adequate safety factors
Web pillar SF > 1.80
Barrier pillar SF > 1.00

Although the web pillar widths in Tables 2 and 3 meet the required pillar safety factor criterion, the pillar width/height ratio is very low. The minimum width/height ratio approximates 1.00. Therefore, a finite element model (FEM) analysis of pillar stability was done using the Rocscience Phase2 program.

The input data for the FEM analysis was obtained from the data presented in the **Seegmiller** report and the **CMT** reports. Two overburden end points were established at 100-feet and 150-feet. Initially, a 7.5-foot wide web pillar was evaluated for the typical 10-cut panel. The cuts are 12-feet wide and 12-feet high, leaving a 3-foot section of "head" coal as the immediate roof. It is clear from the tensile strength (80 lb/in^2 average strength) that the Tropic shale is not self-supporting over a 12-foot wide span.

The results of the initial FEM run are shown in Figure 1. It is clear from the strength factor that approximates a safety factor that the;

1. "Head" coal immediate roof will be stable over the short-term and
2. Pillar webs are likely to fail at mid-height as the safety factor drops below 1.00.

Figure 1. 7.5-Foot Wide Web Pillars Under 100-Feet of Overburden.

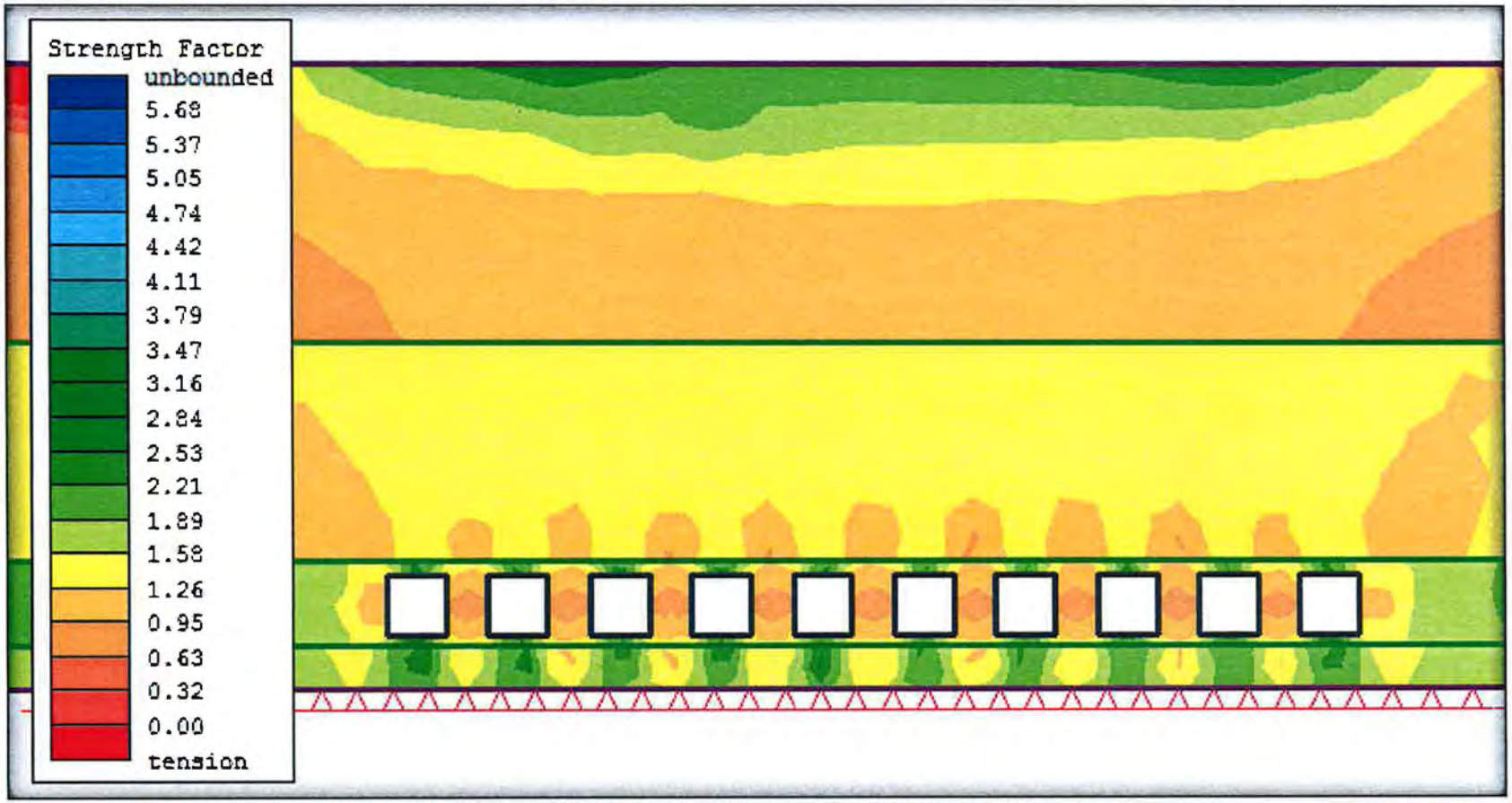


Figure 2. 8.5-Foot Wide Web Pillars Under 100-Feet of Overburden.

The web pillar was increased to 8.5-feet (Figure 2) with the same conclusion that the web pillars are likely to fail at mid-pillar.

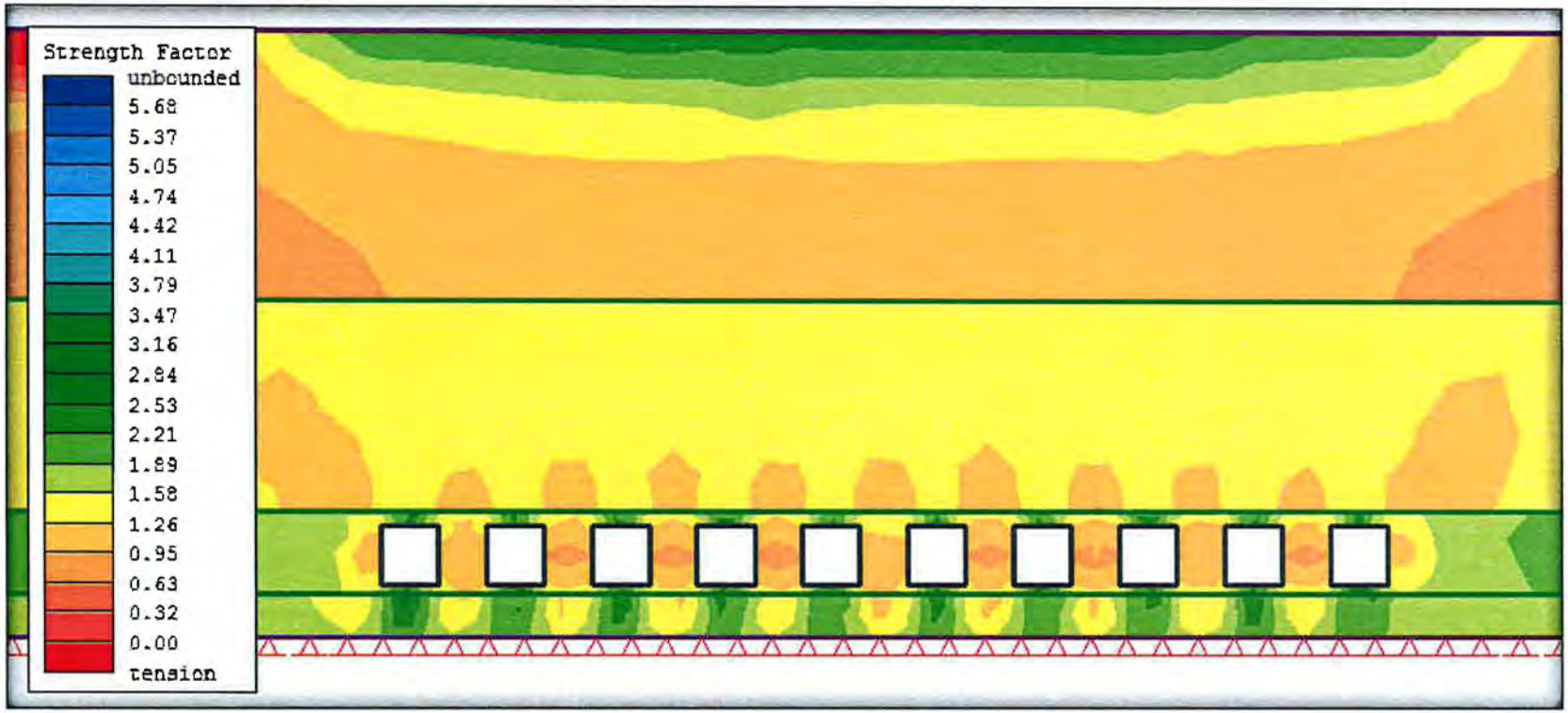


Figure 3. 10.0-Foot Wide Web Pillar Under 100-Feet of Overburden.

At a 10-foot web width, the safety factor at mid-pillar height improves but not to the point where all nine webs can be considered as stable. The mid-height safety factor in six of nine webs is still between 0.63 and 0.95 while in the remaining three webs the safety factor is between 1.26 and 0.95. This is insufficient to ensure pillar stability during the roughly two production shifts that the highwall miner will be in a cut let along the approximately twenty shifts required to complete a ten cut panel.

A 12-foot wide web pillar and 30-foot wide barrier pillar were evaluated at 100-feet and 150-feet. At 100-feet the 12-foot web pillar shows short-term stability with a safety factor ranging between 1.26 and 1.58 as shown in Figures 4 and 5. The "head" coal stability also improves with the increased web pillar width.

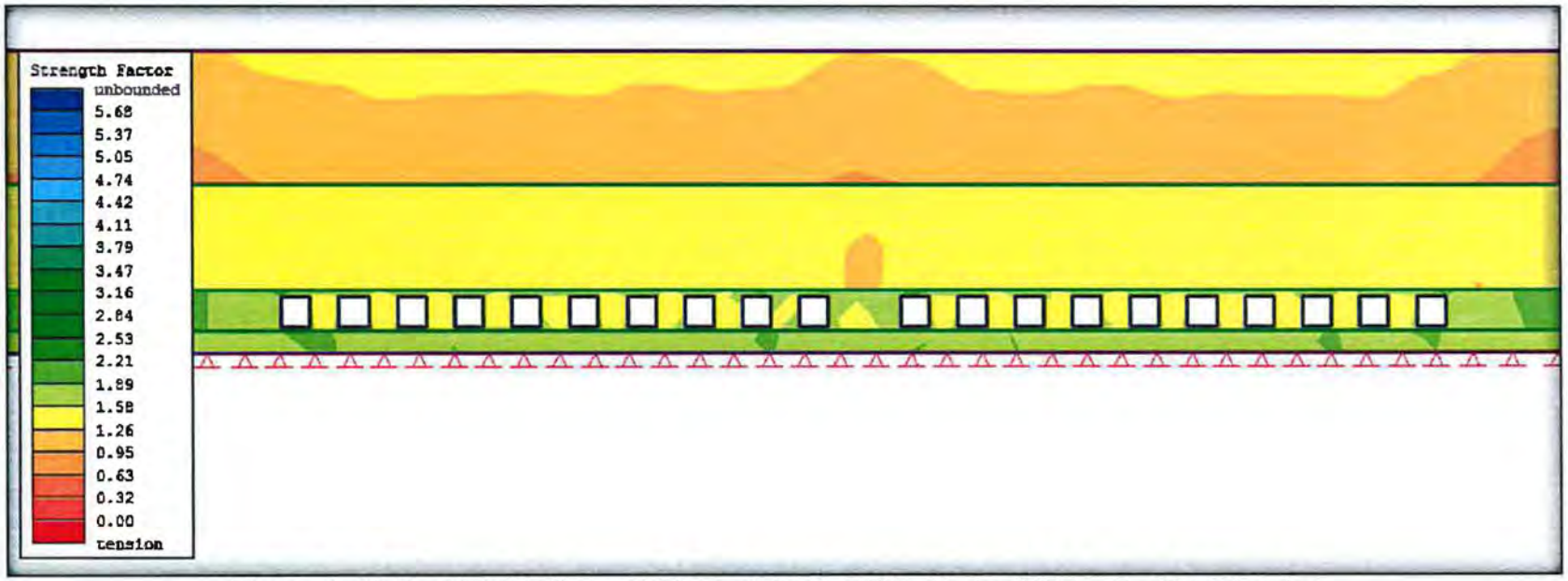


Figure 4. 12-Foot Web Pillar and 30-Foot Barrier Pillar Under 100-Feet of Overburden.

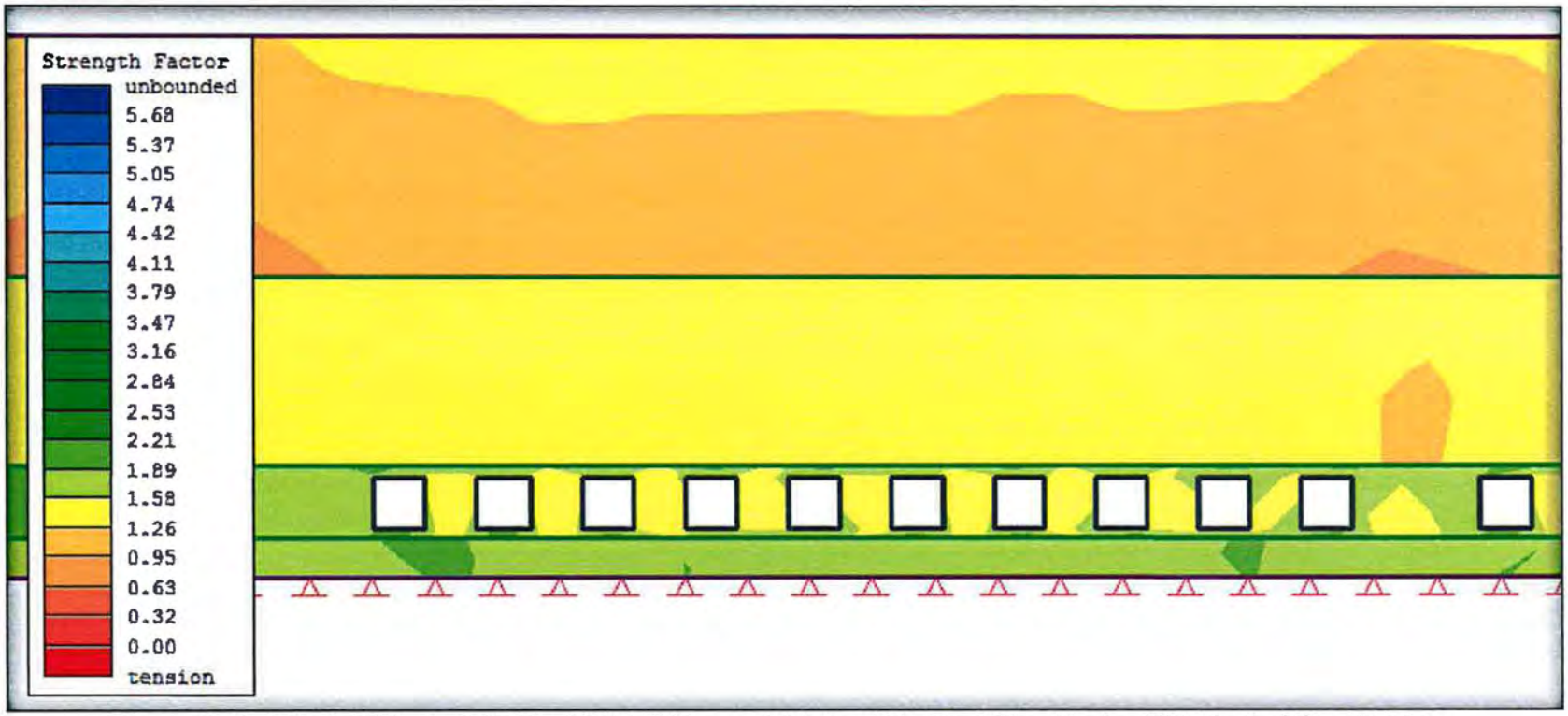


Figure 5. Detailed of View of 12-Foot Web Pillar and 30-Foot Barrier Pillar Under 100-Feet of Overburden.

However, the stability of the interior web pillars decrease when the overburden thickness is increased to 150-feet. In this area, the web pillar safety factor ranges between 0.95 and 1.26 which is marginally stable. At 150-feet of overburden, the interior web pillars may be sufficiently stable to permit the 10-cut panel to be extract prior to crushing. The 30-foot barrier pillar appears adequate to isolate ground conditions in the adjacent panel from the active panel. These comments are more clearly illustrated in Figures 6 and 7.

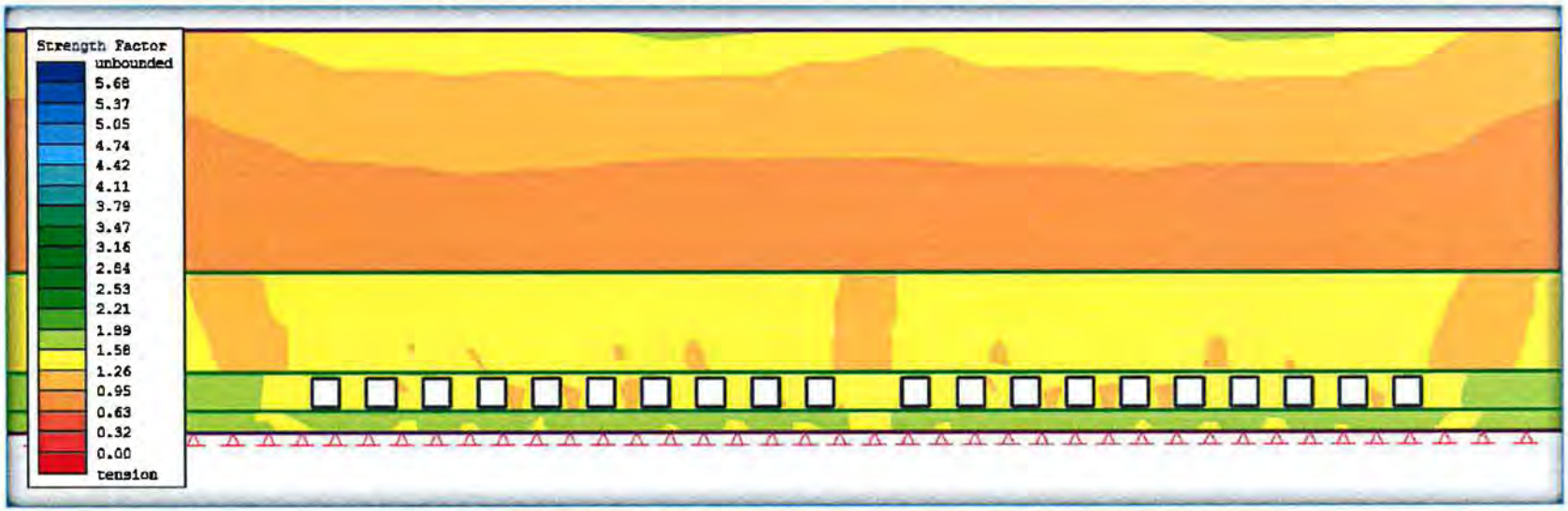


Figure 6. 12-Foot Web Pillar and 30-Foot Barrier Under 150-Feet of Overburden.

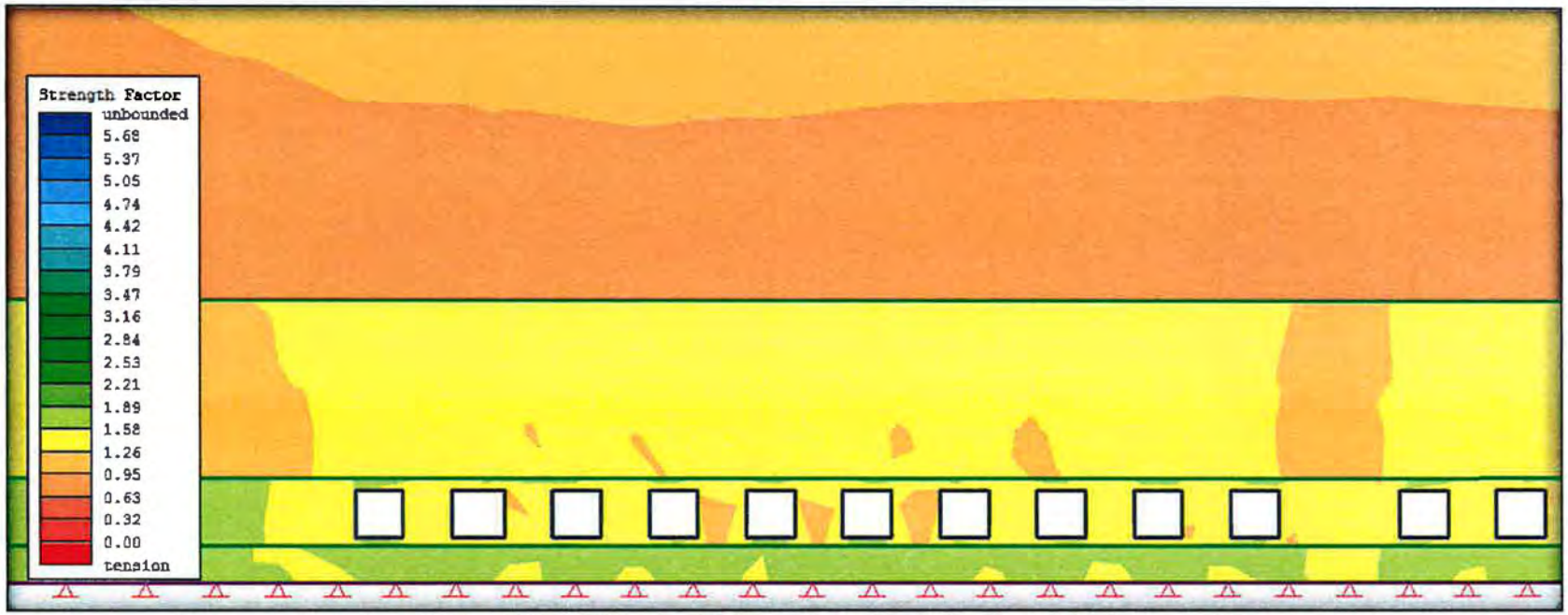


Figure 7. Detail of 12-Foot Web Pillar and 30-Foot Barrier Pillar Under 150-Feet of Overburden.

As would be anticipated, the combination of a 15-foot wide web pillar and 30-foot barrier pillar provide a more uniform range of short-term stability (1.26 - 1.58) to medium-term stability (1.58-1.89). This is illustrated in Figures 8 and 9.

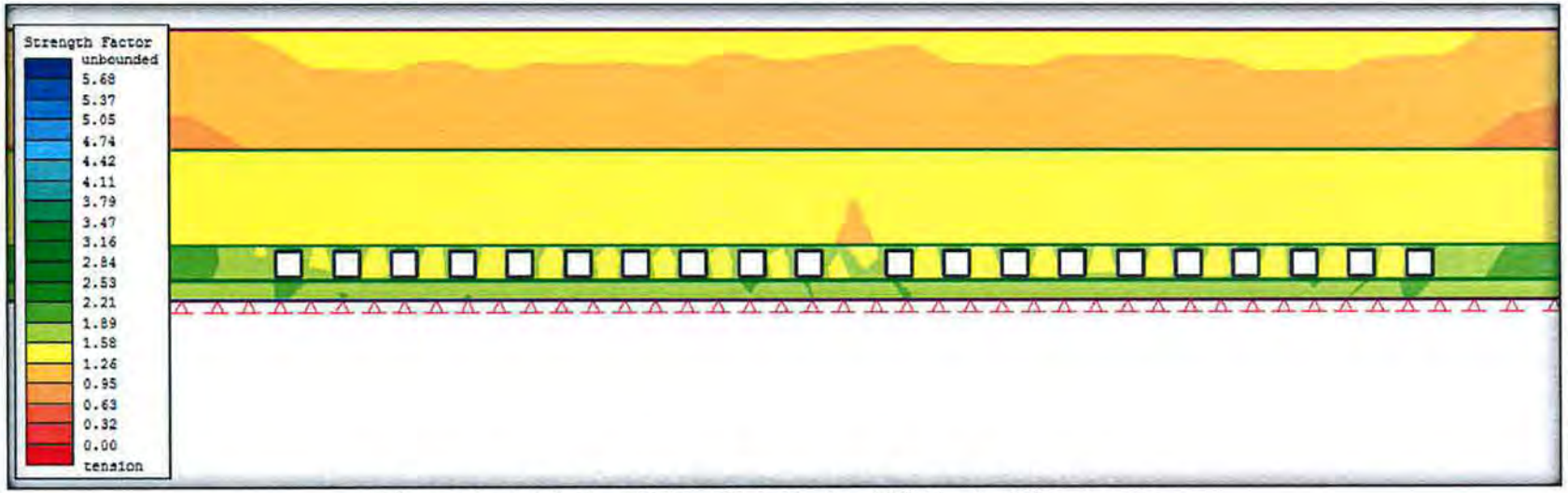


Figure 8. 15.0-Foot Wide Web Under 100-Feet of Overburden.

Figure 9. Detail of 15-Foot Web Pillar and 30-Foot Barrier Pillar Under 100-Feet of Overburden.

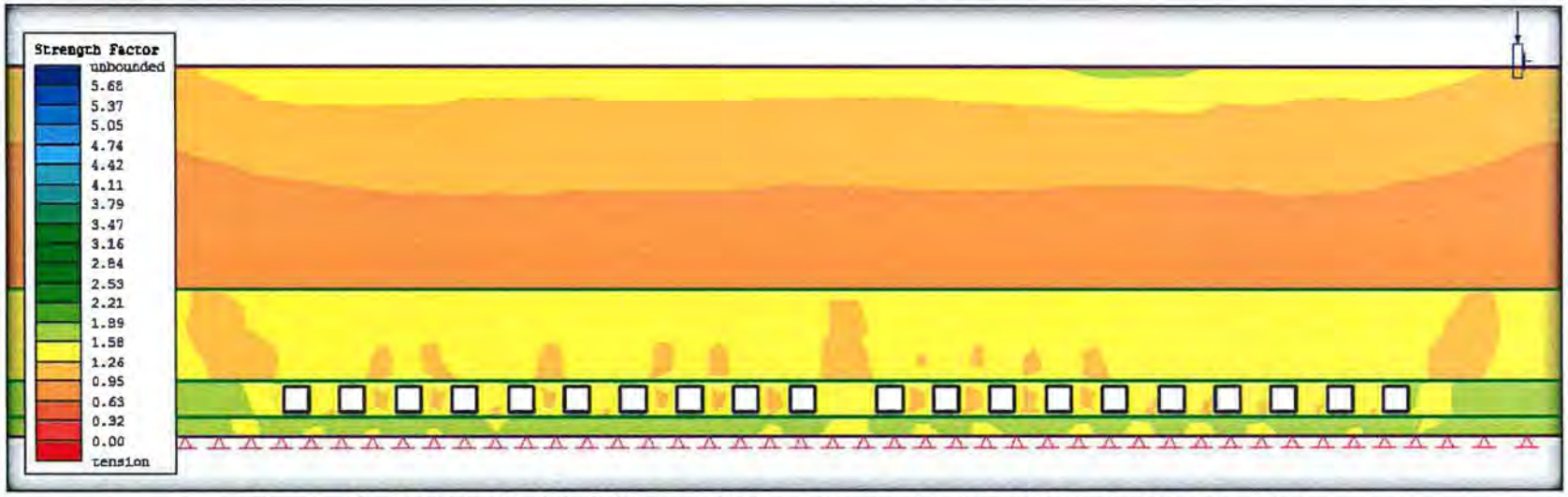


Figure 10. 15.0-Foot Wide Web and 30-Foot Barrier Under 150-Feet of Overburden.

For a 15-foot wide web pillar and 30-foot wide barrier pillar under 150-feet of overburden, the safety factor of the interior web pillars drop to the marginal range of 0.95-1.26. This area of lower safety factor is located within the pillar core. It is clear from examining Figures 10 and 11 that the web pillar stability increases as the cut sequence works away from the barrier pillar toward the solid coal (see the right side panel in Figure 10). However, when highwall mining begins on the adjacent panel, the safety factor of the last set of web pillars will decrease as does the safety factor of the first five web pillars of the adjacent panel.

There are two approaches to avoid the circumstances illustrated in Figures 10 and 11. The first is to increase the barrier pillar width and the second is to increase the web pillar width to 18-feet. The latter is shown in Figures 12 and 13.

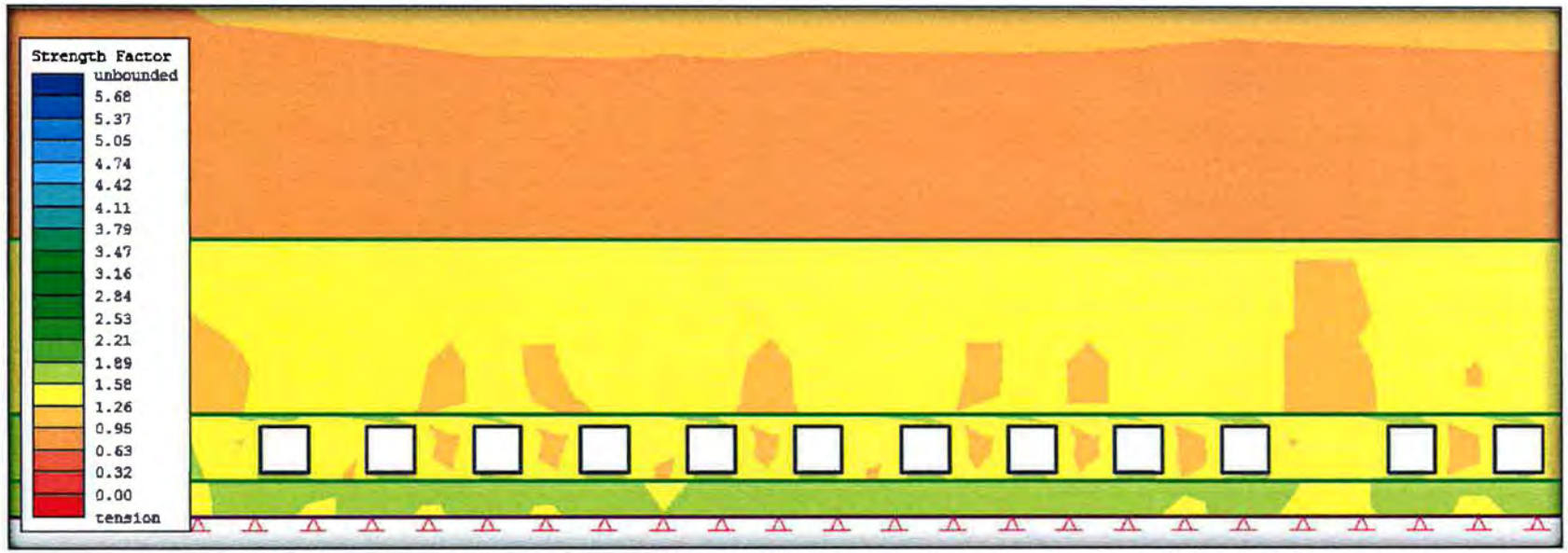


Figure 11. Detailed View of 15-Foot Web Pillar and 30-Foot Barrier Pillar Under 150-Feet of Overburden.

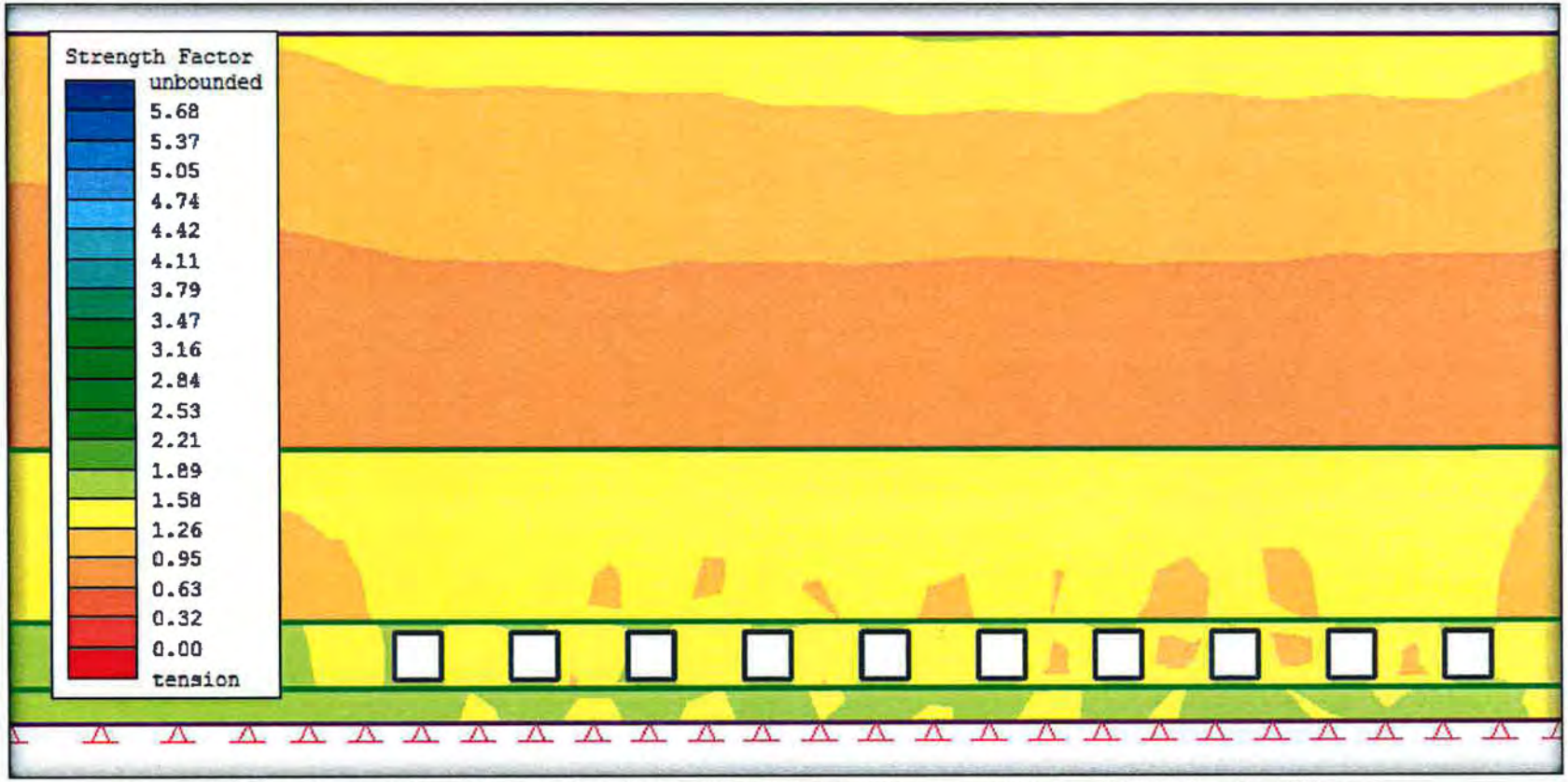


Figure 13. Detailed View of the 18-Foot Wide Web Pillars and 36-Foot Wide Barrier Pillar.

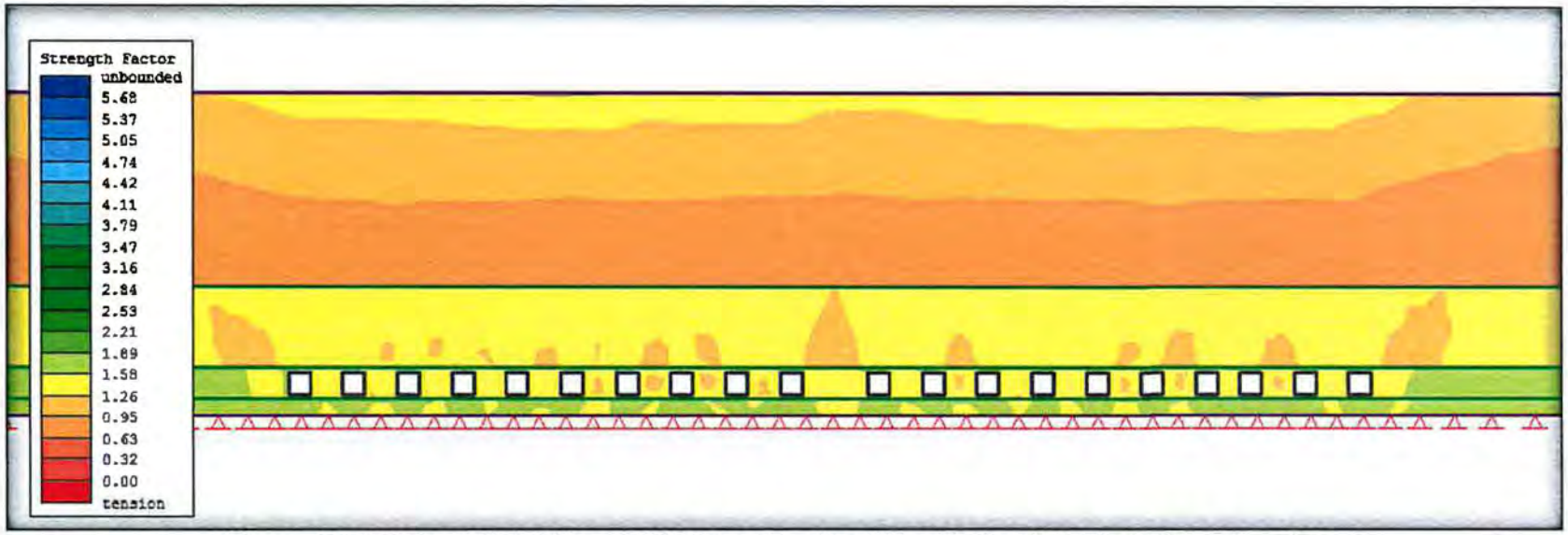


Figure 12. 18-Foot Web Pillar and 36-Foot Barrier Pillar Under 150-Feet of Overburden.

The last series of FEM runs was made for an 18-foot wide web pillar and a 36-foot wide barrier pillar. The purpose was examining stability at width/height ratios of 1.5 for the web pillar and 2.0 for the barrier pillar. As shown in Figures 12 and 13 the web pillar safety factors of the second panel are generally within the short-term range of 1.26 to 1.58.

III. Conclusions and Recommendations

The conclusions of the feasibility analysis of using a highwall miner to extract cuts 12-feet x 12-feet in the Smirl seam at overburden depths ranging between 100-feet and 150-feet are that;

1. The Tropic shale cannot be used as the immediate roof because the lithology is not sufficiently strong to span the 12-cut and it is susceptible to moisture dependent deterioration.

2. The Smirl coal appears to be stable as an immediate roof when a 3-foot thick unit is left as "head" coal.

3. Web pillar stability is controlled by the weak compressive strength of the Smirl seam and by the pillar geometry. The failure mode appears to start as a mid-pillar crushing or collapse if an undersized web pillar is used.

4. A 12-foot wide web pillar (1.00 width/height ratio) appears to be the minimum dimension that should provide short-term stability under 100-feet of overburden. A 30-foot wide barrier pillar appears to provide sufficient stability to isolate each panel of 10 highwall miner cuts from the adjacent panels.

5. For 150-feet of overburden, the web pillar width should be increased to 18-feet. A 15-foot wide web pillar may be viable if the barrier pillar were increased to further isolate the panels. The web pillar safety factor appears to stabilize at an 18-foot wide web. Examining the pillar safety factors of the barrier pillars, it appears unlikely that wider pillars will produce higher stability. After a stable pillar geometry is achieved, pillar stability is then controlled by the in-situ compressive strength of the Smirl seam.

6. A barrier pillar should be left between each group of ten highwall miner cuts. The leaving of a barrier pillar is a well-established mining practice to prevent ground control problems encountered in one area of the highwall from extending over large distances.

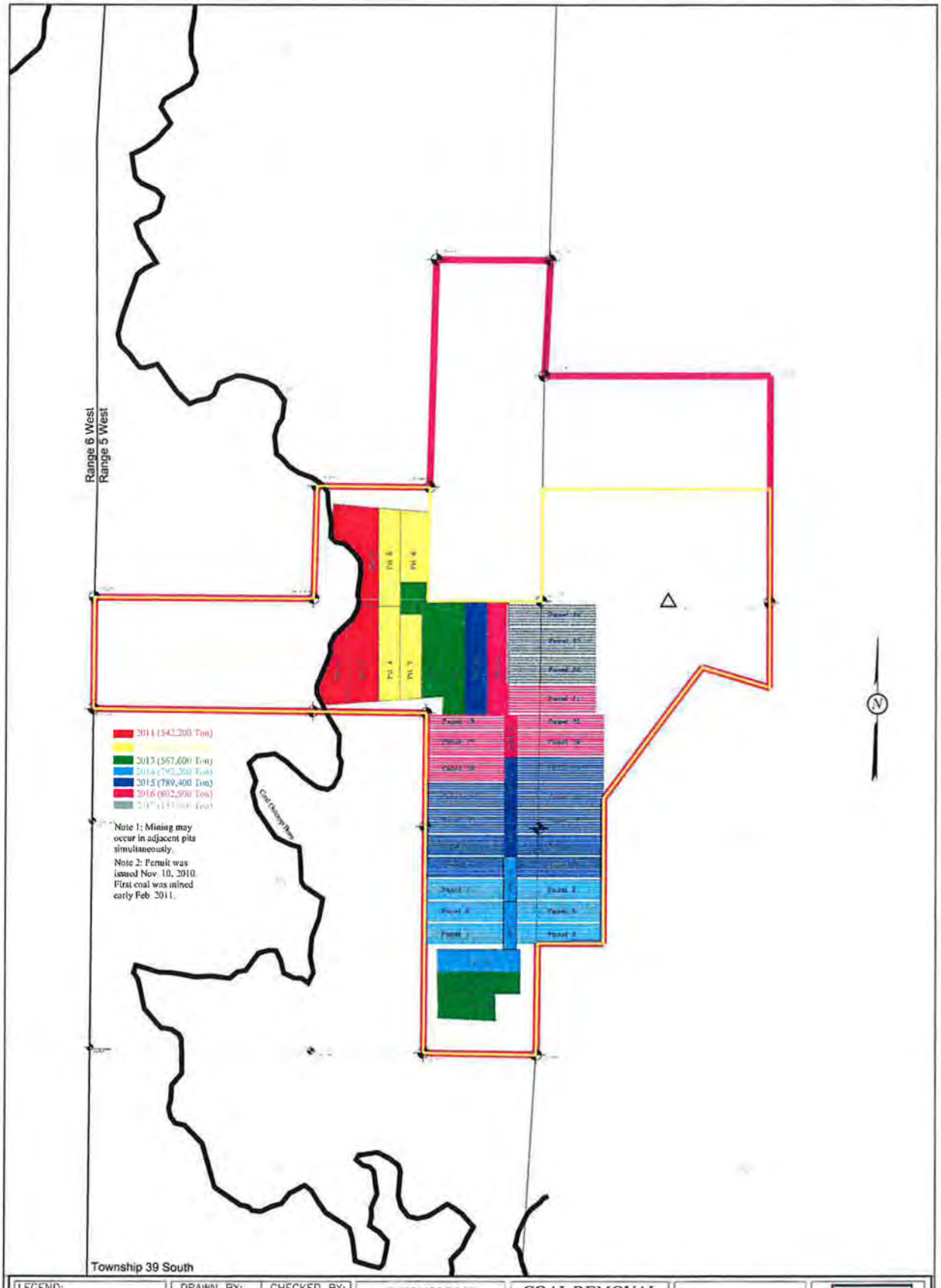
7. The moisture sensitivity of the Smirl seam immediate floor (Dakota formation) must be determined. Water should not be allowed to accumulate in the active pit or abandoned HWM cuts. Water should be diverted to a sump and immediately pumped out of the pit after a rainfall event. A diversion ditch should be cut around the perimeter of highwall to keep surface runoff from eroding the alluvium and running down the highwall. The abandoned highwall miner cuts within the active panel should be barricaded with spoil material to prevent the migration of water into the cut. Complete backfilling of an abandoned pit should be accomplished as soon as feasible after the completion of mining.

8. The web pillar safety factors are based upon the width of the webs as listed. Consequently, for the web to function as shown designed, attention must be focused on maintaining a uniform width without deviation. The angular orientation and offset distance of each highwall miner cut must be surveyed to insure that the current cut is parallel to the previous cut. For example, an error of 0°21'29" in aligning a 5-foot wide web will permit the end of a 600 foot long cut to intersect with the previous cut.

9. A guidance system is strongly recommended to ensure uniform web pillar widths. Similarly, gamma meter mounted on the continuous miner is strongly recommended to ensure the 3-foot "head coal" thickness is left.

Appendix I

Plan View Map of the Surface Mine Pit Layout at the Coal Hollow Mine



LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- COAL RECOVERY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-10A	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
9/16/08	CRM
02/24/11	JKSR
06/28/11	KN
01/16/13	KN
03/18/13	KN
10/15/13	KN

COAL REMOVAL SEQUENCE

SURFACE & HIGHWALL MINING

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-10A

463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

Appendix 2

Sample Data Test Results

CMT ENGINEERING LABORATORIES
Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

August 27, 2013

Alton Coal Development
463 N 100 W Suite 1
Cedar City, UT 84721

Compressive Strength of Coal

Customer: **Alton Coal**
Project: **6243-Highwall Strength**
Date Cast:
Identification:

TEST DATA

Lab #	Break Date	Age	Width In.	Length In.	Area Sq. In.	Total Load lbs.	Strength PSI
390504a	8/27/13		1.567	2.039	3.195	6054	1895
390504b	8/27/13		1.897	1.988	3.771	7340	1946
390504c	8/27/13		1.719	1.885	3.240	8115	2504
390504d	8/27/13		1.782	2.014	3.589	5020	1399
390504e	8/27/13		1.828	1.756	3.210	8974	2796
390504f	8/27/13		1.744	1.716	2.993	10014	3346
390504g	8/27/13		1.944	1.699	3.303	10040	3040
390504h	8/27/13		1.758	1.750	3.077	10072	3274
390504i	8/27/13		1.900	2.150	4.085	12480	3055
Average							2584
Standard Deviation							691

Sincerely,

Manager

CMT ENGINEERING LABORATORIES

Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

Date: August 28, 2013

ASTM D3967, Splitting Tensile Strength of Intact Rock Core Specimens

Client: Alton Coal

Project No: 6243 Project Name: Highwall Strength

Description: UG001 Specified PSI:

Curing Type: Dry: X Wet:

Remarks: Moisture Content-As Received

Core #	Lab #	Diameter Inches	Length inches	Area Inches^2	Length / Diameter Ratio	Correction Factor	Load in Pounds	Corrected Psi	Identification
1	390503l	2.43	2.23	4.64	0.92		280	33	
2	390503m	2.06	3.76	3.33	1.83		930	76	
3	390503n	2.32	2.18	4.22	0.94		320	40	
4	390503o	2.41	3.74	4.55	1.55		310	22	
5	390503p	2.37	3.99	4.40	1.68		201	14	
6	390503q	2.34	2.59	4.30	1.10		313	33	
7									
8									
9									
10									
Averages								**40** psi	Standard Deviation, psi: 21.8

Manager

CMT ENGINEERING LABORATORIES

Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

Date: August 28, 2013

Compressive Strength of Drilled Intact Rock Cores

Client: Alton Coal

Project No: 6243 Project Name: Highwall Strength

Description: UG001 Specified PSI:

Curing Type: Dry: X Remarks:
Wet:

Core #	Lab #	Diameter Inches	Height inches	Area Inches^2	Length / Diameter Ratio	Correction Factor	Load in Pounds	Corrected Psi	Identification
1	390502k	2.25	3.40	3.97	1.51	0.96	4,850	1170	
2	390502l	2.40	4.26	4.52	1.78	1.00	795	180	
3	390502m	2.37	3.92	4.41	1.66	0.97	361	80	
4	390502n	2.25	3.13	3.97	1.39	0.95	2,610	620	
5	390502o	2.26	2.46	4.02	1.09	0.89	356	80	
6	390502p	2.61	2.95	5.36	1.13	0.90	580	100	
7									
8									
9									
10									
Averages								**370** psi	Standard Deviation, psi: 442.6

Manager

CMT ENGINEERING LABORATORIES

Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

Date: August 28, 2013

ASTM D3967, Splitting Tensile Strength of Intact Rock Core Specimens

Client: Alton Coal

Project No: 6243 Project Name: Highwall Strength

Description: AG014 Specified PSI:

Curing Type: Dry: X Remarks: MC-As Received

Wet:

Core #	Lab #	Diameter Inches	Length inches	Area Inches^2	Length / Diameter Ratio	Correction Factor	Load in Pounds	Corrected Psi	Identification
1	390503g	2.42	2.31	4.60	0.95		75	9	
2	390503h	2.41	2.56	4.56	1.06		118	12	
3	390503i	2.33	4.44	4.27	1.90		344	21	
4	390503j	2.48	4.44	4.82	1.79		351	20	
5	390503k	2.48	4.54	4.84	1.83		338	19	
6									
7									
8									
9									
10									
Averages								**20** psi	Standard Deviation, psi: 5.6

Manager

CMT ENGINEERING LABORATORIES

Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

Date: August 28, 2013

ASTM D3967, Splitting Tensile Strength of Intact Rock Core Specimens

Client: Alton Coal

Project No: 6243 Project Name: Highwall Strength

Description: AG004 Specified PSI:

Curing Type: Dry: X Remarks:
Wet:

Core #	Lab #	Diameter Inches	Length inches	Area Inches^2	Length / Diameter Ratio	Correction Factor	Load in Pounds	Corrected Psi	Identification
1	390503a	2.37	2.28	4.42	0.96		1,205	142	
2	390503b	2.38	3.91	4.45	1.65		835	57	
3	390503c	2.42	2.85	4.61	1.18		711	66	
4	390503d	2.36	3.01	4.37	1.28		1,004	90	
5	390503e	2.42	3.15	4.60	1.30		1,090	91	
6	390503f	2.32	3.39	4.22	1.46		515	42	
7									
8									
9									
10									
Averages								**80** psi	Standard Deviation, psi: 35.3

Manager

CMT ENGINEERING LABORATORIES
Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

Date: August 28, 2013

Compressive Strength of Drilled Intact Rock Cores

Client: Alton Coal

Project No: 6243 Project Name: Highwall Strength

Description: AG004 Specified PSI:

Curing Type: Dry: X Remarks:
Wet:

Core #	Lab #	Diameter Inches	Height inches	Area Inches^2	Length / Diameter Ratio	Correction Factor	Load in Pounds	Corrected Psi	Identification
1	390502a	2.39	3.70	4.48	1.55	0.96	1,802	390	
2	390502b	2.40	3.00	4.54	1.25	0.93	1,400	290	
3	390502c	2.38	4.19	4.45	1.76	1.00	2,230	500	
4	390502d	2.31	4.64	4.17	2.01	1.00	980	230	
5	390502e	2.42	3.11	4.58	1.29	0.93	480	100	
6	390503f	2.40	2.55	4.52	1.06	0.88	1,500	290	
7									
8									
9									
10									
Averages								**300** psi	Standard Deviation, psi: 136.5

Manager

CMT ENGINEERING LABORATORIES
Construction • Materials • Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

Date: August 28, 2013

Compressive Strength of Drilled Intact Rock Cores

Client: Alton Coal

Project No: 6243 Project Name: Highwall Strength

Description: AG014 Specified PSI:

Curing Type: Dry: X Remarks:
Wet:

Core #	Lab #	Diameter Inches	Height inches	Area Inches^2	Length / Diameter Ratio	Correction Factor	Load in Pounds	Corrected Psi	Identification
1	390502g	2.39	2.46	4.49	1.03	0.87	616	120	Broken in half prior to testing
2	390502h	2.41	4.18	4.56	1.73	0.98	1,176	250	
3	390502i	2.37	4.08	4.42	1.72	0.98	153	30	cracks on outside before testing
4	390502j	2.38	3.39	4.44	1.43	0.95	1,312	280	
5									
6									
7									
8									
9									
10									
Averages								**170** psi	Standard Deviation, psi: 116.3

Manager

Appendix 7-11	Petersen Hydrologic, LLC hydrologic investigation of mine-water inflows and re-evaluation of sediment pond network
Appendix 7-12	UPEDS Permit No. UTG040027
Appendix 7-13	Petersen Hydrologic, LLC hydrologic investigation to evaluate the acid/neutralization behavior of groundwater in the coal seam
Appendix 7-14	PHC of Coal Mining in the 85.88-acre New Dame Lease IBC at the Alton Coal Development, LLC Coal Hollow Mine

CHAPTER 7

R645-301-700. HYDROLOGY

711. GENERAL REQUIREMENTS

711.100 – 711.500 Contents

This chapter provides a description of the hydrology and hydrogeology of the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area). Specifically, this permit section includes descriptions of existing hydrologic resources according to R645-301-720, proposed operations and potential impacts to the hydrologic balance according to R645-301-730, methods and calculations utilized to achieve compliance with the hydrologic design criteria and plans according to R645-301-740, applicable hydrologic performance standards according to R645-301-750, and reclamation activities according to R645-301-760.

This information is presented in subsequent sections of this chapter and in Appendix 7-1. Appendix 7-1 includes a comprehensive characterization of groundwater and surface-water systems in the proposed Coal Hollow permit and adjacent areas (including the 85.88-acre Dame Lease IBC), recommendations for groundwater and surface-water monitoring, and the results of a field investigation regarding the potential for alluvial valley floors in the proposed Coal Hollow Mine permit and adjacent area. It should be noted that Appendix 7-1 may be updated periodically in the future as additional hydrologic and hydrogeologic data become available.

712 CERTIFICATION

All cross sections, maps, and plans have been prepared per R645-301-512. Compliance with this section has been completed and certifications are available on all Drawings. The cross sections and maps that are included in this permit application and are required to be certified have been prepared by or under the direction of a qualified, registered, professional engineer or a professional geologist, with assistance from experts in related fields such as hydrology, geology and landscape architecture.

713 INSPECTION

Impoundments will be inspected as described under R645-301-514.300. Designs for proposed impoundments in the proposed Coal Hollow permit area are shown in Drawings 5-25 through 5-31 and Appendices A5-1 and A5-2. No impoundments or sedimentation

ponds meeting the size or other qualifying criteria of MSHA, 30 CFR 77.216(a) exist or are planned within the proposed Mine Permit Area.

A professional engineer or specialist experienced in the construction of impoundments will inspect impoundments. Inspections will be made regularly during construction, upon completion of construction, and at least yearly until removal of the structure or release of the performance bond. The qualified registered professional engineer will promptly, after each inspection, provide to the Division, a certified report that the impoundment has been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules. The report will include discussion of any appearances of instability, structural weakness or other hazardous conditions, 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. A copy of the report will be retained at or near the mine site.

720 ENVIRONMENTAL DESCRIPTION

721 GENERAL REQUIREMENTS

The existing, pre-mining hydrologic resources within the permit and adjacent areas that may be affected by coal mining and reclamation operations (including the 85.88-acre Dame Lease IBC) are described in Appendix 7-1 and are summarized below.

Groundwater Resources

A spring and seep survey of the proposed Coal Hollow Mine permit and surrounding area (that includes the 85.88-acre Dame Lease IBC) has been conducted by Petersen Hydrologic, LLC (see sub-appendix B of Appendix 7-1). The locations of springs and seeps in the proposed permit and adjacent area are shown on Drawing 7-1. Seasonal discharge and field water quality measurements for springs and seeps in the proposed Coal Hollow Mine permit and adjacent area have been submitted electronically to the Utah Division of Oil, Gas and Mining Utah Coal Mining Water Quality Database (UDOGM, 2007). Baseline discharge and water quality data for groundwater resources in the proposed Coal Hollow Mine permit and adjacent area are have also been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007). Locations of baseline monitoring stations are shown on Drawing 7-2. Locations of water rights in and adjacent to the proposed Coal Hollow Mine permit area (including the 85.88-acre Dame Lease IBC area) are shown on Drawing 7-3. Water rights data from the proposed Coal Hollow Mine permit and adjacent area are detailed in Appendix 7-3. A plot showing potentiometric levels in alluvial groundwater systems in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC) is presented in Drawing 7-13.

horizon along the eastern margin of lower Sink Valley, no springs or seeps with measurable discharge have been identified in the Tropic Shale. The lack of appreciable groundwater discharge in the Tropic Shale is a result of the poor water transmitting properties of the marine shale unit. While sandstone units occur stratigraphically higher in the Tropic Shale in the surrounding area, in areas proposed for surface mining, the unit present consists of a fairly uniform sequence of soft shale, silty shale, and claystone with minor siltstone horizons. Competent sandstone strata in the Tropic Shale overlying proposed mining areas was not observed during drilling. The Tropic Shale acts as a barrier impeding downward migration of groundwater in the proposed Coal Hollow Mine permit and adjacent area where it is present. The unit also forms a basal confining layer for alluvial groundwater systems in the proposed permit area.

Groundwater discharge from the Dakota Sandstone in the permit and adjacent area is also meager. The Dakota Formation consists of shaley strata interbedded with lenticular, fine- to medium-grained sandstone and coal. Because of the pervasiveness of interbedded low-permeability horizons in the formation and the vertical and lateral discontinuity of sandstone horizons, the potential for vertical and horizontal movement of groundwater is limited. While no springs discharge from the Dakota Formation in the permit area, a spring with a discharge of about 1 gpm and displaying little seasonal variability in discharge (SP-4; Drawing 7-1) discharges from an apparent fault zone in the Dakota Formation approximately 1.1 miles south of the proposed Coal Hollow permit area. Additionally, two seeps with discharges of less than 0.05 gpm (SP-27 and SP-34; Drawing 7-1) seep from the Dakota Formation in lower Sink Valley more than ½ mile south of the proposed Coal Hollow Mine permit area. The results of slug testing performed on wells screened in the Smirl coal seam indicate relatively low values of hydraulic conductivity for the coal seam (Table 7-8). In much of the proposed mining area, the coal seam is dry (UDOGM, 2007). Thus, appreciable migration of groundwater through the Smirl coal seam is not anticipated.

No water wells are known to exist in the Tropic Shale or Dakota Formation in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area), demonstrating the inability of these formations to transmit useful quantities of water to wells. Groundwaters from the Tropic Shale and Dakota Formation do not contribute measurable baseflow to streams in the proposed permit and adjacent area (at least at the surface in stream channels).

Natural groundwater discharge in the permit and adjacent area occurs primarily from alluvial sediments. Alluvial discharge occurs both as discrete springs and seeps (Drawing 7-1) and also locally as diffuse seepage to the surface. Groundwater discharge areas in the proposed Coal Hollow Mine permit and adjacent area are shown on Drawing 7-4 (see also photograph section). The area of most appreciable alluvial groundwater discharge occurs in central Sink Valley in the northwest quarter of Section 29, T39S, R5W (see Drawing 7-4; groundwater discharge area A). The alluvial groundwater system in this area exists under artesian conditions, resulting from the presence of a considerable thickness of sloping, low permeability clayey sediments overlying coarser, water-bearing alluvial sediments at depth (See Drawing 6-3). The artesian alluvial

Surface Water Resources

Surface water resources in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC) are described in Appendix 7-1 and are summarized below.

Surface waters in the proposed Coal Hollow Mine permit and adjacent area are tributary to Kanab Creek. Surface waters in the northern portion of the proposed permit and adjacent area drain into the Robinson Creek and upper Kanab Creek drainages. Surface waters in the southern portion of the proposed permit and adjacent area drain into the Sink Valley Wash drainage which is tributary to Kanab Creek about 6 miles below the proposed Coal Hollow Mine permit area. Surface water drainages in the permit and surrounding areas are shown in Appendix 7-1. Surface water baseline monitoring stations are shown on Drawing 7-2. Locations of surface-water water rights in and adjacent to the proposed Coal Hollow Mine permit and adjacent area are shown on Drawing 7-3. Water rights data from the proposed Coal Hollow Mine permit and adjacent area are detailed in Appendix 7-3.

Information on water quality for groundwaters and surface-waters has been uploaded into the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007) and is summarized and described in Appendix 7-1.

Surface waters in Kanab Creek are used for stock watering and crop irrigation in the irrigable lands adjacent to Kanab Creek west of the proposed Coal Hollow Mine permit area. Discharge in Kanab Creek measured near the town of Alton (SW-1) is seasonally dependent and largely influenced by upstream water use. Discharge in Kanab Creek monitored at SW-1 typically ranges from 10 cfs or less during the springtime runoff period to 1 cfs or less during the summertime.

Discharge in Lower Robinson Creek drainage is meager. Other than during the springtime runoff event in wet years or during torrential precipitation events, flow has not been observed at monitoring stations SW-4 and SW-101 (Drawing 7-2). Discharge at the lower monitoring site on Lower Robinson Creek (SW-5; Drawing 7-2) is meager. The small discharge occasionally present at SW-5 is derived from the seepage of alluvial groundwater into the Lower Robinson Creek stream channel between monitoring sites SW-101 and SW-5.

Tributaries to the Sink Valley Wash drainage in the proposed Coal Hollow Mine permit and adjacent areas include (from north to south) Water Canyon, an unnamed drainage south of Water Canyon in Section 21 T39S, R5W, and Swapp Hollow. Discharge rates in these drainages are highly seasonally dependent (UDOGM, 2007; Appendix 7-1). Discharges in the Water Canyon and Swapp Hollow drainages are intermittent or perennial in nature with discharge peaks occurring during the springtime runoff season and much lower flows occurring during the late summer and fall months. Discharge in the unnamed drainage in Section 21 T39S, R5W is ephemeral.

722 CROSS SECTIONS AND MAPS

722.100 A map showing the locations of springs and seeps in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area) is presented in Drawing 7-1. A map showing potentiometric levels in alluvial groundwater systems in the proposed Coal Hollow and adjacent areas (including the 85.88-acre Dame Lease IBC) is presented in Drawing 7-13. It is important to note that the alluvial groundwater potentiometric contours depicted in Drawing 7-13 are not representative of a laterally or vertically continuous groundwater system. Within the proposed Coal Hollow Mine permit and adjacent area, appreciable portions of the alluvial sediments are not saturated. Additionally, perched groundwater conditions are present in many locations in the alluvium in the area. In other words, the alluvial groundwater systems in the proposed Coal Hollow Mine permit and adjacent area are not a single, interconnected aquifer. Rather, there exist several areas of saturated alluvium, which may or may not be in good hydraulic communication with adjacent areas. Consequently, it is not possible or meaningful to construct a true potentiometric contour map in the strict sense. Consequently, it is not appropriate to evaluate regional potentiometric trends over large distances or to infer precise groundwater flow directions or hydraulic gradients in the alluvial groundwater system based on Drawing 7-13. The alluvial groundwater system potentiometric map presented in Drawing 7-13 is useful for evaluating approximate local potentiometric conditions and general saturation trends.

722.200 Location of surface water bodies

Within the proposed Coal Hollow Mine permit and adjacent area, no significant natural ponds or lakes occur. The locations of springs and streams are shown in Drawing 7-1. Many small earthen impoundments and ponds have been created to store surface-water runoff and spring discharge water for stock watering and irrigation use. Some of these impoundments were created by constructing straight or semi-circular berms across ephemeral surface water drainages to impound surface runoff. Because of the character of the alluvial sediments, some of the ponds have become filled with sediment over time and the holding capacities have diminished. The locations of ponds and associated conveyance ditches are shown on Drawing 7-7.

722.300 Baseline monitoring stations

723 SAMPLING AND ANALYSIS

Water quality sampling and analyses have been and will be conducted according to the "Standard Methods for the Examination of Water and Wastewater" or EPA methods listed in 40 CFR Parts 136 and 434. Information regarding laboratory analytical methods utilized in performing water quality analyses at the analytical laboratories has been submitted to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007).

724 BASELINE INFORMATION

Baseline groundwater, surface-water, geologic, and climatologic data (including information for the 85.88-acre Dame Lease IBC area) are described in Appendix 7-1 and summarized below.

724.100 Groundwater Information

The location of wells and springs in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC) are shown on Drawings 7-1 (Spring and seep survey map), 7-2 (Baseline monitoring locations), and 7-12 (Monitoring well location map). Groundwater rights in and around the proposed Coal Hollow Mine permit area are shown on Drawing 7-3 and tabulated in Appendix 7-3.

Seasonal quality and quantity of groundwater and usage is presented in Appendix 7-1 and UDOGM (2007). Baseline discharge and water quality data have been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality (UDOGM, 2007).

Baseline monitoring of groundwater resources in and around the proposed Coal Hollow permit area have been carried out by several entities. Previous hydrologic studies of the region have been made in the Alton Coal Field area by Goode (1964, 1966), Sandberg (1979), Cordova (1981), and Plantz (1983). Selected hydrologic data collected in conjunction with these studies have been incorporated into the hydrologic analysis and baseline data included in this permit application.

During the 1980's, extensive monitoring of groundwater resources in the proposed permit and surrounding areas was performed by Utah International, Inc. Utah International Inc.'s groundwater monitoring activities included the construction of numerous groundwater monitoring wells, aquifer testing activities, and the performance of discharge, water level, and field and laboratory water quality monitoring of springs, seeps, and wells. These baseline monitoring activities were performed as part of a

724.200 Surface Water Information

The locations of streams, stock watering ponds, and conveyance ditches in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area) are shown on Drawing 7-7. Surface-water rights in and adjacent to the proposed Coal Hollow Mine permit area are shown on Drawing 7-3 and tabulated in Appendix 7-3. Surface-water discharge rates and water quality data have been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality Database (UDOGM, 2007). Additional surface-water information is provided in Appendix 7-1.

It is not anticipated currently that discharge from the proposed Coal Hollow Mine will be necessary. Where necessary, alluvial groundwater that may be intercepted by mining will be placed in drains and diverted away from disturbed areas and discharged (i.e., as groundwater dewatering). However, a Utah UPDES discharge permit will be obtained so that if discharge of mine water becomes necessary, it can be discharged in accordance with the UPDES discharge permit. The exact locations of mine water discharge points will be established upon issuance of the UPDES discharge permit. Any mine discharge water will be placed in either the Lower Robinson Creek drainage or the Sink Valley Wash drainage. Both of these drainages are tributary to Kanab Creek.

As described in R645-301-728.320, acid drainage is not expected from the proposed mining operation. This is due to the pervasiveness of carbonate minerals in the mine environment that will neutralize any acid produced.

Seasonal quality and quantity of groundwater and usage is described herein and in Appendix 7-1. Baseline discharge and water quality data have been submitted electronically to the Utah Division of Oil, Gas and Mining, Utah Coal Mining Water Quality (UDOGM, 2007).

Baseline monitoring of surface-water resources in and around the proposed Coal Hollow permit area have been carried out by several entities. Previous hydrologic studies of the have been made in the Alton Coal Field area by Goode (1964, 1966), Sandberg (1979), Cordova (1981), and Plantz (1983). Selected hydrologic data collected in conjunction with these studies have been incorporated into the baseline data as part of this permit application.

During the 1980's, extensive monitoring of surface water resources in the proposed permit and surrounding areas was performed by Utah International, Inc. Utah International Inc.'s groundwater monitoring activities included the operation of continuous recording stations on selected streams, and the performance of routine surface-water discharge measurements and field and laboratory water quality analyses. These baseline monitoring activities were performed as part of a proposed coal mine permitting action in the Alton Coal Field. Ultimately, the proposed coal mining action did not proceed. Relevant monitoring information from the Utah International, Inc. baseline monitoring activities have been included as supplemental baseline data as part of this permit application. Commencing in the 2nd quarter of 2005, regular quarterly baseline

permit (which is considered unlikely), Alton Coal Development, LLC may when necessary and with the approval of the Utah Division of Oil, Gas and Mining construct supplemental containment and settlement ponds in which mine discharge waters may be held for treatment (where necessary) and subsequent discharge through UPDES discharge points in compliance with the UPDES discharge permit.

724.700 Alluvial Valley Floor Determination

A field investigation has been performed in the proposed Coal Hollow Mine permit and adjacent area to provide to the Division the information required to make an evaluation regarding the existence of a probable alluvial valley floor in the proposed Coal Hollow Mine permit and adjacent area. The results of this field investigation and related information is provided in Appendix 7-1. Additional information regarding potential alluvial valley floors in the area is provided in Appendix 7-7.

A report detailing the findings of a previous field investigation performed by Water Engineering & Technology, Inc., entitled "Geomorphological and sedimentological characteristics of Sink Valley, Kane County, Utah" is included as Appendix 7-4.

725 BASELINE CUMULATIVE IMPACT AREA INFORMATION

Appendix 7-1 contains the results of a comprehensive investigation of groundwater and surface-water systems in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area). Appendix 7-1 also includes information regarding the probable hydrologic consequences of coal mining in the proposed Coal Hollow Mine permit area and recommendations for hydrologic monitoring. Appendix 7-1 also includes the results of a field investigation performed in the proposed Coal Hollow Mine permit and adjacent area to provide to the Division of Oil, Gas and Mining the information required to make an evaluation regarding the existence of a probable alluvial valley floor in the proposed Coal Hollow Mine permit and adjacent area. This Information together with the information submitted herein can be used to assess the probable cumulative hydrologic impacts of coal mining and reclamation operations in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area) as required by R645-301-729.

R645-301-726 Modeling

No numerical models have been created for the permit area nor are any planned.

727 ALTERNATIVE WATER SOURCE INFORMATION

This section provides information on the alternative water source that will be used to replace water from groundwaters or surface waters should they be impacted by mining and reclamation activities in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre Dame Lease IBC area).

The alternative water source is a water production well planned for construction on private land leased by Alton Coal Development, LLC in the northwest quarter of Section 29, Township 39 South, Range 5 West. The planned location for the well, which is situated within the proposed Coal Hollow Mine permit area, is shown on Drawing 5-8C. The well will produce water from the alluvial groundwater system in Sink Valley in locations up-gradient of proposed mining operations. Based on aquifer testing performed in the alluvial groundwater system near the proposed water well (using the existing well Y-61 as a pump testing well), it is believed that adequate water can be produced from the new well to satisfy the potential water replacement needs of the mine. Details of the aquifer testing and information on the hydrogeologic characteristics of the Sink Valley alluvial groundwater system are presented in Appendix 7-1.

Water quality data from the Sink Valley alluvial groundwater system near the location of the proposed new water well have been collected from well Y-102 and have been submitted electronically to the Utah Division of Oil, Gas and Mining Utah Coal Mining Water Quality Database (UDOGM, 2007). It is anticipated that the quantity and quality of water produced from the new water production well will be suitable for the existing premining uses and approved postmining land uses.

It should be noted that the proposed water replacement well source will produce water from the coarse-grained alluvial groundwater system in Sink Valley. Nearby springs that could potentially be impacted by mining and reclamation activities are supported by the same alluvial groundwater system. However, while modest decreases in the artesian hydraulic pressures in the alluvial groundwater system could potentially result in diminution of spring flows, the planned new water well will likely be approximately 100 feet deep and will be equipped with an electric well pump giving it the capacity to produce groundwater from the alluvial system even if the hydraulic head in the area were to be diminished such that artesian flow conditions temporarily ceased to exist.

An analysis of the total average discharge of state appropriated groundwaters from the permit and adjacent area has been performed to determine whether the quantity of water that could likely be produced from the new water replacement well will be adequate for potential replacement needs. Based on baseline spring discharge data submitted to the Division (UDOGM, 2007), it is determined that the average discharge of all state appropriated groundwater from groundwater discharge area A (Drawing 7-3, Drawing 7-4) is approximately 35 gpm. The state appropriated waters in groundwater discharge Area A include most of the significant springs in the area and essentially all of the largest springs in the area (Drawing 7-3; Appendix 7-3). The average discharge of all state

728 PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION

This section describes the probable hydrologic consequences of surface coal mining in the proposed Coal Hollow Mine permit area. This determination is based on data presented herein and on information provided in Appendix 7-1. The probably hydrologic consequences associated with proposed highwall mining activities within the 85.88-acre Dame Lease IBC area are presented in Appendix 7-4. This mining and reclamation plan has been designed to minimize potential adverse impacts to the hydrologic balance. It should be noted that this PHC and also Appendix 7-1 may be updated periodically as required as additional hydrogeologic information and mining data become available in the future.

728.310 Potential adverse impacts to the hydrologic balance

Other than the possible short-term diminution in discharge rates from alluvial groundwater systems, including the potential short-term diminution of discharge rates from some springs and seeps in Sink Valley, appreciable adverse impacts to the hydrologic balance, either on or off the permit area are not expected to occur. The basis for this determination is discussed below.

As discussed in Section 721 above, minimal groundwater resources exist in the Tropic Shale, which directly overlies the coal reserves in proposed mining areas. Groundwater in the Tropic Shale does not provide measurable baseflow discharge to streams in the area. The lack of appreciable groundwater flow in the Tropic Shale is a result of the poor water transmitting properties of the marine shale unit. Consequently, it is anticipated that little groundwater will be encountered in the Tropic Shale in mining areas. Thus, the potential for adverse impacts to the hydrologic balance resulting from mining through the Tropic Shale in the proposed Coal Hollow Mine permit area is minimal.

Similarly, as described in Section 722 above, groundwater resources in the Dakota Formation underlying the coal seam to be mined are not appreciable. This condition is fundamentally a result of the heterogeneity of the rock strata in the Dakota Formation which impedes the ability of the formation to transmit groundwaters significant distances vertically or horizontally. The presence of the essentially impermeable Tropic Shale on top of the Dakota Formation also minimizes the potential for vertical recharge to the Dakota Formation. Mining operations will remove the overlying Tropic Shale rock strata from the Dakota Formation in addition to the Smirl coal seam deposit at the top of the Dakota Formation in mined areas. However, because the pre-mining hydraulic communication between the Tropic Shale and the underlying Dakota Formation in planned mining areas is believed to be minimal, the removal of the Tropic Shale overburden and Smirl coal seam from the Dakota Formation, followed by the rapid backfilling of pit areas with low-permeability fill materials should not result in adverse impacts to the hydrologic balance in the Dakota Formation (i.e., the post-mining degree

731.200 Water Monitoring

This section describes the hydrologic monitoring plan (including that for the 85.88-acre Dame Lease IBC). Locations of surface-water and groundwater monitoring sites are indicated on Drawing 7-10. Hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-4. Groundwater and surface-water monitoring locations are listed in Table 7-5. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in Table 7-6, and for groundwater in Table 7-7. The hydrologic monitoring plan during reclamation will be the same as during the operational phase. The hydrologic monitoring parameters have been selected in consultation with the Division's directive Tech-006, *Water Monitoring Programs for Coal Mines.*

The groundwater and surface-water monitoring plan is extensive and includes 53 monitoring sites. The monitoring plan is designed to monitor groundwater and surface-water resources for any potential impacts that could potentially occur as a result of mining and reclamation activities in the proposed Coal Hollow Mine permit and adjacent area. Each of the sampling locations and their monitoring purpose are described below.

Streams

Kanab Creek will be monitored at sites SW-3 (above the permit area), and SW-2 (below the permit area). Lower Robinson Creek will be monitored at sites SW-4 (above the permit area), SW-101 (within the permit area), and SW-5 (below the permit area above the confluence with Kanab Creek). The irrigation water near SW-4 will also be monitored at site RID-1. Swapp Hollow creek will be monitored above the permit area at site SW-8. Sink Valley Wash will be monitored at SW-6 (a small tributary to the wash immediately below the permit area) and at SW-9, located in the main drainage below the permit area. All of these locations, with the exception of RID-1) will be monitored for discharge and water quality parameters specified in Table 7-6 quarterly, when reasonably accessible. Additionally, Lower Robinson Creek will be monitored at site BLM-1, which is near the location of alluvial groundwater emergence in the bottom of the stream channel. RID-1 will be monitored for discharge and field water quality parameters. BLM-1 will be monitored for discharge and water quality parameters specified in Table 7-6 quarterly. Monitoring sites BLM-1, SW-5, SW-6, and SW-9 will also be monitored for total and dissolved selenium quarterly.

85.88-acre Dame Lease IBC

In conjunction with highwall mining activities within the 85.88-acre Dame Lease IBC, supplemental water monitoring activities will be performed at selected nearby springs and wells. This will include weekly monitoring of spring discharge rates at sites SP-8, SP-14, SP-20, SP-22, and SP-40, and weekly measurements of water levels in monitoring wells C4, C2, C3, C5, and Y-61. The weekly monitoring at these sites will begin one month prior to the commencement of highwall mining in the 85.88-acre Dame Lease IBC and will continue until one month after highwall mining in the IBC is concluded. Following the period of weekly monitoring, the above specified stations will be monitored monthly for a period of six months. The flow and water level data generated during this period of accelerated monitoring will be sent to the Division of Oil, Gas and Mining as a spreadsheet via e-mail at the end of each month.

In accordance with R645-302.245.230 all holes discharging water will be sealed within 72 hours after completion with impervious and noncombustible material. However, in the approved Ground Control Plan for CHM, MSHA requires the adjacent hole remain open for monitoring of the web. Thus, if an adjacent hole is discharging water and needs to be kept open for web monitoring then the discharge will be tested to determine if it contains acid or toxic-forming material and approvel to keep this hole open for web monitoring will be requested from the Division in accordance with R645-302.245.230.

In order to verify that the highwall mining holes excavated into the 85.88-acre Dame Lease IBC do not cause depletion of the overlying shallow alluvial groundwater systems, the groundwater discharge rate (if any) that occurs from the mouths of the holes within the Dame Lease IBC will be monitored daily. The daily monitoring will commence upon completion of the hole excavation and continue until the hole is sealed. Where it is reasonably possible to do so, the discharge rate measurements will be performed using an appropriate field flow measurement technique (i.e. pipe and a calibrated container, flume, weir, etc.). In areas where the performance of a field discharge measurement is not reasonably possible (i.e. under diffuse seepage conditions or where unconcentrated dispersed flow conditions exist) the discharge rate will be estimated. Discharge rate measurements from the highwall holes will not be performed in areas where such measurements cannot be performed safely. In those areas where the discharge rates cannot safely be measured, this will be noted in the flow record and, where possible, a visual estimate of the discharge rate will be made. Upon approval from the Division, at times when no discharge is occurring from any of the open highwall mining holes in the Dame Lease IBC, discharge measurements will be performed daily on those days that the mine is operating (generally Monday through Friday). Under conditions where measurable flows are present at any open highwall mining hole in the 85.88-acre Dame Lease IBC, the flow measurements will be performed on a continuous daily basis (7 days a week) until the hole is sealed. The flow data for each hole will be sent to the Division as a spreadsheet via e-mail at the end of each month.

731.530 State-appropriated water supply

The proposed water replacement well will be used both as a water supply source for the mine and for water replacement if needed (also for use if needed as a replacement water source for mining in the 85.88-acre Dame Lease IBC). Alton Coal Development, LLC commits to having the water-replacement well (or other appropriate water replacement source as approved by the Division) drilled and developed before beginning overburden removal for Pits 13, 14, and 15.

731.600 Stream Buffer Zones

Any perennial or intermittent streams in the mine area will be protected by 100 foot stream buffer zones on either side of these streams. Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water standards and will not adversely affect the water quality and quantity or other environmental resources of the stream.

Temporary or permanent stream channel diversion will comply with R645-301-742-300. It should be noted that the proposed Coal Hollow Mine plan calls for the temporary diversion of a reach of the Lower Robinson Creek stream channel approximately 2,000 feet in length in the southeast ¼ of Section 19, T39S, R5W. Details of the proposed diversion are given in Chapter 5, Section 527.220 of this MRP. If this action results in diminution of the meager discharge of surface water in the drainage below the planned diversion, where required a suitable mitigation for this potential impact will be designed and implemented in consultation with the Division of Oil, Gas and Mining.

The areas surrounding the streams that are not to be disturbed will be designated as buffer zones, and will be marked as specified in R645-301-521.260.

731.700 Cross sections and Maps

The locations of springs and seeps identified in the proposed Coal Hollow Mine permit and adjacent area are shown in Drawing 7-1. The locations of baseline hydrologic monitoring locations are shown on Drawing 7-2. The locations of water rights in the proposed Coal Hollow permit and adjacent area are provided on Drawing 7-3. Cross-sections depicting the stratigraphy and hydrostratigraphy of the proposed Coal Hollow Mine permit and adjacent area are presented in Chapter 6, Drawing 6-2. Designs for proposed impoundments in the proposed Coal Hollow permit area are shown in Drawings 5-25 through 5-31

731.800 Water Rights and Replacement

Alton Coal Development, LLC commits to replace the water supply of an owner of interest in real property who obtains all or part of his or her supply of water for domestic, agricultural, industrial, or other legitimate use from the underground or surface source, where the water supply has been adversely impacted by contamination, diminution, or interruption proximately resulting from the surface mining activities. Baseline hydrologic information required in R645-301-624.100 through R645-301-624.200, R645-301-625, R645-301-626, R645-301-723 through R645-301-724.300, R645-301-724.500, R645-301-725 through R645-301-731, and R645-301-731.210 through R645-301-731.223 will be used to determine the extent of the impact of mining upon ground water and surface water.

Sorensen Spring (SP-40) is the current domestic water supply for the Sorensen Ranch (Personal communication, Darlynn Sorensen, 2008). There is currently no development at the spring that would convey water to the ranch house. Rather, water from the spring is obtained directly from the spring for use at the ranch. Monitoring of discharge rate and water quality is included in the proposed water monitoring plan for the Coal Hollow Mine. The operational and reclamation phase water monitoring protocols for this spring are listed in Tables 7-5 and 7-7A. Should the water source be interrupted, diminished, or contaminated, replacement water will be provided from the new water well that will be constructed prior to the beginning of overburden removal for pits 13, 14, and 15 (see description in section R645-301-727 above, and Drawing 5-8C) or other suitable water replacement source as approved by the Division.

Reclamation designs for the eastern permit boundary where the mining pits meet the undisturbed alluvium are provided in Appendix 7-10. These designs specify engineering methods to be used to minimize drainage from the alluvium into the fill in the reclaimed pits (as the pits are filled and reclaimed) thereby protecting the hydrologic balance in Sink Valley. Through the emplacement of a permanent engineered low-permeability barrier between the alluvial groundwater systems to the east of the mining area and the mine backfill areas, the alluvial groundwater system will be effectively isolated from the mine backfill areas. An evaluation of the permanent barrier for pit 15 has been performed by Mr. Alan O. Taylor of Taylor Geo-Engineering, LLC. Information in the Taylor Geo-Engineering report indicates that the 50-foot wide barrier will prevent any appreciable drainage of alluvial groundwater from the coarse-grained alluvial groundwater system centered east of the permit area into the backfilled pit areas. Laboratory analysis of the Tropic Shale material from which the barrier will be constructed indicates that the compacted shale material will perform adequately to successfully contain the alluvial groundwater. Thereby water levels in the alluvial groundwater systems in Sink Valley east of the pit areas will be reclaimed to approximate pre-mining levels.

As specified in R645-301-112, groundwater quantity will be protected by handling earth materials and runoff in a manner that will restore approximate premining recharge capacity of the reclaimed area as a whole, excluding coal mine waste disposal areas and fills, so as to allow the movement of water to the groundwater system.

Table 7-4 Hydrologic monitoring protocols.

Discharge and water level measurements

Protocol	Applies to	Parameter	Frequency
A	Streams	Discharge	Quarterly
B	Springs	Discharge	Quarterly
C	Monitoring wells	Water elevation	Quarterly
D	Springs	Discharge	Weekly measurements beginning one month prior to highwall mining and continuing until one month after highwall mining in the area, followed by monthly measurements for a period of six months
E	Monitoring wells	Water elevation	Weekly measurements beginning one month prior to highwall mining and continuing until one month after highwall mining in the area, followed by monthly measurements for a period of six months

Water quality

Protocol	Applies to	Parameters	Table	Frequency
1	Streams	Operational field and laboratory water quality measurements	7-6A*	Quarterly
2	Streams	Field water quality measurements only	7-6A*	Quarterly
3	Springs	Operational field and laboratory water quality measurements	7-7A*	Quarterly
4	Springs	Field water quality measurements only	7-7A*	Quarterly
5	Monitoring wells	Operational field and laboratory water quality measurements	7-7A*	Quarterly
6	Monitoring wells	Field water quality measurements only	7-7A*	Quarterly
7	Monitoring wells	Laboratory acidity measurements for a period of two years	—	Quarterly
8	Streams	Laboratory total and dissolved selenium measurements	—	Quarterly

*Note: Every 5 years for the third or fourth quarter monitoring event, laboratory analysis will be performed according to the baseline parameter lists specified in Tables 7-6B and 7-7B for surface waters and groundwaters, respectively. This will first be performed in the year 2015, continuing on a schedule of every five years thereafter.

Table 7-5 Hydrologic monitoring locations and protocols for operational and reclamation phase monitoring.

Site	Protocols	Comments
Streams		
BLM-1	A, 1, 8	Lower Robinson Creek adjacent to mined areas
RID-1	A, 2	Irrigation ditch in Robinson Creek
SW-2	A, 1	Kanab Creek below Robinson Creek
SW-3	A, 1	Kanab Creek above permit area
SW-4	A, 1	Lower Robinson Creek above permit area
SW-5	A, 1, 8	Lower Robinson Creek above Kanab Creek
SW-6	A, 1, 8	Sink Valley Wash at permit boundary
SW-8	A, 1	Swapp Hollow Creek above permit area
SW-9	A, 1, 8	Sink Valley Wash below permit area
SW-101	A, 2	Lower Robinson Creek in permit area
Springs		
Sorensen Spring (SP-40)	B,4, D	Developed alluvial spring in Sink Valley at Sorensen ranch
SP-3	B, 4	Spring in upland pediment alluvium south of permit area (developed and piped down canyon in Sink Valley Wash – now monitored at transfer box at mouth of canyon)
SP-4	B, 3	Developed spring in Sink Valley Wash 1 mile below permit area
SP-6	B, 3	Seep in Sink Valley below permit area
SP-8	B, 3, D	Developed alluvial spring in Sink Valley at Dames ranch
SP-14	B, 3, D	Alluvial spring in Sink Valley
SP-16	B, 4	Alluvial spring in Sink Valley
SP-20	B, 3, D	Alluvial spring in Sink Valley
SP-22	B, 4, D	Alluvial spring in Sink Valley
SP-23	B, 4	Alluvial spring in Sink Valley
SP-33	B, 3	Developed spring in lower Sink Valley alluvium
Wells		
Y-36	C	Coal well in Sink Valley above permit area
Y-38	C, ~~7~~	Coal well in Sink Valley in permit area
Y-45	C	Coal seam well in Swapp Hollow above permit area
Y-61	C, 5, ~~7~~, E	Water well in Sink Valley artesian alluvial groundwater system above permit area
Y-63	C	Monitoring well in lower Sink Valley Alluvium below mining areas
Y-98	C	Alluvial well in Robinson Creek above permit area
Y-102	C	Alluvial well in upper Sink Valley in permit area
C0-18	C	Alluvial monitoring well in Lower Robinson Creek drainage
C0-54	C	Monitoring well in Lower Robinson Creek drainage near coal seam

Site	Protocols	Comments
C1-24	C	Alluvial monitoring well in Lower Robinson Creek drainage
C2-15	C, E	Monitoring well in Sink Valley alluvium
C2-28	C, E	Monitoring well in Sink Valley alluvium
C2-40	C, E	Monitoring well in Sink Valley alluvium
C3-15	C, E	Monitoring well in Sink Valley alluvium
C3-30	C, E	Monitoring well in Sink Valley alluvium
C3-40	C, E	Monitoring well in Sink Valley alluvium
C4-15	C, E	Monitoring well in Sink Valley alluvium
C4-30	C, E	Monitoring well in Sink Valley alluvium
C4-50	C, E	Monitoring well in Sink Valley alluvium
C5-130	C, E	Monitoring well in Sink Valley artesian alluvial groundwater system above permit area
C7-20	C	Monitoring well in Sink Valley alluvium
C9-15	C	Monitoring well in Sink Valley alluvium
C9-25	C	Monitoring well in Sink Valley alluvium
C9-40	C	Monitoring well in Sink Valley alluvium
LR-45	C, 5	Monitoring well in Lower Robinson Creek alluvium below mine area
LS-28	C, 5	Monitoring well in Sink Valley Alluvium below mining areas
LS-60	C	Monitoring well in Sink Valley Alluvium below mining areas
LS-85	C, 5	Monitoring well in artesian Sink Valley Alluvium below mining areas
SS-15	C	Monitoring well in Sink Valley Alluvium below mining areas
SS-30	C, 5	Monitoring well in Sink Valley Alluvium below mining areas
SS-75	C	Monitoring well in burned coal area material
UR-70	C, 5	Monitoring well in Lower Robinson Creek alluvium above mine area

Table 7-6A Surface water operational and reclamation phase water quality monitoring.

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Dissolved Oxygen	mg/L
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Total Suspended Solids	mg/L:
Bicarbonate	mg/L
Carbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Potassium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Oil and grease	mg/L
Cations	meq/l
Anions	meq/l
Cation/Anion Balance	%

Table 7-6B Surface water baseline water quality monitoring

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Dissolved Oxygen	mg/L
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Total Suspended Solids	mg/L
Total Alkalinity	mg/L
Total Hardness ($CaCO_3$)	mg/L
Acidity	mg/L
Aluminum (dissolved)	mg/L
Arsenic (dissolved)	mg/L
Bicarbonate	mg/L
Boron (dissolved)	mg/L
Cadmium (dissolved)	mg/L
Carbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Copper (dissolved)	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Lead (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Molybdenum (dissolved)	mg/L
Ammonia	mg/L
Nitrate+Nitrite	mg/L
Phosphate (total)	mg/L
Potassium (dissolved)	mg/L
Selenium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Zinc (dissolved)	mg/L
Oil and grease	mg/L
Cations	meq/l
Anions	meq/l
Cation/Anion Balance	%

Table 7-7A Groundwater operational and reclamation phase water quality monitoring.

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Carbonate	mg/L
Bicarbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Potassium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Cations	meq/L
Anions	meq/L
Cation/Anion Balance	%

Table 7-7B Groundwater baseline water quality monitoring.

FIELD MEASUREMENTS	REPORTED AS
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Temperature	°C
LABORATORY MEASUREMENTS	
Total Dissolved Solids	mg/L
Total Alkalinity	mg/L
Total Hardness ($CaCO_3$)	mg/L
Acidity	mg/L
Aluminum (dissolved)	mg/L
Arsenic (dissolved)	mg/L
Bicarbonate	mg/L
Boron (dissolved)	mg/L
Cadmium (dissolved)	mg/L
Carbonate	mg/L
Calcium (dissolved)	mg/L
Chloride	mg/L
Copper (dissolved)	mg/L
Iron (total)	mg/L
Iron (dissolved)	mg/L
Lead (dissolved)	mg/L
Magnesium (dissolved)	mg/L
Manganese (total)	mg/L
Manganese (dissolved)	mg/L
Molybdenum (dissolved)	mg/L
Ammonia	mg/L
Nitrate+Nitrite	mg/L
Phosphate (total)	mg/L
Potassium (dissolved)	mg/L
Selenium (dissolved)	mg/L
Sodium (dissolved)	mg/L
Sulfate	mg/L
Zinc (dissolved)	mg/L
Cations	meq/l
Anions	meq/l
Cation/Anion Balance	%

Appendix 7-14

PHC of Coal Mining in the 85.88-acre New Dame Lease IBC at the Alton Coal Development, LLC Coal Hollow Mine

Probable Hydrologic Consequences of Coal Mining in the 85.88-acre New Dame Lease IBC at the Alton Coal Development, LLC Coal Hollow Mine

1 November 2013

Alton Coal Development, LLC
Cedar City, Utah

PETERSEN HYDROLOGIC, LLC
CONSULTANTS IN HYDROGEOLOGY

Probable Hydrologic Consequences of Coal Mining in the 85.88-acre New Dame Lease IBC at the Alton Coal Development, LLC Coal Hollow Mine

1 November 2013

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INTRODUCTION

The Alton Coal Development, LLC Coal Hollow Mine is located approximately 3 miles south of the town of Alton, Utah (Figure 1). A permit to operate the Coal Hollow Mine was issued on 10 November 2010. The first coal was mined in early February 2011. Alton Coal Development, LLC is applying for an Incidental Boundary Change (IBC) to the existing Coal Hollow Mine permit area. The IBC area (new Dame Lease) encompasses 85.88 acres and is contiguous with the eastern boundary of the existing permit area (Figure 1). The purpose of the proposed lease modification is to allow the recovery of privately-owned coal reserves situated immediately east of the existing mine area. Coal mining operations in the new Dame Lease area will include coal mining to be performed using highwall mining techniques. The highwall mining operations are designed to allow for the extraction of the coal resource without resulting in disturbance of the land surface overlying the mined areas. Alton Coal Development, LLC also proposes to perform coal mining operations using highwall mining techniques within portions of the existing Coal Hollow Mine permit area (Figure 2).

The purpose of this investigation is to evaluate the probable hydrologic consequences of mining in the new 85.88 acre Dame Lease. This evaluation includes a determination of the probable hydrologic consequences of coal mining using highwall mining techniques at the Coal Hollow Mine.

Including this introduction, this report includes the following sections:

- Introduction
- Mining Overview
- Climate
- Geology
- Baseline Information
- Groundwater Systems
- Surface-water Systems
- Probable Hydrologic Consequences Determination
- Recommended Monitoring Plans for Surface Water and Groundwater
- References Cited

MINING OVERVIEW

Since the commencement of mining operations at the Coal Hollow Mine, mining operations have been performed using conventional surface mining techniques. Alton Coal Development, LLC proposes to conduct mining operations within portions of the existing Coal Hollow Mine permit area and also within the new 85.88-acre Dame Lease IBC area using highwall mining techniques. Within other portions of the Coal Hollow Mine permit area, conventional surface mining techniques will continue to be employed. Using highwall mining techniques, the coal resource can be extracted from an above-ground surface location without causing disturbance of the land surface overlying coal extraction areas. Additionally, because of the hydrogeologic characteristics of the bedrock unit present above the coal seam to be mined, highwall mining operations may be performed without disrupting overlying shallow alluvial groundwater systems.

Highwall mining operations will be performed at the Coal Hollow Mine using a remotely operated highwall mining machine. Access to the Smirl coal seam will be made where the coal seam is exposed in the highwalls (on both the east and west) of north-south trending surface mining pits (trenches) that would typically be approximately 150 feet wide (Figure 2). Typically, the remote highwall mining machine will be used to drive a series of parallel holes into the coal seam that will be up to 1,000 feet in length and 12 feet wide. As the highwall mining operation progresses, the coal excavated by the highwall miner is conveyed via an auger type mechanism to the surface. The mined coal is then transported by truck to the coal stockpiling and loadout area. Areas of un-mined coal approximately 12 to 15 feet wide (web pillars) will be left between individual highwall mining holes to guarantee stability and support the mine roof and eliminate subsidence at the land surface. Additionally, between every 10 holes (panel), a more substantial un-yieldable barrier pillar of coal (approximately 30 feet wide) will be left in place effectively isolating each adjacent panel. Because web pillars and barrier pillars are left in place for ground control and stabilization, the overall coal recovery rate is less than that achieved using conventional open pit mining techniques.

CLIMATE

Climatological information, including temperature and precipitation data, have been routinely measured and recorded at the Alton, Utah weather station (420086) since 1928. The station is located in the town of Alton, approximately three miles north of the new Dame Lease 85.88-acre IBC area. Climatological data collected at the Alton station for the 77-year period from 1928 to 2005 have been summarized by the Western Regional Climate Center (2013). The month with the minimum monthly average temperature at the Alton station is January (15.1 °F), while the month with the warmest average maximum temperature is July (82.6 °F). Total precipitation averages 16.40 inches. Precipitation in the Alton area occurs during two annual wet cycles. These include wintertime cyclonic storms which bring precipitation to the area (usually as snowfall), and summertime storms originating from convection in the Gulf of Mexico or the Pacific Ocean (Doelling, 1972). Average monthly precipitation at the Alton station ranges from a low of 0.57 inches in June to a maximum of 1.79 inches in January and February. The average monthly precipitation falling during the month of September is nearly as great, averaging 1.76 inches.

Wind data have been collected at the Coal Hollow Project weather station (located on the northern boundary of the new Dame Lease 85.88-acre IBC) since December 2005. Based on data from the Coal Hollow Project weather station, it is apparent that the predominant wind directions in the Coal Hollow Mine permit area are from the northeast, with secondary peaks from the north and south-southwest. Surface winds recorded at the Coal Hollow Project weather station averaged about 6.4 miles per hour. Wind data have also been collected historically at nearby locations by governmental and other entities. The regionally predominant direction of winds in the region is southwest through west. Secondary peaks are from southeast and northwest. Surface winds in the regional area average approximately 8 miles per hour. Higher wind speeds are associated with passage of weather fronts and storms and generally occur during the springtime.

GEOLOGY

The geology of the Coal Hollow Mine permit and adjacent areas has been described previously by Petersen Hydrologic (2007 – Appendix 7-1 in the Coal Hollow Mine MRP). Within the IBC area, only Quaternary alluvium is present at the land surface. The Cretaceous Tropic Shale and Dakota Formation are present at moderate depths below the surface within the new Dame Lease 85.88-acre IBC area. These geologic units are described below.

Quaternary Deposits

Quaternary deposits present within the 85.88-acre new Dame Lease area are dominated by alluvial deposits consisting of interbedded clays, silts, sands, and gravels. Drilling logs from holes drilled in the area indicate that the gravel deposits are most commonly present near the base of the alluvial deposits. Within the 85.88-acre new Dame Lease area, the alluvial deposits range from less than 40 feet to more than 100 feet in thickness.

Tropic Shale (Cretaceous)

The Tropic Shale consists predominantly of gray and carbonaceous silty shale with a few marine sandstone beds. The formation typically weathers at the surface to a clayey soil that typically forms gentle, vegetated slopes. The Tropic Shale is present immediately beneath the Quaternary alluvium throughout the 85.88-acre new Dame Lease IBC area. The formation was deposited in an open-marine offshore environment during the maximum westward transgression of the Cretaceous Western Interior Seaway in the Late Cretaceous (Tilton, 2001). Near the top of the formation, more sandy horizons are interbedded with the mudstone units of the formation. These sandy units together with the sandstone at the base of the overlying Straight Cliffs Formation reflect the initial sand influx onto the marine environment of the Tropic Shale. The thickness of the Tropic Shale in the Alton Quadrangle is about 700 feet.

Dakota Formation (Cretaceous)

The Dakota Formation contains the economic coal seams in the Alton Coal Field. The formation consists of fine- to medium-grained sandstone (commonly lenticular) with interbedded gray shale, carbonaceous shale, and coal. In most locations, shaley strata dominate

the formation, comprising about 60 to 75 percent of the formation (Doelling, 1972). The unit characteristically forms ledge and slope topography. In the Coal Hollow Project area the Dakota Formation directly overlies the Carmel Formation. The economic coal seams in the Alton Coal Field are present near the base (Bald Knoll coal zone) and near the top of the formation (Smirl coal zone). Local thinner coal seams that are not of economic importance are present in the center of the formation. The thickness in the western portion of the Alton Coal Field is about 450 feet. In the eastern portion of the Alton Coal Field, the Dakota Formation is about 150 feet thick and rests on the Entrada Sandstone.

Structure

Rock strata in the region dip gently toward the north and east, generally from 1 to 5 degrees. The Alton Coal Field is bounded on the east by the Paunsaugunt Fault, and on the west by the Sevier Fault. Regional displacements on these two faults are about 1,000 to 2,000 feet, and 100 to 800 feet, respectively. Additionally, several faults with lesser displacements have been mapped in the region, including the Sand Pass Fault zone (about 400 feet of offset), the Bald Knoll Fault (about 650 feet of offset), and the Sink Valley Fault. The 85.88-acre new Dame Lease IBC area is situated east of the mapped location of the Sink Valley Fault and the associated Tropic Shale bedrock ridge in the existing Coal Hollow Mine permit area. Most local faults in the Alton Quadrangle trend in a northerly or north-westerly direction, are several miles long, and are near vertical. A prominent north- to northwest-trending vertical joint set is present in the Upper Cretaceous sandstone rocks in the region. Stratal dips vary appreciably near the fault zones.

BASELINE HYDROLOGIC DATA

The locations of springs, streams, and wells from which hydrologic data have been collected in the vicinity of the 85.88 acre new Dame Lease IBC area are shown on Figure 3. Hydrologic monitoring at many of these locations commenced in 2005 in support of Alton Coal Development, LLC coal mine permitting activities and has continued to the present time. Over the nine years that monitoring has occurred in and adjacent to the IBC area, a large quantity of surface-water and groundwater quantity and quality data, including field

and laboratory water quality data, spring and stream discharge rate data, and groundwater potentiometric data from wells has been collected. These data have been entered into the Utah Division of Oil, Gas and Mining's on-line coal water quality database and are freely accessible at http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi.

GROUNDWATER SYSTEMS

Groundwater systems in Coal Hollow Mine and adjacent area (which includes the 85.88-acre new Dame Lease IBC area) have been described in detail by Petersen Hydrologic (2007 – Appendix 7-1 in the Coal Hollow Mine MRP). Additional data collection and analysis in the Coal Hollow Mine and surrounding areas has been performed in conjunction with ongoing permitting and operational activities at the Coal Hollow Mine. The character of the groundwater systems in the vicinity of the 85.88-acre new Dame Lease IBC area are summarized here. A geologic map showing the Dame Lease LBA is shown in Figure 5.

Alluvial Groundwater Systems

Within the new Dame Lease IBC and nearby areas, groundwater naturally discharges to the surface only from alluvial groundwater systems. Discharge from the alluvial groundwater system occurs both as discrete springs and seeps and also locally as diffuse seepage to the surface. Locations of monitored springs, seeps and wells in the alluvial groundwater systems within and adjacent to the new Dame Lease IBC are shown on Figure 3. Locations of all identified springs and seeps in the area are shown on Drawing 7-1 in the Coal Hollow Mine MRP. Discharge and water quality information for these springs and seeps are presented in a summary report of the spring and seep survey (Sub-appendix B, in Petersen Hydrologic, 2007; Appendix 7-7 of Coal Hollow Mine MRP). The groundwater recharge mechanisms, flow paths, and discharge mechanisms in the alluvial system are largely controlled by the heterogeneous character of the alluvial sediments in the area and by the slope of the surface topography. Geologic information obtained from drilling logs of wells in the area indicates that coarse-grained alluvial sediments (sands and gravels) are present near the base of the alluvial sediments in the deeper portions of the Sink Valley alluvium (UII, 1987). Alluvial sediments in the more shallow horizons of the Sink Valley alluvium (including the shallow

alluvium overlying the regions containing deep coarse-grained deposits) consist predominantly of fine-grained sediments including clays, silts, and fine-grained sands (UII, 1987; Petersen Hydrologic, 2007). Alluvial groundwater systems in the IBC area are primarily recharged via mountain-front recharge mechanisms along the flanks of the Paunsaugunt Plateau east of the new Dame Lease IBC area. In these upland areas, snowmelt and precipitation runoff water shed from the Paunsaugunt Plateau infiltrates into coarser-grained alluvial sediments present near the surface along the mountain flanks. Alluvial groundwater flows from the mountain-front recharge areas preferentially through more permeable zones down-gradient (westward) toward the Coal Hollow Mine permit area. The fine grained clays and silts present in the shallow alluvial deposits in the Sink Valley area act as a confining layer, which isolates the alluvial groundwater flowing through the deeper, coarse-grained alluvial sediments from the land surface. By this mechanism, artesian flow conditions are created in the deep, coarse-grained alluvial groundwater systems present in portions of Sink Valley. Artesian flow conditions are not present in regions further to the west where only thin, predominantly fine-grained alluvial deposits are present. Within those portions of Sink Valley where the deeper, coarse-grained sediments support artesian groundwater flow conditions, flowing artesian wells are present (including wells near the new Dame Lease IBC including Y-102, Y-61, C5-130, and the Coal Hollow Mine water production well). Springs and seeps are also supported by discharge from the alluvial groundwater system (including monitored springs near the new Dame Lease IBC area including SP-8, SP-14, SP-16, SP-19, SP-20, SP-22, SP-23, and Sorensen Spring). A well pump test performed during January 2007 (using well Y-61 for the pumping well) demonstrated hydraulic connection between the coarse-grained artesian alluvial groundwater system in which the flowing artesian wells are screened and the alluvial groundwater systems that support the springs in the new Dame Lease IBC area.

The quality of the groundwater in the alluvial groundwater system in the vicinity of the 85.88-acre new Dame Lease IBC area has been well-documented through nine years of quarterly monitoring of springs and wells in the area. Generally, the quality of the alluvial groundwater is good, with average TDS concentrations measured at springs and wells ranging from about 400 to 450 mg/L (UDOGM, 2013). The alluvial groundwater near the

new Dame Lease IBC area is of the magnesium-calcium-bicarbonate solute geochemical type (UDOGM, 2013). Seasonal variation in groundwater and surface-water quantity and quality in the 85.88-acre new Dame Lease IBC is described in Chapter 7 of the Coal Hollow Mine MRP (see Appendix 7-1 and Appendix 7-7).

Groundwater in the Tropic Shale

Appreciable groundwater systems have not been encountered within the marine Tropic Shale where it is naturally exposed at the surface in areas near the Coal Hollow Mine or where it has been excavated within the mine pits at the Coal Hollow Mine. The lack of appreciable groundwater systems within the Tropic Shale bedrock is attributable to the low permeability of the claystones and mudstones that dominate the lithologic composition of the unit. A drilling core from the Coal Hollow Mine permit area consisting of unweathered Tropic Shale was analyzed at the laboratory to determine its coefficient of permeability (hydraulic conductivity). The core sample was remolded and compacted at the laboratory prior to the analysis. A value of 8.24×10^{-8} centimeters per second was measured on the Tropic Shale sample, confirming the very low hydraulic conductivity of the material. The low hydraulic conductivity of the Tropic Shale bedrock prevents appreciable groundwater flow through the unit, either vertically or horizontally. Also present in the Tropic Shale bedrock are layers of bentonite clay. The Bentonite clay has been identified in drilling cores regionally and is observed in continuous layers in the walls of the excavated mine pits at the Coal Hollow Mine overlying the Smirl coal seam. Bentonite clays swell when wetted and are known to have very low values of hydraulic conductivity and to deform plastically when wetted. Accordingly, the presence of the interbedded bentonite layers within the surrounding claystones and mudstones of the Tropic Shale minimize the potential for the vertical flow of groundwater through the formation. Swelling clays reduce the hydraulic conductivity of the rock or soil that contains them and contribute to the rapid closing or healing of tension fractures that can result from coal mining operations (UDOGM, 2007). Because of the very low overall permeability of the Tropic Shale, the potential for groundwater recharge through the Tropic Shale to the underlying Dakota Formation is very low.

Groundwater in the Smirl coal seam

During surface mining operations at the Coal Hollow Mine, only meager quantities of groundwater (typically less than about one or two gpm) have entered the mine pits from the Smirl coal seam when it is exposed in the mine pits (the Smirl coal seam is present near the top of the Dakota Formation at the contact with the overlying Tropic Shale). This condition is likely a result of 1) the relatively low permeability of the in-situ coal deposit, and 2) the lack of an appreciable recharge mechanism to the coal seam resulting from the presence of an essentially impermeable cap of Tropic Shale bedrock on top of the coal seam which greatly inhibits the potential for vertical movement of groundwater downward into the coal seam. The cap of Tropic Shale overlying the Smirl coal seam should effectively isolate the alluvial groundwater system in Sink Valley from the Smirl coal seam to be mined. It should be noted, however, that during previous investigations of groundwater systems in Sink Valley (UII, 1987) hydraulic communication between groundwater in the Sink Valley alluvium and the underlying Smirl coal seam was suggested to be present in some portions of Sink Valley. Specifically, hydraulic communication between the alluvium and the coal seam in regions near monitoring well Y-36 and Y-48 were indicated. Their conclusion was based on 1) a mounding of the contoured potentiometric surface in the Smirl coal seam near wells Y-36 and Y-48, and 2) apparent geochemical influence of alluvial groundwater on the chemical composition of groundwater sampled from the coal wells Y-36 and Y-48. Currently, well Y-48 is not available for monitoring. Water level measurements performed recently on well Y-36 do indeed show water levels that are substantially elevated above the physical elevation of the coal seam (by about 110 feet) suggesting considerable hydraulic head (about 48 psi) on the groundwater system screened in the well. However, since monitoring by Alton Coal Development commenced at Y-36 in 2005, it has been observed that there has been a continuous flow of groundwater upward through the well annulus (outside the well casing at a flow rate on the order of 2 to 5 gpm) and on to the ground at Y-36. This suggests that there is hydraulic communication (and a pathway for free groundwater flow) between the well annulus and the artesian alluvial groundwater system at that well location. Such conditions suggest the likelihood of a poor completion of the well at Y-36. If the well seal is compromised, it is likely that the hydraulic head measured at Y-36 represents a composite

head, with contributions from both the coal zone and the alluvial artesian aquifer. This condition (the existence of a composite head and cross-communication between the two groundwater systems influencing in the well) could explain both the elevated hydraulic head measurements observed at the well and the apparent alluvial groundwater chemical influence to groundwater sampled from the well (i.e. the water monitored at the well may be sourced by components from both the coal zone and the artesian alluvial groundwater system). Given the substantial thickness of Tropic Shale bedrock that separates the Smirl coal seam from the base of the alluvial groundwater system (64 feet), and the inherent difficulties in successfully completing a monitoring well under flowing artesian conditions in the borehole, it seems reasonably plausible that a composite hydraulic head is being measured at Y-36 which is not representative of actual conditions in the Smirl coal seam at that location. However, this is not known with certainty, and thus remains problematic.

Groundwater in the Dakota Formation

Groundwater resources in the Dakota Formation underlying the coal seam to be mined are not appreciable in the Coal Hollow Mine permit and adjacent area. This condition is fundamentally a result of the heterogeneity of the rock strata in the Dakota Formation which impedes the ability of the formation to transmit groundwaters significant distances vertically or horizontally. The Dakota Formation consists predominantly of shaley strata interbedded with lenticular, fine- to medium-grained sandstone and coal. Because of the pervasiveness of interbedded low-permeability horizons in the formation and the vertical and lateral discontinuity of sandstone horizons, the potential for vertical and horizontal movement of groundwater is limited. Although aquifer-quality sandstone strata may exist within the formation, appreciable groundwater migration through the formation over large distances likely does not occur due to the lenticular, discontinuous nature of these permeable sandstones. The presence of the essentially impermeable Tropic Shale on top of the Dakota Formation also minimizes the potential for vertical recharge to the underlying Dakota Formation. Consequently, groundwater discharge from the rocks of the Dakota Formation in the proposed Coal Hollow Mine permit and adjacent area is not appreciable.

SURFACE-WATER SYSTEMS

All surface waters within the 85.88-acre new Dame Lease IBC are tributary to the Sink Valley Wash drainage (see Plate 2 in Appendix 7-7 of the Coal Hollow Mine MRP). Runoff from springtime snowmelt and torrential precipitation events flows southward toward topographically lower areas in Sink Valley. Discharge in Sink Valley Wash is monitored at site SW-6 below the 85.88-acre new Dame Lease IBC, and also at monitoring site SW-9, located lower in the Sink Valley Wash drainage (Figure 3). Discharge measured at both SW-6 and SW-9 is ephemeral in nature, with flows only being present in direct response to appreciable snowmelt or torrential precipitation events. The quality of the surface water measured at SW-6 and SW-9 is variable, with TDS concentrations ranging from 127 to 2,220 mg/L and averaging 1,272 mg/L at SW-6, and ranging from 360 to 3,400 mg/L and averaging 1,624 mg/L at SW-9. Seasonal variability in surface-water quantity and quality is described in Appendix 7-1 and Appendix 7-7 of the Coal Hollow Mine MRP.

Discharges from alluvial seeps and springs in the IBC area typically run over the land surface before infiltrating into the subsurface or being lost to evapotranspiration. Discharge from spring SP-20 is routed down a ditch and into a small holding pond. Overflow from the pond typically runs over the land surface a short distance before being lost to infiltration or evapotranspiration. Discharge from SP-8 is piped to the Swapp Ranch for domestic use, with the unused water being routed to a small holding pond at the ranch. Overflow from this pond also runs a short distance over the land surface before being lost to infiltration or evapotranspiration prior to reaching any primary surface water channel. There is no measurable baseflow component of discharge in Sink Valley Wash derived from groundwater discharge from Sink Valley (or any other source).

PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION

This section describes the probable hydrologic consequences of coal mining and reclamation activities in the 85.88-acre new Dame Lease IBC. The information presented herein is considered as a supplement to the existing Coal Hollow Mine PHC determination. This determination is based on data presented herein and on information provided elsewhere in the Coal Hollow Mine MRP. This section describes the specific hydrologic consequences of conducting coal mining operations using the proposed highwall mining techniques. The mining and reclamation plan has been designed to minimize potential adverse impacts to the hydrologic balance. It should be noted that this PHC may be updated periodically as required as additional hydrogeologic information and mining data become available in the future.

Potential adverse impacts to the hydrologic balance

Appreciable adverse impacts to the hydrologic balance, either on or off the permit area are not expected to occur as a result of the proposed highwall mining at the Coal Hollow Mine (including the 85.88 acre new Dame Lease IBC). The basis for this determination is discussed below.

Using highwall mining techniques, the coal reserves proposed for mining at the Coal Hollow Mine (including the 85.88-acre new Dame Lease IBC) will be accessed from surface locations within the existing permitted Coal Hollow Mine permit area. Surface disturbance within mining areas in the IBC is not anticipated. The highwall mining plan has been designed and engineered to prevent subsidence of the land surface overlying highwall mined areas.

The highwall mining holes will exist entirely within the Smirl coal seam. Appreciable excavation of the Dakota Formation underlying the Smirl coal seam is not anticipated (and would be undesirable from a mining standpoint). Likewise, excavation of the overlying Tropic Shale formation should not occur during excavation of the highwall mine holes.

If the highwall mining holes were to come into hydraulic communication with permeable units of the overlying alluvial groundwater systems, alluvial groundwater could temporarily drain into the holes, depleting the quantity of water present in the alluvial groundwater system. However, because of the presence of considerable thicknesses of low-permeability Tropic Shale bedrock (discussed previously) in the zone extending from the top of the Smirl coal seam to the base of the overlying alluvial groundwater systems, it is considered unlikely that this would occur. The thicknesses of Tropic Shale bedrock that exist in the interburden between the top of the coal seam and the base of the alluvial groundwater system (as determined from drilling information) for wells near the new Dame Lease IBC are appreciable, as summarized in Table 1 below.

Table 1 Tropic Shale interburden thicknesses in selected monitoring wells and geologic borings near the new Dame Lease 85.88-acre IBC.

Well/Boring	Unweathered Tropic Shale depth interval (feet below ground surface)	Thickness of Tropic Shale interburden (feet)*
Y-36 (on or near IBC)	130-194	64
Y-48 (on or near IBC)	67-113	46
CH-05-05 (adjacent area)	48-155	107
CH-06-05 (adjacent area)	49-62	13
CH-08 (adjacent area)	40-84	44

*It should be noted that for some of the wells/boreholes for which information is presented in Table 1 above, appreciable thicknesses of clay, which may be weathering products of the Tropic Shale and have low permeabilities, are not included in the "Thickness of Tropic Shale interburden" column in Table 1 above.

Additionally, in the unlikely event that alluvial groundwater were to drain into the highwall mining holes, this impact would be temporary, because the holes are to be sealed with low-permeability backfill materials within a short time after mining of the hole is completed, which prevents the flow of groundwater from the hole. Additionally, because the Smirl coal seam will be accessed from the floors of the excavated pits (trenches), these trenches will be backfilled soon after mining is completed in an area, limiting the potential for long-term outflow from the alluvial groundwater system.

It should be noted that the highwall mining holes excavated within the new Dame Lease IBC will slope downward (to the east), away from the highwall access location as a result of the prevailing dip of the Smirl coal seam (generally toward the east or northeast). Consequently, unless a large volume of water were to be intercepted (enough to fill the entire void of the highwall hole), then gravity discharge of any intercepted groundwater to the surface would not occur.

As discussed previously, it has been suggested that groundwater in the Smirl coal seam near Y-36 and Y-48 may be in hydraulic communication with the overlying alluvial groundwater system (UII, 1987). Although there are uncertainties as to this conclusion, in the event that there is communication between the alluvial groundwater system and the Smirl coal seam, then there would be a potential for alluvial groundwater to enter the highwall mining holes. If appreciable quantities of alluvial groundwater were to be intercepted, this condition would be short-lived, as the holes could be sealed with low permeability materials to prevent the outflow of large quantities of groundwater from the alluvial groundwater system. Additionally, if there were to be communication with the overlying alluvial groundwater system, the volume of water that would be intercepted would be proportional to the hydraulic conductivity of the Smirl coal seam. Aquifer testing at Y-36 did not indicate high values of hydraulic conductivity for the interval screened in that well (1×10^{-5} cm/s; UII, 1987).

If any Utah State appropriated water rights are impacted by mining and reclamation operations at the Coal Hollow Mine (or at the 85.88-acre new Dame Lease IBC), these will be replaced according to all applicable Utah State laws and regulations using the designated water replacement source described in Chapter 7 of the Coal Hollow Mine MRP (Section 727).

Monitoring wells and geologic borings

No previous coal mining is known to have occurred within the Coal Hollow Mine permit or the new Dame Lease 85.88-acre IBC. However, during several decades prior to the commencement of coal mine permitting activities by Alton Coal Development, LLC in 2005, it is known that several operators performed various permitting activities, conducted coal

exploration drilling programs, and performed miscellaneous environmental studies in conjunction with the these permitting activities. In conjunction with these activities, it is known that numerous monitoring wells were drilled and completed, geologic borings were made, and miscellaneous other drilling activities occurred within the Coal Hollow Mine and adjacent areas (including the 85.88-acre new Dame Lease IBC area). Notably, two large-diameter (16 to 20 inch diameter well casings) water wells were drilled and completed in the Alton area in 1961. These wells were both more than 1,400 feet deep and extended to the Navajo Sandstone (Utah DNR, 1981). Prior to 2010, both of these wells remained in-tact. While neither of these two wells is located within the Coal Hollow Mine permit area, one of the wells was located immediately east of the existing mine permit area. This well was plugged and abandoned by Alton Coal Development in 2010. The second well (located north of the mine permit area) reportedly remains in-tact. Apparently, some of the old monitoring wells and geologic borings in the Alton Coal Field were abandoned prior to 2005. However, reliable information regarding the abandonment procedures used to abandon these wells has not been obtained. Currently, scattered throughout the Coal Hollow Mine permit and adjacent areas are numerous monitoring wells constructed prior to the commencement of permitting and mining activities by Alton Coal Development in 2005. Some of these wells are known to extend through the coal seam, while others are screened in the alluvium. In researching the records created by previous potential mining company operators in the Alton Coal Field, records on many of these wells have been obtained (UII, 1987). Additional historic well information has been obtained by Alton Coal Development, LLC from the U. S. Bureau of Land Management. Known monitoring well and geologic boring locations in the vicinity of the proposed highwall mining operations are shown on Figure 4.

If the highwall mining holes were to intersect an open borehole or improperly abandoned well, there would be the potential for groundwaters from overlying areas (if saturated permeable zones are present at that location) to flow through the open boreholes into the highwall mining holes at appreciable rates. As described previously, because the proposed highwall mining operations at the Coal Hollow Mine will access the Smirl coal seam from the bottom of excavated trenches, the potential environment concerns that could arise from an unplanned interception of an open borehole could be mitigated by sealing the affected

borehole, and subsequently backfilling the access trench with the widely available low-permeability native materials at the mine site. To minimize the potential for this occurrence, identified historic monitoring wells and geologic boring locations will be avoided with the highwall mining holes.

Presence of acid-forming or toxic-forming materials

Chemical information on the acid- and toxic-forming potential of earth materials naturally present in the existing mine permit area are presented in the Coal Hollow Mine MRP (Appendix 6-2). Chemical information on the low-sulfur Smirl coal seam proposed for mining is presented in the Coal Hollow Mine MRP (Appendix 6-1; confidential binder). Based on the close proximity of the 85.88-acre new Dame Lease IBC area to the existing Coal Hollow Mine area, and because the geologic conditions present in the IBC area are similar to the geologic conditions in the adjacent Coal Hollow Mine permit area, it is believed that the acid- and toxic-forming materials information collected from the existing permit area is generally representative of conditions in the new Dame Lease IBC area.

Based on laboratory analytical data, it is apparent that acid-forming and toxic-forming materials that could result in the contamination of surface-water or groundwater supplies in the proposed Coal Hollow Mine permit and adjacent area (including the 85.88-acre new Dame Lease IBC area) are generally not present.

Selenium was not detected in any of the samples from the Coal Hollow Mine permit area. Likewise, concentrations of water-extractable boron were also low, being less than 3 mg/kg in all samples analyzed. The pH of groundwaters in and around the Coal Hollow Mine permit area (including the 85.88-acre new Dame Lease IBC) is moderately alkaline (UDOGM, 2013). Data in the Coal Hollow Mine MRP (Appendix 6-2) likewise indicate moderately alkaline conditions in sediments in the existing mine permit area. The solubility of many dissolved trace metals is usually limited in waters with alkaline pH conditions. Consequently, high concentrations of these metal constituents in groundwaters and surface waters with elevated pH levels are not anticipated. Additionally, most of the materials that are handled as part of mining and reclamation activities in the Coal Hollow Mine area are of

low hydraulic conductivity (i.e. clays, silts, shales, siltstones, claystones, etc.). Consequently, it has been the experience at the Coal Hollow Mine that groundwater seepage volumes through low-permeability backfill and reclaimed land surfaces in reclaimed mine pit areas and excess spoils storage areas have not been large. Such conditions are anticipated during future operations at the Coal Hollow Mine. Additionally, reclaimed areas will be regraded, sloped, and otherwise managed to minimize the potential for land erosion, to restore approximate surface-water drainage patterns, and also to minimize the potential for ponding of surface waters on reclaimed areas (other than "roughening" or "gouging" of some areas to enhance reclamation). Thus, the potential for interactions between large amounts of disturbed earth materials and groundwaters and surface waters, which could result in leaching of chemical constituents into groundwater and surface-water resources, will be minimized.

Additionally, the mining plan calls for the emplacement of 40 inches of suitable cover material over backfilled areas made up of material types which could appreciably impact vegetation (materials with elevated SAR ratios or other physical or chemical characteristics that could adversely impact vegetation).

The neutralization potential greatly exceeded the acid potential in all samples analyzed, with the neutralization potential commonly exceeding the acid potential by many times, suggesting that acid-mine-drainage will not be (and have not been) a concern at the Coal Hollow Mine. Acid-forming materials in western coal mine environments often consist of sulfide minerals, commonly including pyrite and marcasite, which, when exposed to air and water, are oxidized causing the liberation of H^+ ions (acid) into the water. Oxidation of sulfide minerals may occur in limited amounts in the mine pits where oxygenated water encounters sulfide minerals. However, the acid produced by pyrite oxidation is quickly consumed by dissolution of abundant, naturally occurring carbonate minerals (see Coal Hollow Mine MRP; Appendix 6-2). Dissolved iron is readily precipitated as iron-hydroxide in well-aerated waters, and consequently excess iron is not anticipated (nor is it usually present) in mine discharge water.

Other acid-forming materials or toxic-forming materials have not been identified in significant concentrations nor are such suspected to exist in materials to be disturbed by mining.

Because of the overall low-permeability of the rock strata and sediments surrounding the proposed highwall mining holes in the 85.88-acre new Dame Lease IBC, the potential for seepage of mine water outward into adjacent stratigraphic horizons is low. Additionally, because the floors of the mine pits need to be accessible in order to extract the coal, the mining operations will be carried out in such a manner that the accumulation of large amounts of water in the highwall mine access trenches will be avoided.

Sediment yield from the disturbed area

Because there will be no surface disturbance within the highwall mining areas within the new Dame Lease IBC, additional sediment yield from these areas is not anticipated. Within the trench areas from which the highwall mining will take place, as well as along the coal haul roads (outside the new Dame Lease IBC), erosion from disturbed areas will be minimized through the use of silt fences and other sediment control devices. Surface runoff occurring on disturbed areas will be collected and treated as necessary to remove suspended matter.

Cut ditches will be established on the shoulders of all primary roads to control drainage and erosion. Cut and fill slopes along the primary roads will be minimal and are not expected to cause significant erosion. In locations where there are culvert crossings, the fills slopes will be stabilized by utilizing standard methods such as grass matting or straw wattles. The location and details for roads can be viewed in Chapter 5 of the Coal Hollow Mine MRP (Drawings 5-3 and 5-22 through 5-24).

Through the implementation of these sediment control measures, it is anticipated that sediment yield from disturbed areas in the Coal Hollow Mine permit area will continue to be minimized.

Impacts to important water quality parameters

As discussed above, appreciable quantities of intercepted groundwater are not anticipated in association with the highwall mining operations at the Coal Hollow Mine due primarily to the lack of appreciable groundwater systems in the overlying low-permeability Tropic Shale. Similarly, appreciable quantities of groundwater are not expected to upwell from the Dakota Formation in the highwall mine holes. This conclusion is based on the fact that 1) vertical and horizontal groundwater flow in the Dakota Formation is impeded by the presence of low-permeability shales that encase the interbedded lenticular sandstone strata in the formation (i.e., the formation is not a good aquifer), and 2) appreciable natural discharge from the Dakota Formation in the surrounding area to springs or streams is not observed. Similarly, no appreciable inflows of groundwater from the Dakota Formation into the previously mined pits at the Coal Hollow Mine have been observed. Rather, as anticipated, the only appreciable source of groundwater inflow to the mine pit areas has been from saturated near-surface alluvial deposits. These observations support the conclusion that the natural flux of groundwater through the Dakota Formation is meager. As discussed previously, the results of aquifer testing performed on wells screened in the Smirl coal seam indicate relatively low values of hydraulic conductivity for the coal seam (see Table 7 of Appendix 7-1 of the Coal Hollow Mine MRP), suggesting that it is unlikely that large inflows of water from the Smirl coal seam into the highwall mine holes would occur. Accordingly, because it is considered unlikely that large quantities of groundwater will be intercepted during the highwall mining operations (from either the Tropic Shale or the Dakota Formation), it is likely that discharge of large quantities of intercepted groundwater from the mine to receiving waters (such that impacts to important water quality parameters in the receiving waters could occur) will not occur. For these reasons, it is considered unlikely that impacts to important water quality parameters in groundwater and/or surface water resources in the mine area will occur as a result of the proposed highwall mining operations at the Coal Hollow Mine.

The water quality of groundwaters in the alluvial groundwater system up-gradient of mining operations will likely not be impacted by mining and reclamation activities in the proposed highwall mining areas at the Coal Hollow Mine. In the unlikely event that alluvial groundwaters were to be intercepted by the mine holes and this water was allowed to flow

into the mine pits, there would be the potential for increased TDS concentrations as the water interacts with the marine Tropic Shale and the Smirl coal seam.

As groundwater naturally migrates through the shallow, fine-grained alluvial sediments in the Coal Hollow Mine permit and adjacent area (most evident in Sink Valley), the quality of the water is naturally degraded. In the distal portions of Sink Valley, most notably concentrations of magnesium, sulfate, and bicarbonate are elevated in the alluvial groundwater.

The potential for TDS increases associated with interaction of waters with the Tropic Shale can be minimized by avoiding contact where practical between water sources and earth materials containing soluble minerals.

As discussed above, acid mine drainage is not anticipated (nor has it been encountered) at the Coal Hollow Mine permit area. This is due primarily to the relatively low sulfur content of the coal and rock strata in the permit and adjacent area, and to the pervasiveness of carbonate minerals in the soil and rock strata which neutralize the acidity of the water if it occurs. If sulfide mineral oxidation and subsequent acid neutralization via carbonate dissolution were to occur, increases in TDS, calcium, magnesium, sulfate, and bicarbonate concentrations (and possibly also sodium concentrations via ion-exchange with calcium or magnesium on exchangeable clays) would be anticipated.

At any mining operation there is the potential for contamination of soils, surface-water and groundwater resources resulting from the spillage of hydrocarbons. Diesel fuels, oils, greases, and other hydrocarbons products will be stored and used at the mine site for a variety of purposes. A spill Prevention Control and Countermeasure Plan has been implemented at the Coal Hollow Mine that helps to minimize any potential detrimental impacts to the environment.

Spill control kits are provided on all mining equipment and personnel will be trained to properly control spills and dispose of any contaminated soils in an appropriate manner.

Based on these findings, it is concluded that the potential for mining and reclamation activities in the Coal Hollow Mine permit area (including the new Dame Lease IBC) to cause detrimental impacts to important water quality parameters is minimal.

Flooding or streamflow alteration

As described above, appreciable groundwater inflows to the highwall mine holes are not anticipated. This conclusion is based on the hydrogeologic characteristics of the Tropic Shale, Dakota Formation, and the Smirl coal seam, and is also based on previous experience at the Coal Hollow Mine. Consequently, the maximum reasonably foreseeable rates of groundwater drainage into the highwall mining holes that could occur would very likely not be of a magnitude that could potentially cause flooding or streamflow alteration in either the Sink Valley Wash or Lower Robinson Creek drainages.

If excess groundwater were to be encountered during mining operations such that it could not be adequately managed or discharged in compliance with the Utah UPDES discharge permit (which is considered unlikely), Alton Coal Development, LLC may when necessary construct supplemental containment and settlement ponds in which mine discharge waters may be held for treatment (where necessary) and subsequent discharge through UPDES discharge points in compliance with the UPDES discharge permit, minimizing the potential for flooding or streamflow alteration in areas adjacent to mining.

The surface-water drainages adjacent to the Coal Hollow Mine permit area have large discharge capacities (lower Sink Valley Wash, Lower Robinson Creek, and Kanab Creek). These drainages periodically convey very large amounts of precipitation water associated with torrential precipitation events. The anticipated maximum discharge rates from the highwall mining holes based on any reasonably foreseeable scenario and the corresponding amounts of mine discharge water that could potentially be required to be discharged from the highwall mining trench areas is much less than that periodically occurring during major torrential precipitation events. While the addition of modest amounts of sediment-free water into these stream channels has the potential to cause minor increases in channel erosion, the

magnitude of this potential impact is inconsequential relative to that occurring during torrential precipitation events.

The potential for flooding or streamflow alteration resulting from the proposed highwall mining operations at the Coal Hollow Mine permit is considered minimal.

Groundwater and surface water availability

Groundwater use in the proposed Coal Hollow Mine permit and adjacent area (including the new Dame Lease 85.88-acre IBC area) is generally limited to stock watering and domestic use in Sink Valley. Some limited use of spring discharge water for irrigation has occurred in Sink Valley, although such irrigation is not occurring presently nor has it occurred in at least the past 10 years.

As discussed previously, there is only a very limited potential for the interception of appreciable quantities of groundwater during the proposed highwall mining operations at the Coal Hollow Mine. Additionally, if any such impact were to occur, it would be short-lived because the highwall mining areas are to be sealed and backfilled shortly after mining in an area is competed, limiting the potential for the outflow of water from the mined area. Consequently, the potential for impacts to groundwater and surface-water availability as a result of the proposed highwall mining operations is considered low.

Whether mining and reclamation activity will result in contamination, diminution or interruption of State-appropriated waters

As discussed previously, it is considered unlikely that long-term impacts to groundwater or surface-water resources will occur as a result of the proposed highwall mining operations at the Coal Hollow Mine. Consequently, the potential for highwall-mining-related activities to result in the contamination, diminution, or interruption of State-appropriated waters is considered low. In the event that any State appropriated waters were to be contaminated, diminished, or interrupted due to mining and reclamation activities in the Coal Hollow Mine permit area (including the new Dame Lease IBC), groundwater will be replaced according to

all applicable State laws and regulations using the replacement water source described in Chapter 7 of the Coal Hollow Mine MRP (Section 727).

RECOMMENDED MONITORING PLANS FOR SURFACE WATER AND GROUNDWATER

In order to monitor for potential impacts to surface-water and groundwater resources resulting from mining and reclamation activities in the New Dame Lease 85.88-acre IBC, we recommend monitoring at the sites listed below. The locations of these recommended monitoring sites are shown on Figure 3 and also on Drawing 7-10 of the Coal Hollow Mine MRP. It is noted that all of these locations are currently included on the Coal Hollow Mine groundwater and surface-water monitoring plan for other reasons. We recommend that the same monitoring frequency and monitoring protocols that are listed in Table 7-4 be used for the monitoring associated with mining in the 85.88 acre new Dame Lease IBC.

GROUNDWATER

Springs

SP-8 (alluvial spring within IBC area)

SP-14 (alluvial spring adjacent to IBC area)

SP-20 (alluvial spring within IBC area)

SP-22 (alluvial spring adjacent to IBC area)

SP-40 - Sorensen Spring (alluvial spring adjacent to IBC area)

Wells

C4-15 (alluvial monitoring well within IBC area)

C4-30 (alluvial monitoring well within IBC area)

C4-50 (alluvial monitoring well within IBC area)

C2-15 (alluvial monitoring well adjacent to IBC area)

C2-28 (alluvial monitoring well adjacent to IBC area)

C2-40 (alluvial monitoring well adjacent to IBC area)

C3-15 (alluvial monitoring well adjacent to IBC area)

C3-30 (alluvial monitoring well adjacent to IBC area)

C3-40 (alluvial monitoring well adjacent to IBC area)

C5-130 (alluvial monitoring well adjacent to IBC area)

Y-61 (alluvial monitoring well adjacent to IBC area)

SURFACE WATER

SW-6 (Sink Valley Wash below IBC area)

SW-9 (Sink Valley Wash below IBC area)

The recommended monitoring plan for groundwater and surface-water monitoring at the 85.88-acre new Dame Lease IBC area is intended to provide verification that mining-related impacts to groundwater and surface-water systems do not occur, and to determine the magnitude and character of potential impacts if they do occur. Comparisons between monitoring data (for the parameter of interest or concern) collected during baseline pre-mining conditions should be made with monitoring data (for the same parameter or interest of concern) collected during the operational and/or reclamation phase of mining to determine impacts. When changes to monitored parameters subsequent to mining in an area are observed in the monitoring data, an analysis of all data should be performed to determine the cause(s) of the change in the hydrologic condition. In utilizing the monitoring data to detect or quantify potential mining-related impacts, it is necessary to evaluate all factors relevant to the prevailing hydrologic conditions together with the monitoring data. This is because other factors, which are not related to the mining activity, may cause changes in the prevailing hydrologic conditions. In particular, climatic variability (which may result in increased or decreased groundwater and surface-water flow rates, changes in water levels in wells, and changes in water quality) should be carefully evaluated together with the monitoring data. Other factors that may influence coal mine hydrology include grazing practices, land use, and range condition. A convenient and useful means of evaluating regional climatic data is through the use of the Palmer Hydrologic Drought Index, which is a monthly value that indicates the severity of wet and dry spells that is generated by the National Climatic Data Center and available on-line at http://www1.ncdc.noaa.gov/pub/data/cirs/drd964x.phdi.txt.

The use of Stiff (1951) diagrams is a useful technique that is frequently used to analyze and compare groundwater and surface-water quality characteristics from various sources. Information required to create Stiff diagrams is available from the Division of Oil, Gas and Mining Coal Water Quality Database, which is freely accessible at: http://ogm.utah.gov/coal/edi/wqdb.htm. Additional information on coal mining hydrology and potential mining-related impacts, which can be used to assist in the evaluation of monitoring data and potential mining-related impacts is provided on the Utah Division of Oil, Gas and Mining web page at http://ogm.utah.gov/coal/water/default.htm.

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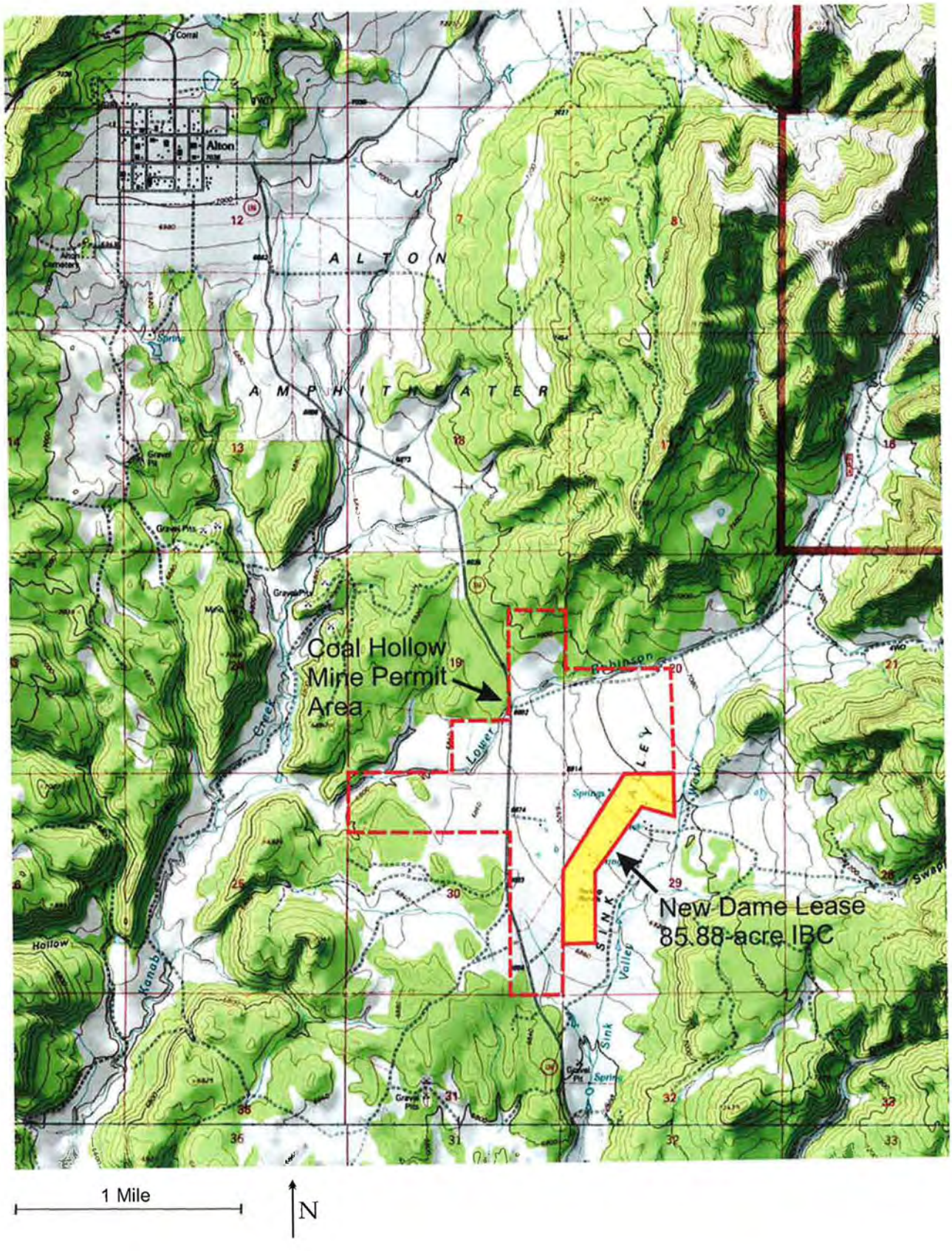
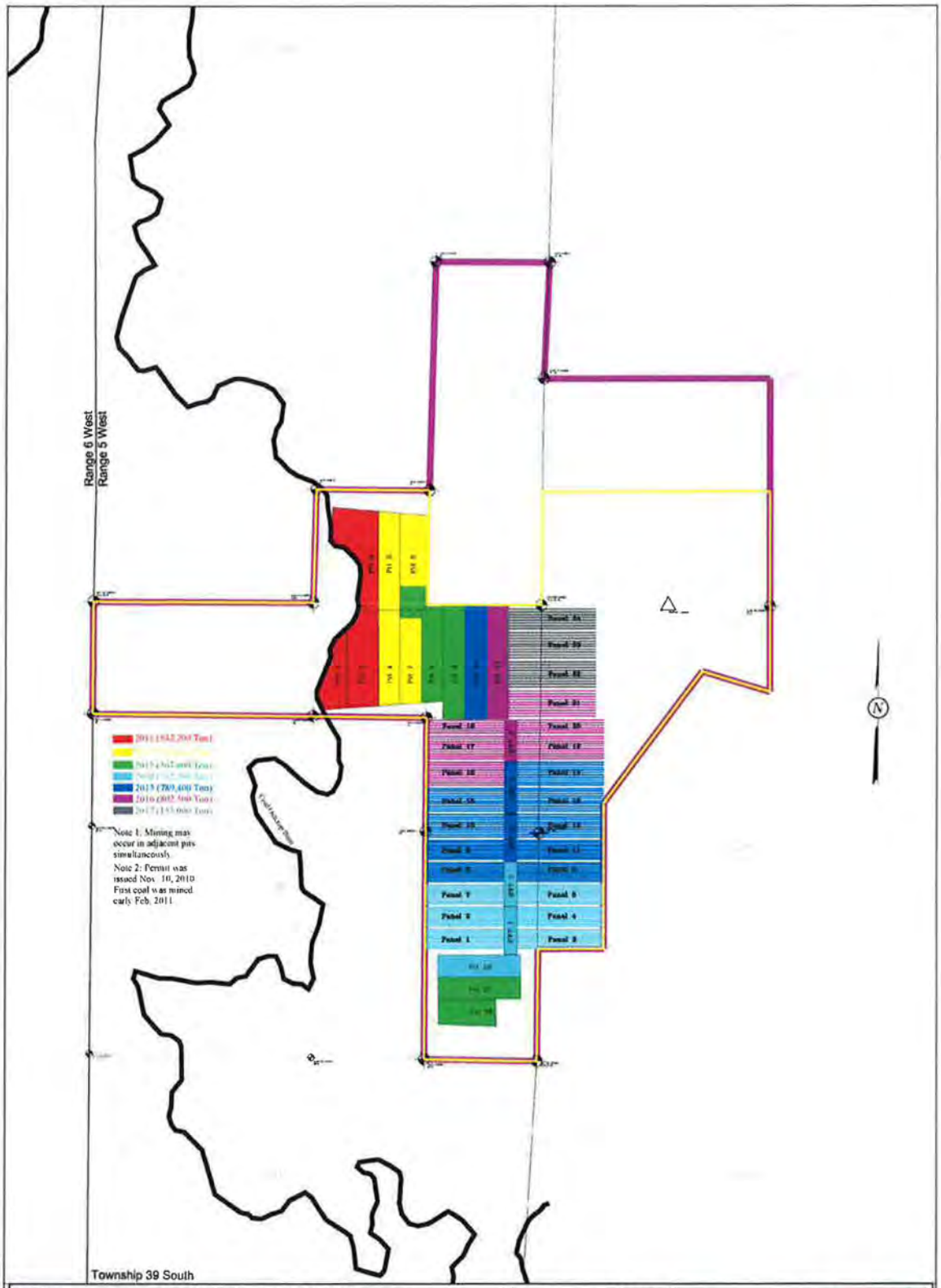


Figure 1 Location of the Coal Hollow Mine permit area and the new Dame Lease 85.88-acre IBC.



LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- COAL RECOVERY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOLRI	WJ
DRAWING: Figure 2	DATE: 4/20/07
	SCALE:
JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
9/16/08	CRM
02/24/11	JKSR
06/28/11	KN
01/16/13	KN
03/18/13	KN
10/30/13	KN

COAL REMOVAL SEQUENCE

SURFACE & HIGHWALL MINING

COAL HOLLOW PROJECT
ALTON, UTAH

FIGURE 2

Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone 435-867-5301
Fax 435-867-1192

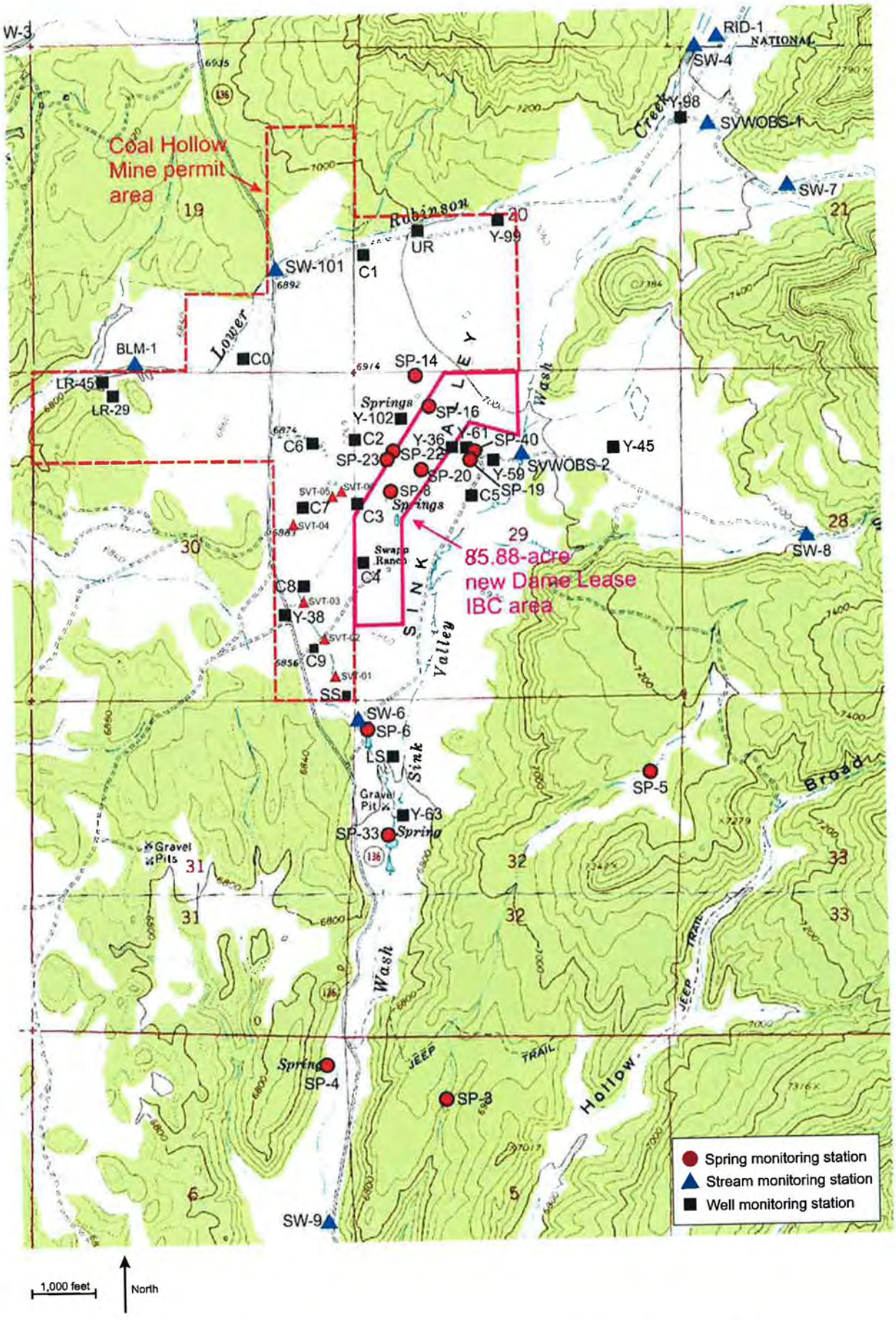
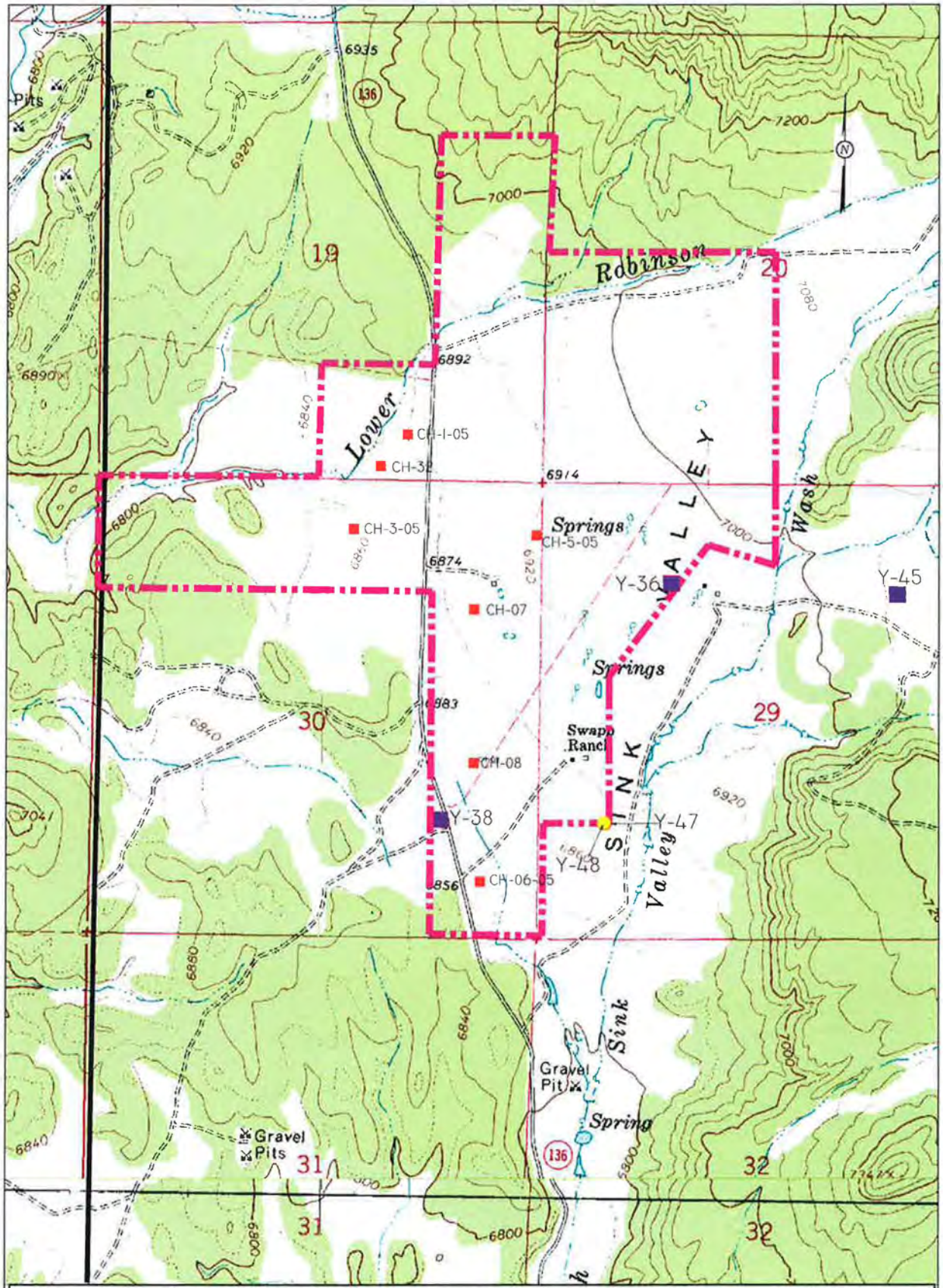


Figure 3 Spring, well, and stream monitoring sites near the new Dame Lease 85.88-acre IBC area.



LEGEND:	DRAWN BY:	CHECKED BY:
PERMIT BOUNDARY	E. PETERSEN	ECP/CRM
COAL MONITORING WELL	DRAWING: Figure 4	DATE: 4/30/07
CORE HOLES		SCALE: 1" = 500'
COAL WELLS NOT MONITORED	JOB NUMBER: 1400	SHEET

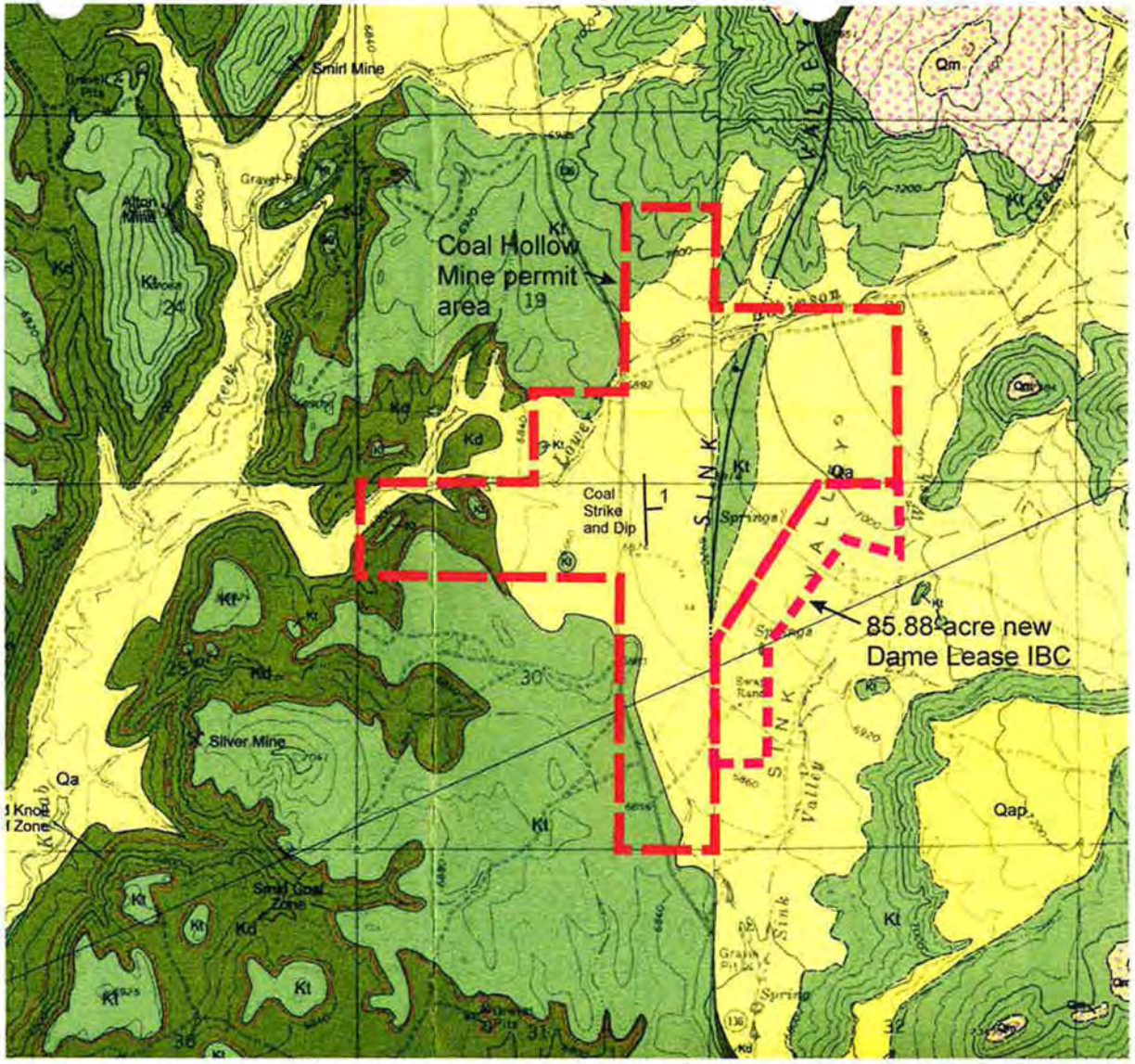
REVISIONS	
DATE:	BY:
12/18/08	ECP
10/30/13	KN

LOCATION of KNOWN COAL BORINGS

COAL HOLLOW PROJECT
ALTON, UTAH

FIGURE 4

Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192



Map Symbols

- Contact - *dashed where approximately located*
- Normal Fault - *dashed where approximately located or inferred; dotted where concealed; ball and bar on down-thrown side; X marks the point of reversal of offset on scissor(?) faults; arrows on cross section show offset*
- Strike and dip of bedding
- Strike of vertical joint
- Horizontal joint
- Line of cross section
- Coal zone - approximately located
- Coal mine or prospect
- Approximate line of measured section (appendix)

2,000 feet

N

- Qa — Alluvium
- Qms — Landslide deposits
- Qm — Mass-wasting debris
- Qap — Pediment alluvium
- Qb — Basalt
- Tbh — Brian Head Formation
- Tcw — White member of Claron Formation
- Tcp — Pink member of Claron Formation
- Kwk — Wahweap and Kaiparowits Formations (undivided)
- Ksd — Drip Tank Member of the Straight Cliffs Formation
- Ksj — John Henry Member of the Straight Cliffs Formation
- Smoky Hollow Member of the Straight Cliffs Formation
- Tibbet Canyon Member of the Straight Cliffs Formation
- Kt — Tropic Shale
- Kd — Dakota Formation
- Jcw — Winsor Member of the Carmel Formation

Figure 5 - Geologic map of the 85.88-acre new Dame Lease IBC and adjacent area (after Tilton, 2001).

CHAPTER 8

R645-301-800. BONDING AND INSURANCE

820. REQUIREMENT TO FILE A BOND

820.100 The Operator Agrees to File a Bond.

After the permit application is approved, but before the permit is issued, the applicant will file with the Division, on a form prescribed and furnished by the Division, a bond or bonds conditioned upon performance of all requirements of the State Program, the permit and the reclamation bond.

820.110-111 Area to be Covered by the Performance Bond

The disturbed area at the Coal Hollow Project will be bonded. Bonding will be in Phases according to sequence of disturbance identified on Drawing 5-3. The area to be mined is also identified on Drawing 5-3.

820.112-114 Incremental Bonding

Not applicable at this time.

820.120 Acceptance of Bond

The applicant agrees not to commence operations until the Division approves a performance bond for the Coal Hollow Project.

820.130 Coverage of Bond

The applicant will provide a performance bond for the disturbed area within the permit.

820.200 Form of the Performance Bond

820.223 Surety Bond

Alton Coal Development, LLC is proposing to submit a surety bond consistent with the requirements of R645-301-860.100 and any additional requirements in the State Program.

830. DETERMINATION OF BOND AMOUNT

830.100 Determined by the Division

The amount of the bond required will be determined by the Division.

830.140 Detailed Estimated Costs

The bonding amount for final reclamation will depend upon the approved permit and reclamation plan (R645-301-830.120). The alternative highwall mining will reduce surface disturbance. Mining disturbance to the surface will be reduced along with reclamation needs. Thus, estimates have been completed for the individual mining phases shown in Drawings 5-17, 5-18 and 5-19 ,the mining that will generate the largest disturbance and require the larger bond. These estimates are provided as Appendix 8-1. These cost calculations are based on the specific details shown on these drawings. As requested by the Division, a separate bond estimate is completed for all three phases shown in the drawings and in general, each stage is representative of the expected reclamation liability for Phase 1, 2 and 3, respectively. If the alternative highwall mining is selected the bond will be reduced as appropriate for the area of disturbance generated. The bond estimate by Phase, escalated for the 2017 (anticipated end of mining) is the following:

Phase 1:	$5,346,000
Phase 2:	$9,888,000
Phase 3:	$6,624,000

A summary and supporting calculations for these cost estimates is provided in Appendix 8-1.

840. GENERAL TERMS AND CONDITIONS OF THE BOND

General terms and conditions of the bond as stated at R645-301-840 through R645-301-840.520 will be met by Alton Coal Development, LLC

850. BOND REQUIREMENTS FOR UNDERGROUND COAL MINING

Not Applicable

860. FORM OF BOND

860.100 Surety Bond

The applicant will submit a surety bond as defined under R645-100-200 and meet all the requirements under R645-301-860.110 to .120.

870. REPLACEMENT OF BONDS

Equivalent bond coverage will be provided if Alton Coal Development, LLC replaces the surety bond.

880. REQUIREMENT TO RELEASE PERFORMANCE BONDS

Upon completion of reclamation operations, the applicant will apply for bond release and meet the requirements of R645-301-880.

890. TERMS AND CONDITIONS FOR LIABILITY INSURANCE

890.100 Certificate of Liability Insurance

A copy of the Certificate of Liability Insurance is provided in Appendix 1-3. Alton Coal Development, LLC will meet the requirements of R645-301-890 prior to commencing any mining operations.

R6W R5W

Alton

ALTON AMPHITHEATER

Alton Cemetery

Spring

Gravel Pit

Gravel Pits

Mine

Creek

Lower Robinson Creek

SINK VALLEY

Springs

Swapp Ranch

Kanab Wash

Sink Valley Wash

Broad Hollow

JEEP TRAIL

NATIONAL FOREST

T 39 S

T 40 S

LEGEND:			
PERMIT AREA	DRAWN BY: N. BUTKOVICH	CHECKED BY: APC	
INCIDENTAL BOUNDRY CHANGE	DRAWING: 1 – 1	DATE: 8/16/04	
COAL LINE BOUNDARY		SCALE: 1" = 1000'	
COUNTY ROAD	JOB NUMBER: 1400	SHEET	

REVISIONS	
DATE:	BY:
8/25/08	CRM
10/18/13	KN

PERMIT AREA

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 1-1

RECEIVED
JAN 16 2014
DIV. OF OIL, GAS & MINING

UTAH REGISTERED PROFESSIONAL ENGINEER #154168 DAN W. GUY 10/28/13

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

R6W R5W

ALTON

PRIVATE

AMPHITHEATER

NATIONAL FOREST

Alton

Alton Cemetery

Gravel Pit

Gravel Pits

Mine

Spring

Springs

Swapp Ranch

Sink Valley

Robinson Creek

Lower Kanab Creek

Kanab Wash

Swapp Wash

Broad Hollow

JEEP TRAIL

T 39 S

T 40 S

LEGEND:

- PROPOSED LBA BOUNDARY
- PERMIT AREA
- COAL LINE BOUNDARY
- COUNTY ROAD

DRAWN BY:	CHECKED BY:
N. BUTKOVICH	APC
DRAWING: 1–2	DATE: 8/16/04
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
8/25/08	CRM
10/18/13	KN

PERMIT AREA WITH LBA

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 1-2

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 10/28/13

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

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DIV. OF OIL, GAS & MINING

R6W R5W

ALTON TOWN

ALTON

A L T O N

A M P H I T H E A T E R

NATIONAL FOREST

Alton
Alton Cemetery
Spring
Gravel Pit
Gravel Pits
Mine
Keith R. & Anne Marie Stanworth 9-5-18-2
Lower Kanab Creek
Swapp Ranch
Sink Valley Wash
Broad Hollow
JEEP TRAIL
Roundabout Creek
Dry

12 7 13 18 17 16 24 19 20 21 25 30 29 28 36 31 32 33

20 Acres Orval & Greta Palmer 9-6-12-6	20 Acres Kenley & Natalie Palmer 9-6-12-9
20 Acres Kenley Glover 9-6-12-7A	413 Acres Heaton Brothers LLC 9-5-7-1
20 Acres Gary & Terri Glover 9-6-12-7	30 Acres Delbert & Karen Palmer 9-5-7-3
7 Acres Orval & Greta Palmer 9-6-12-3	20 Acres G. Ferril and Dorothy M. Heaton 9-6-12-5A
40 Acres Palmer #1 Ranch 9-5-7-6	31 Acres Gene Edward Roundy 9-5-7-5
60 Acres Gene Edward Roundy 9-6-12-8	40 Acres Darol A. & Georgia T. Heaton 9-6-12-4
77.25 Acres Dean R. Heaton 9-5-7-4	206 Acres Heaton Brothers, LLC 9-6-12-5
7 Acres Orval & Greta Palmer 9-6-12-3	10 Acres G. Ferril and Dorothy M. Heaton 9-6-12-1
15.0 Acres Dean R. Heaton 9-5-7-4A	30 Acres G. Ferril and Dorothy M. Heaton 9-5-7-3A
20 Acres Dean R. Heaton 9-6-12-2	200 Acres Heaton Brothers, LLC 9-6-13-2
10 Acres Dean R. Heaton 9-5-18-3	30 Acres G. Ferril and Dorothy M. Heaton 9-5-18-5
40 Acres Heaton Brothers LLC 9-5-18-4	120 Acres Heaton Brothers, LLC 9-6-13-1
38.34 Acres G. Ferril and Dorothy M. Heaton 9-5-18-3A	600.36 Acres Heaton Brothers LLC. 9-5-17-1
151.97 Acres Mackelprang William & Helen Palmer 9-5-18-1	320 Acres John Bramall 9-6-24-2
37.71Acres Heaton Brothers LLC 9-5-20-3	316.78 Acres C. Burton Pugh 9-5-20-2
332.92 Acres C. Burton Pugh 9-5-21-2	160 Acres C. Burton Pugh 9-5-19-1
40 Acres Brigham Johnson 9-6-24-1	76.89 Acres Darlynn & Arlene Sorensen 9-5-21-1
80 Acres Darlynn & Arlene Sorensen 9-5-19-1	120 Acres Brigham Johnson 9-6-25-3
49.92 Acres Bradley Lamb 9-6-25-2	159.60 Acres C. Burton Pugh 9-5-30-2
36.04 Acres C. Burton Pugh 9-5-29-3	55.88 Acres Richard L. Dame 9-5-29-2
518.14 Acres Darlynn & Arlene Sorensen 9-5-29-1	550.33 Acres Darlynn & Arlene Sorensen 9-5-28-1
60 Acres Dale &or Suzanne Brinkerhoff 9-5-21-1	93.68 Acres C & F Properties 9-6-25-4
61.96 Acres Richard L. Dame 9-5-30-1	65.96 Acres Darlynn & Arlene Sorensen 9-5-32-3
640 Acres Paunsaugunt Holding Trust 9-6-36-1	54.02 Acres Lloyd Johnson 9-5-32-2
395.23 Acres Darlynn & Arlene Sorensen 9-5-33-1	XX Acres Heaton Brothers, LLC 40-6-6-1

T 39 S
T 40 S

LEGEND:

- PROPOSED LBA BOUNDARY
- PERMIT AREA
- BLM OWNERSHIP
- PRIVATE OWNERSHIP
- SURFACE OWNERSHIP BOUNDARY

DRAWN BY:	CHECKED BY:
N. BUTKOVICH	LWJ
DRAWING: 1 – 3	DATE: 8/16/04
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
7/1/13	KN
10/18/13	KN

SURFACE OWNERSHIP

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COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 1-3

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 10/28/13

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

#	FEDERAL OWNERSHIP
	United States of America - BLM

#	PRIVATE OWNERSHIP
1	C. Burton Pugh, Roger M. Pugh, and Margaret Moyers
	9-6-30-2, 9-5-19-1, 9-5-29-3, 9-5-20-2
1a	Mineral leased to Alton Coal Development
2	Richard L. Dame 9-5-30-1, 9-5-29-2
2a	Mineral leased to Alton Coal Development
3	Heaton Brothers, LLC 9-6-13-1, 9-6-13-2, 9-6-12-5
4	G. Ferril & Dorothy M. Heaton 9-5-18-3A, 9-5-18-5, 9-5-7-3A, 9-6-12-1
5	Dean R. Heaton 9-6-12-2, 9-5-18-3, 9-5-7-4A, 9-5-7-4
6	Gene Edward Roundy 9-6-12-8, 9-5-7-5
7	Orval Palmer & Gerta L. Palmer 9-6-12-3
8	Darol A. Heaton & Georgia T. Heaton 9-6-12-4
9	Darlynn & Arlene Sorensen 9-5-20-1, 9-5-29-1
10	James Johnson, Lloyd Johnson & Julie Johnson
11	Sharon C. Lamb & Lorene C. Lamb
12	Swapp Livestock Co.

R6W R5W

ALTON TOWN

T 39 S
T 40 S

LEGEND:

- PERMIT BOUNDARY
- BLM OWNERSHIP
- PRIVATE OWNERSHIP
- COAL OWNERSHIP BOUNDARY
- COUNTY ROAD

DRAWN BY:	CHECKED BY:
N. BUTKOVICH	APC
DRAWING: 1 – 4	DATE: 8/16/04
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
9/13/04	NLB
3/6/06	JAS
6/6/06	NLB
2/21/07	NLB
8/25/08	CRM
10/18/13	KN

COAL OWNERSHIP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 1-4

UTAH REGISTERED #154168 DAN W. GUY 10/8/13 PROFESSIONAL ENGINEER

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LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- COUNTY ROAD
- FOUND SECTION CORNER (SURVEYED)

DRAWN BY:	CHECKED BY:
C. MCCOURT	
DRAWING: 1–5	DATE: 10/13/08
	SCALE: 1" = 100'
JOB NUMBER: 1400	SHEET 1 OF 1

REVISIONS

DATE:	BY:
10/18/13	KN

Permit Boundary and Occupied Dwelling at Swapp Ranch

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COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 1-5

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Fax (435)867-1192

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER (SURVEYED)

DRAWN BY:	CHECKED BY:
C. MCCOURT	ECP
DRAWING: 1–6	DATE: 12/10/08
	SCALE: 1" = 100'
JOB NUMBER: 1400	SHEET 1 OF 1

REVISIONS

DATE:	BY:
10/18/13	KN

Permit Boundary and Sorenson Ranch Buildings

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COAL HOLLOW PROJECT ALTON, UTAH

DRAWING: 1-6

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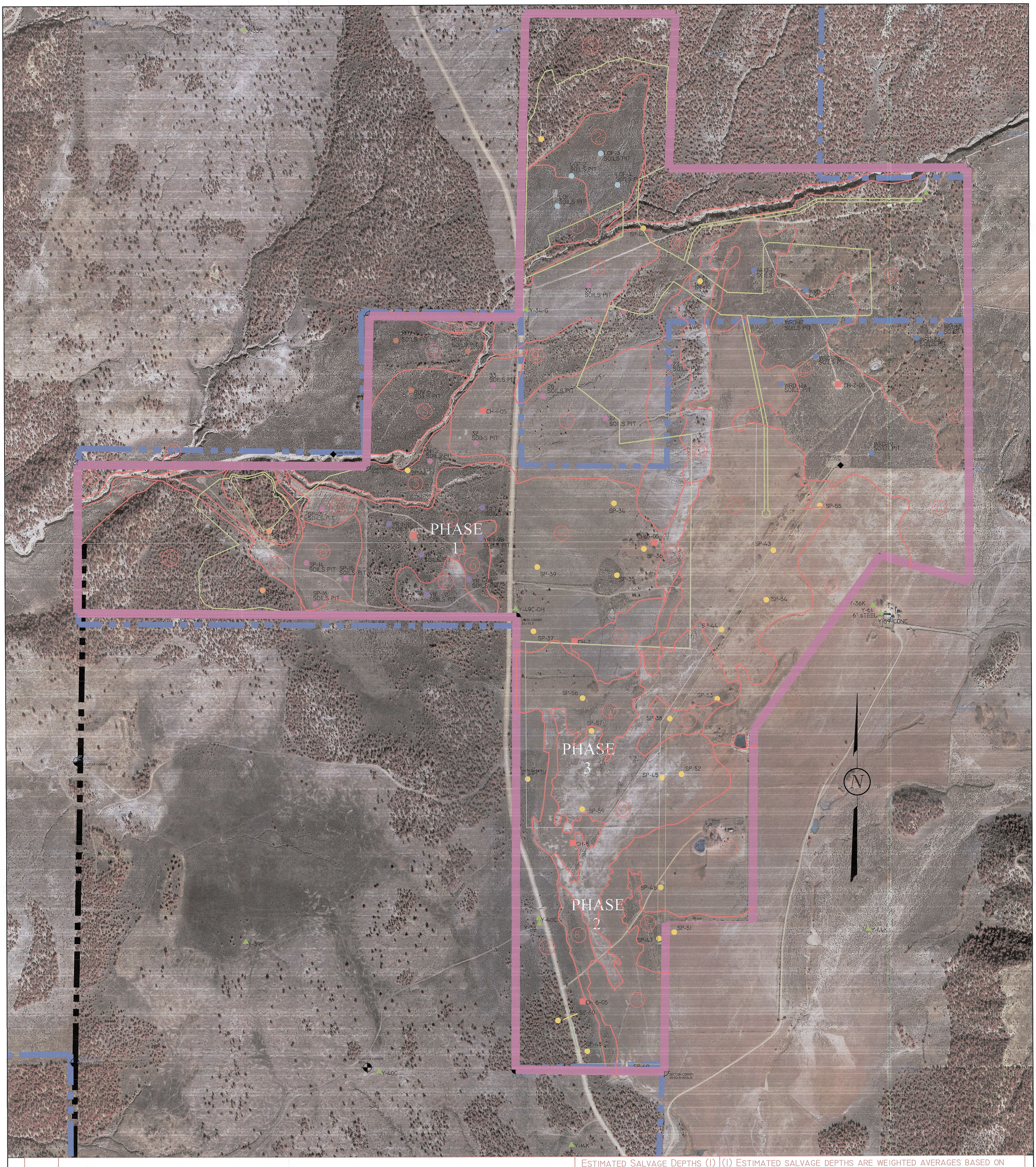
Fax (435)867-1192



Map Unit	Map Unit Name	Estimated Salvage Depths (1) Topsoil Depth	Good/Fair Subsoil(2)	Poor Subsoil(3)
		--------INCHES--------		
1	A Family - Wapiti Family complex, 3 to 8 percent slope	9	23	55
2	M Family - Calendar Family - D Family complex, 3 to 8 percent slopes	7	17	18
3	Cibeque Family - Wapiti Family complex, 3 to 8 percent slopes	6	19	50
4	Jonale Family - Graystone cobbly substratum Family - Wapiti Family complex, 3 to 8 percent slope	10	27	33
5	Calendar Family - M Family - Drififty Family complex, 8 to 25 percent slopes	7	15	8
6	Graystone - Cookcan - Jonale Family complex, 1 to 5 percent slopes	10	42	18
7	Happyhollow Family - Alamosa complex, 1 to 5 percent slopes	10	37	28
8	Brumley - Graystone - Snilloc complex, 3 to 8 percent slopes	10	55	20
9	D Family - Deacon complex, 5 to 30 percent slopes	10	19	42
10	Zigzag Clay, 8 to 25 percent slopes	5	13	1
11	A Family Clay, 8 to 25 percent slopes	8	17	56
12	Manzanst Family Clay Loam, 3 to 12 percent slopes	6	1	26
13	A Family - Happyhollow Family complex, 1 to 12 percent	9	19	58

(1) Estimated salvage depths are weighted averages based on map unit components and percentage of each component in the map unit. Variations of salvage depth occur within each map unit and should be monitored during salvage operations

(2) Good/Fair subsoil is based on the soil meeting the good and fair suitability criteria for all parameters except clay textures in Guidelines for Management of Topsoil and Overburden (Utah DOGM, 2005)

(3) Poor subsoil is based on material that meets all of the criteria for good and fair in all categories except pH, percent calcium carbonate; and clay textures; but meets the minimum requirements for these parameters in the poor category in Guidelines for Management of Topsoil and Overburden (Utah DOGM, 2005)

LEGEND:

- SECTION CORNER
- EXISTING DRILL HOLE
- 2005/2007 CORE HOLES
- PHASE 1
- PHASE 2
- PHASE 3

SOILS PIT

- SP
- YR
- ROV
- DAH
- WRD
- LOF
- 2007 Soil Pits

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DRAWN BY:	CHECKED BY:
J. STANSFIELD	LWJ
DRAWING: 2-1	DATE: 04/20/07
	SCALE: 1" = 400'
JOB NUMBER: 1400	SHEET 1 OF 1

REVISIONS

DATE:	BY:
4/30/07	NLB
1/11/08	RL/CRM
10/14/08	RL/CRM
01/10/14	KN

SOIL SURVEY MAP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 2-1

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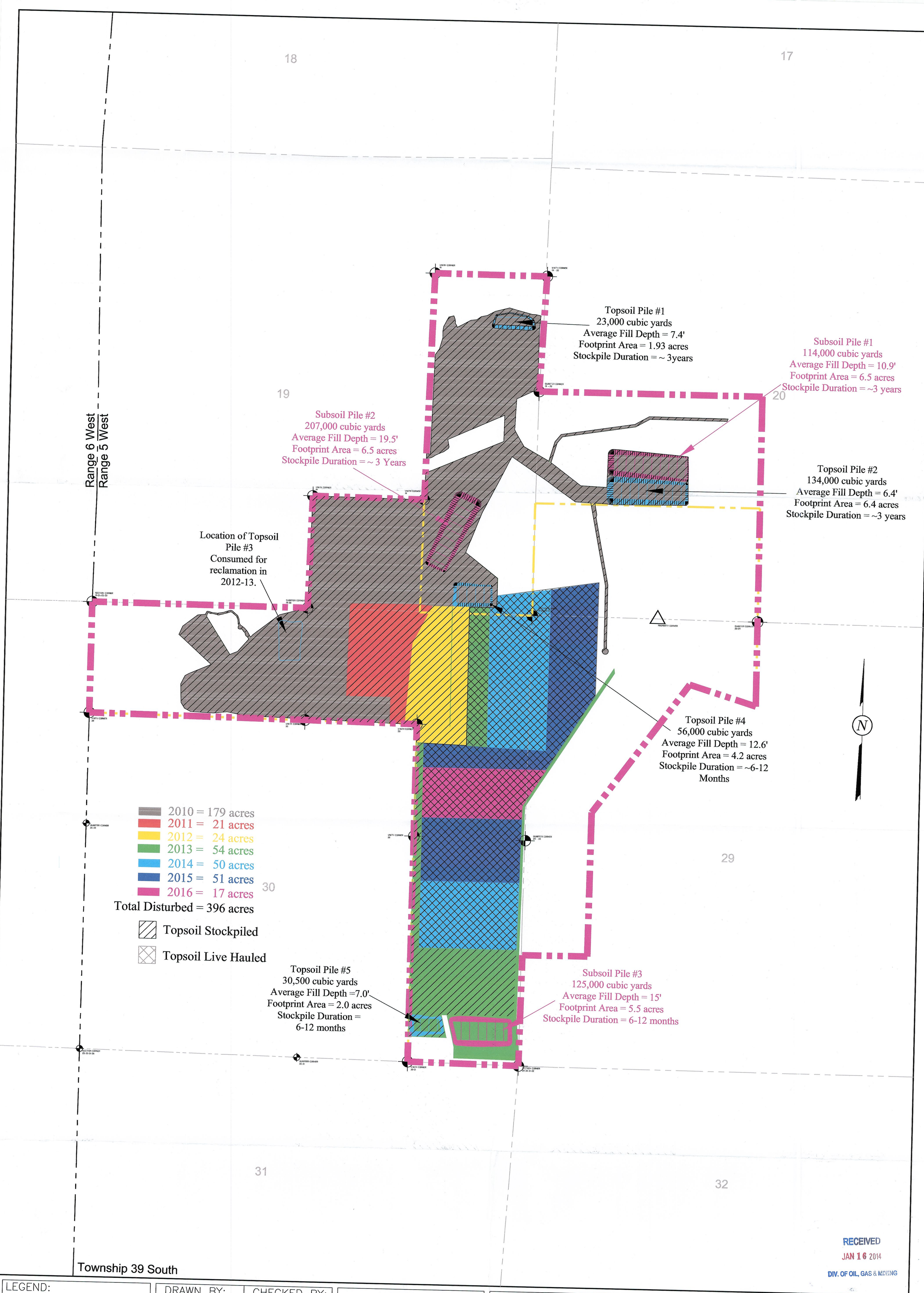

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
J. STANSFIELD	LWJ
DRAWING: 2–2	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
1/11/08	CRM
10/27/08	CRM
02/24/11	JKSR
03/28/13	KN
10/24/13	LWJ

TOPSOIL HANDLING

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 2-2

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER

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Range 6 West
Range 5 West

Topsoil Pile #1
23,000 cubic yards
Average Fill Depth = 7.4'
Footprint Area = 1.93 acres
Stockpile Duration = ~ 3years

Subsoil Pile #1
114,000 cubic yards
Average Fill Depth = 10.9'
Footprint Area = 6.5 acres
Stockpile Duration = ~3 years

Subsoil Pile #2
207,000 cubic yards
Average Fill Depth = 19.5'
Footprint Area = 6.5 acres
Stockpile Duration = ~ 3 Years

Topsoil Pile #2
134,000 cubic yards
Average Fill Depth = 6.4'
Footprint Area = 6.4 acres
Stockpile Duration = ~3 years

Location of Topsoil Pile #3 Consumed for reclamation in 2012-13.

Topsoil Pile #4
56,000 cubic yards
Average Fill Depth = 12.6'
Footprint Area = 4.2 acres
Stockpile Duration = ~6-12 Months

2010 = 179 acres
2011 = 21 acres
2012 = 24 acres
2013 = 56acres
2014 = 12 acres
2015 = 28 acres
Total Disturbed = 320 acres

Topsoil Stockpiled

Topsoil Live Hauled

Topsoil Pile #5
30,500 cubic yards
Average Fill Depth =7.0'
Footprint Area = 2.0 acres
Stockpile Duration = 6-12 months

Subsoil Pile #3
125,000 cubic yards
Average Fill Depth = 15'
Footprint Area = 5.5 acres
Stockpile Duration = 6-12 months

Township 39 South

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
J. STANSFIELD	LWJ
DRAWING: 2–2a	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
02/27/14	KN

TOPSOIL HANDLING

Surface & Highwall Mining

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 2-2A

Alton Coal Development
Coal Hollow Project
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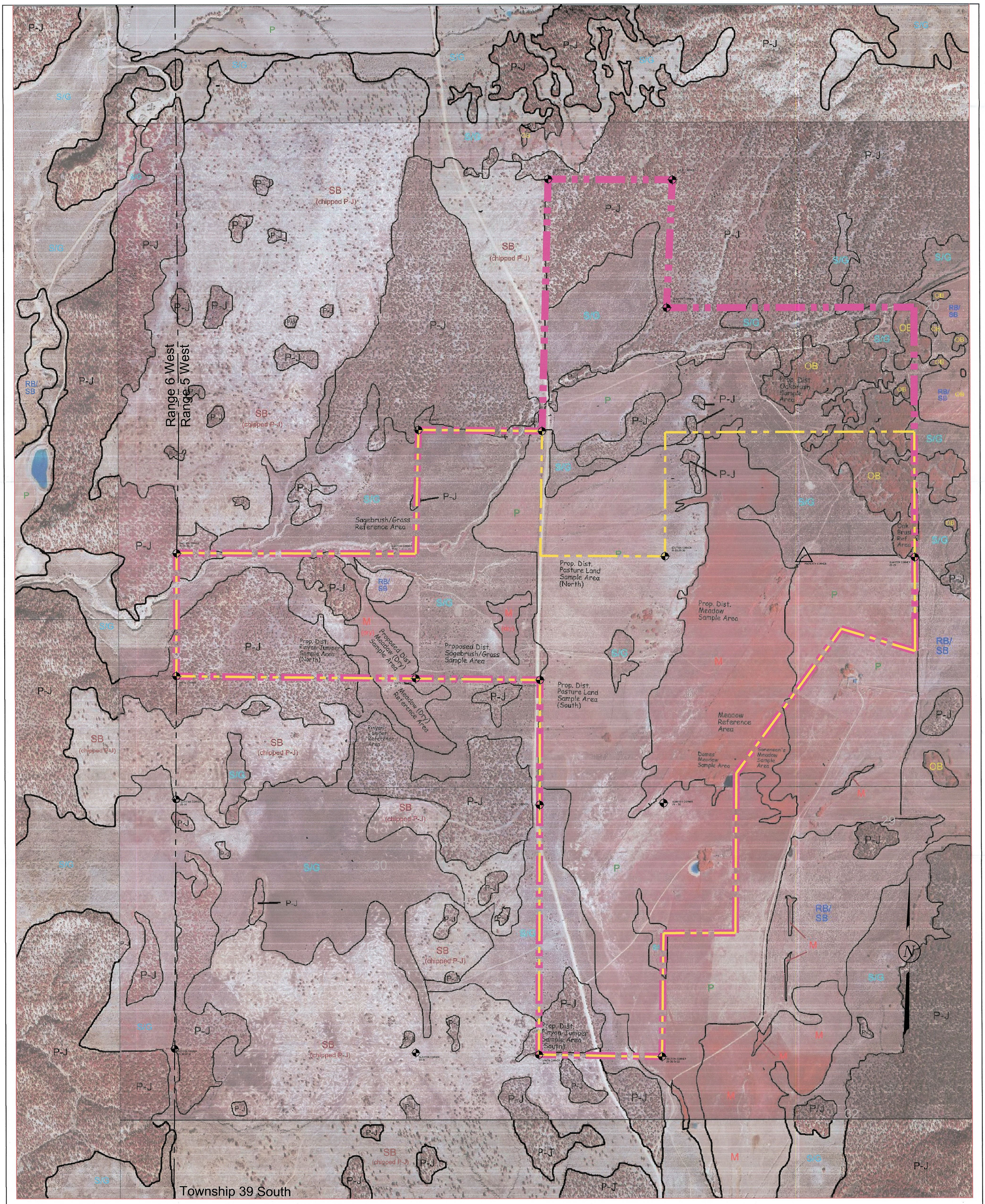

LEGEND

Map Symbol	Plant Communities
P-J	Pinyon Juniper
S/G	Sagebrush / Grass
SB	Sagebrush
RB/SB	Rabbitbrush / Sagebrush
P	Pasture Land
M	Meadow
OB	Oak brush

Base Map: Olympus Aerial Surveys, Inc. (July 2006)
Merged with Olympus Aerial Surveys, Inc. (November 2007)

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY: J. STANSFIELD	MAPPED BY: P.D. COLLINS
DRAWING: 3-1	CHECKED BY: PDC
	DATE: 04/20/07
JOB NUMBER: 1400	SCALE: 1" = 500'

REVISIONS

DATE:	BY:
12-26-07	PDC/CM
12-03-08	PDC/CM
10/24/13	LWJ

VEGETATION MAP

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COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-1

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Phone (435)867-5331
Fax (435)867-1192

MAP SYMBOL	HABITAT
BLACK BEAR	SEASON: YEAR-LONG VALUE: SUBSTANTIAL SOURCE: BLACK BEAR HABITAT. 2000. GIS DATABASE, UTAH DIVISION OF WILDLIFE RESOURCES, SALT LAKE CITY, UT.

\Talon_2\talon talon 2\My Documents\TALON_jobs\GIS_general_dat

ALTON

AMPHITHEATER

NATIONAL FOREST

SINK VALLEY

R.6 W.

R.5 W.

T 39 S

T 40 S

LEGEND:

PROJECT AREA

COUNTY ROAD

DRAWN BY:	CHECKED BY:
N. BUTKOVICH	APC
DRAWING: 3-2	DATE: 5/9/06
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
6/6/06	NLB
2/21/07	NLB
10/24/13	LWJ

BLACK BEAR HABITAT MAP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-2

ALTON COAL DEVELOPMENT
COAL HOLLOW PROJECT
615 North, 400 East
P.O. Box 1230
Huntington, Utah 84528
Phone (435)687-5310
Fax (435)687-5311

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MAP SYMBOL		HABITAT
SUMMER / YEAR-LONG	ROCKY MOUNTAIN ELK	SEASON/VALUE: SUMMER/HIGH SEASON/VALUE: YEAR-LONG/SUBSTANTIAL SOURCE: ROCKY MOUNTAIN ELK HABITAT. 2004. GIS DATABASE, UTAH DIVISION OF WILDLIFE RESOURCES, SALT LAKE CITY, UT.

Alton
Alton Cemetery
Spring
A L T O N
A M P H I T H E A T E R
Gravel Pit
Gravel Pits
Mine
R.6 W.
R.5 W.
Creek
Robinson
Lower
Springs
S I N K V A L L E Y
Wash
NATIONAL FOREST
Creek
Dry
Kanab
Swapp Ranch
Sink Valley
Swapp
Broad
Wash
Spring
JEEP TRAIL
Hollow
T 39 S
T 40 S

LEGEND:

PROJECT AREA

COUNTY ROAD

DRAWN BY:	CHECKED BY:
N. BUTKOVICH	APC
DRAWING: 3-3	DATE: 5/9/06
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
6/6/06	NLB
2/21/07	NLB
10/24/13	LWJ

ROCKY MOUNTAIN ELK HABITAT MAP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-3

RECEIVED
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ALTON COAL DEVELOPMENT
COAL HOLLOW PROJECT
615 North, 400 East
P.O. Box 1230
Huntington, Utah 84528
Phone (435)687-5310
Fax (435)687-5311

MAP SYMBOL		HABITAT
	MULE DEER	SEASON: SUMMER VALUE: HIGH SOURCE: MULE DEER HABITAT. 2004. GIS DATABASE, UTAH DIVISION OF WILDLIFE RESOURCES, SALT LAKE CITY, UT.

LEGEND:

PROJECT AREA

COUNTY ROAD

DRAWN BY:	CHECKED BY:
N. BUTKOVICH	APC
DRAWING: 3–4	DATE: 5/9/06
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
6/6/06	NLB
2/21/07	NLB
10/24/13	LWJ

MULE DEER HABITAT MAP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-4

RECEIVED
JAN 16 2014
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ALTON COAL DEVELOPMENT
COAL HOLLOW PROJECT
615 North, 400 East
P.O. Box 1230
Huntington, Utah 84528
Phone (435)687-5310
Fax (435)687-5311

MAP SYMBOL		HABITAT
	SAGE-GROUSE BROOD	SOURCE: SAGE-GROUSE BROOD HABITAT. 2000. GIS DATABASE, UTAH DIVISION OF WILDLIFE RESOURCES, SALT LAKE CITY, UT.

Alton
Alton Cemetery
A L T O N
A M P H I T H E A T E R
Spring
Gravel Pit
Gravel Pits
Mine
Creek
Lower
Springs
Robinson
Creek
Dry
Wash
S I N K V A L L E Y
Swapp Ranch
Kanab
Creek
Sink Valley
Wash
JEEP TRAIL
Swapp
Broad
Hollow
NATIONAL FOREST
T 39 S
T 40 S
R 6 W
R 5 W

LEGEND:			
PROJECT AREA	DRAWN BY: N. BUTKOVICH	CHECKED BY: APC	
COUNTY ROAD	DRAWING: 3–5	DATE: 5/9/06	
		SCALE: 1" = 1000'	
	JOB NUMBER: 1400	SHEET	

REVISIONS	
DATE:	BY:
6/6/06	NLB
2/21/07	NLB
10/24/13	LWJ

SAGE-GROUSE BROOD HABITAT MAP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-5

RECEIVED
JAN 16 2014
DIV. OF OIL, GAS & MINING

ALTON COAL DEVELOPMENT
COAL HOLLOW PROJECT
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P.O. Box 1230
Huntington, Utah 84528
Phone (435)687-5310
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Golden Eagle Inactive
Raven Inactive
Red-tailed Hawk Inactive
Falcon Inactive
Peregrine Falcon Active
Golden Eagle Inactive
Golden Eagle Inactive
Golden Eagle Inactive
Great Horned Owl Inactive

R6W R5W

T 39 S
T 40 S

ALTON
AMPHITHEATER
SINK Valley

NATIONAL FOREST BOUNDARY

ERODED OR BURNED AREA

Alton
Alton Cemetery
Filtration Tank
Gravel Pit
Gravel Pits
Gravel Pits
Gravel Pits
Mine
Swapp Ranch

Springs
Spring
Spring
Spring
Spring
Spring
Spring
Spring
Springs
Springs
Fisher Spring
Fuller Spring
Elbo Spring

Birch Canyon
Kanab
Rush Canyon
Water Canyon
Corral Canyon
Dry Fork
Creek
Creek
Creek
Wash
Wash
Hollow
Hollow
Hollow
Hollow
Coal Hollow
Frankie Hollow
Swapp
Broad
Broad
Tater Canyon
Fisher Canyon
Dry Canyon
Canyon
Canyon
Canyon
Kanab
Kanab
Valley
Valley

JEEP TRAIL
PACK TRAIL
SUNSET CLIFFS
Robinson
Robinson

LEGEND:

- PERMIT AREA
- COAL LINE BOUNDARY
- COUNTY ROAD
- 2008 FLIGHT PATH
- Golden Eagle
- Great Horned Owl
- Red-tailed Hawk
- Falcon
- Peregrine Falcon
- Raven

DRAWN BY:	CHECKED BY:
C. McCOURT	P.D. COLLINS
DRAWING: 3–6	DATE: 12/08/08
	SCALE: 1" = 1500'
JOB NUMBER: 1400	SHEET

DATE:	BY:
10/24/13	KN

DWR-2008
RAPTOR SURVEY
FLOWN 5/23/08

COAL HOLLOW
PROJECT
ALTON, UTAH

DRAWING: 3-6

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Range 6 West
Range 5 West

18 17 19 20 30 29 31 32

1/16TH CORNER 19 | 1/16TH CORNER 19 - 20 | QUARTER CORNER 19 - 20 | 1/16TH CORNER 19 | 1/16TH CORNER 19 | SECTION CORNER 19-24-25-30 | QUARTER CORNER 19-30 | SECTION CORNER 19-20-29-30 | PROPERTY CORNER | QUARTER CORNER 20-29 | 1/16TH CORNER 30 | 1/16TH CORNER 30 | 1/16TH CORNER 30 | QUARTER CORNER 25-30 | 1/16TH CORNER 30 | QUARTER CORNER 29 - 30 | SECTION CORNER 25-30-31-36 | QUARTER CORNER 30-31 | 1/16TH CORNER 30-31 | SECTION CORNER 29-30-31-32

S/G Seed Mixture
Treatments* A, B, C

PHASE 1

S/G Seed Mixture
Treatments* A, B, C

S/G Seed Mixture

Seed Mixture = P-J
Rec. Tmts. = A, B, C

Spring 2012

M Seed Mixture
Treatments* A, B, C

S/G Seed Mixture
Treatments* A, B, C

PHASE 3

PHASE 2

P Seed Mixture
Treatments* A, B, C

Seed P-J Mixture
Treatments* A, B, C

N

Disturbance

Phase 1 = 289 acres
Phase 2 = 40 acres
Phase 3 = 89 acres
Total Disturbed = 418 acres

S/G: Sagebrush/Grass
(see Table 3-37)

P: Pasture
(see Table 3-38)

P-J: Pinyon-Juniper
(see Table 3-39)

M: Meadow
(see Table 3-40)

*Reclamation Treatments:
(see Section 341.220)

A. Seedbed Analysis
B. Ripped, disked, harrowed (if compacted)
C. Mulch (0.75T/Ac; 1.0T/Ac on slopes 3:1 or greater)

Post-Mining Sample Transect Sample Locations (approx.)

Township 39 South

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 3-7	DATE: 8/12/09
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
02/26/14	KN

RECLAMATION TREATMENTS, MONITORING & SAMPLE LOCATIONS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-7

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

Range 6 West
Range 5 West

Township 39 South

S/G Seed Mixture
Treatments* A, B, C

S/G Seed Mixture
Treatments* A, B, C

PHASE
1

S/G Seed Mixture

Seed Mixture = P-J
Rec. Tmts. = A, B, C

S/G Seed Mixture
Treatments* A, B, C

PHASE
3

P Seed Mixture
Treatments* A, B, C

PHASE
2

Seed P-J Mixture
Treatments* A, B, C

Disturbance
Phase 1 = 255 acres
Phase 2 = 40 acres
Phase 3 = 25 acres
Total Disturbed = 320 acres

S/G: Sagebrush/Grass
(see Table 3-37)

P: Pasture
(see Table 3-38)

P-J: Pinyon-Juniper
(see Table 3-39)

M: Meadow
(see Table 3-40)

*Reclamation Treatments:
(see Section 341.220)

A. Seedbed Analysis
B. Ripped, disked, harrowed (if compacted)
C. Mulch (0.75T/Ac; 1.0T/Ac on slopes 3:1 or greater)

Post-Mining Sample Transect Sample Locations (approx.)

LEGEND:
PERMIT BOUNDARY
PRIVATE COAL OWNERSHIP
SECTION LINE
FOUND SECTION CORNER
FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 3-7a	DATE: 8/12/09
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
02/26/14	KN

RECLAMATION TREATMENTS, MONITORING & SAMPLE LOCATIONS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-7A

Alton Coal Development
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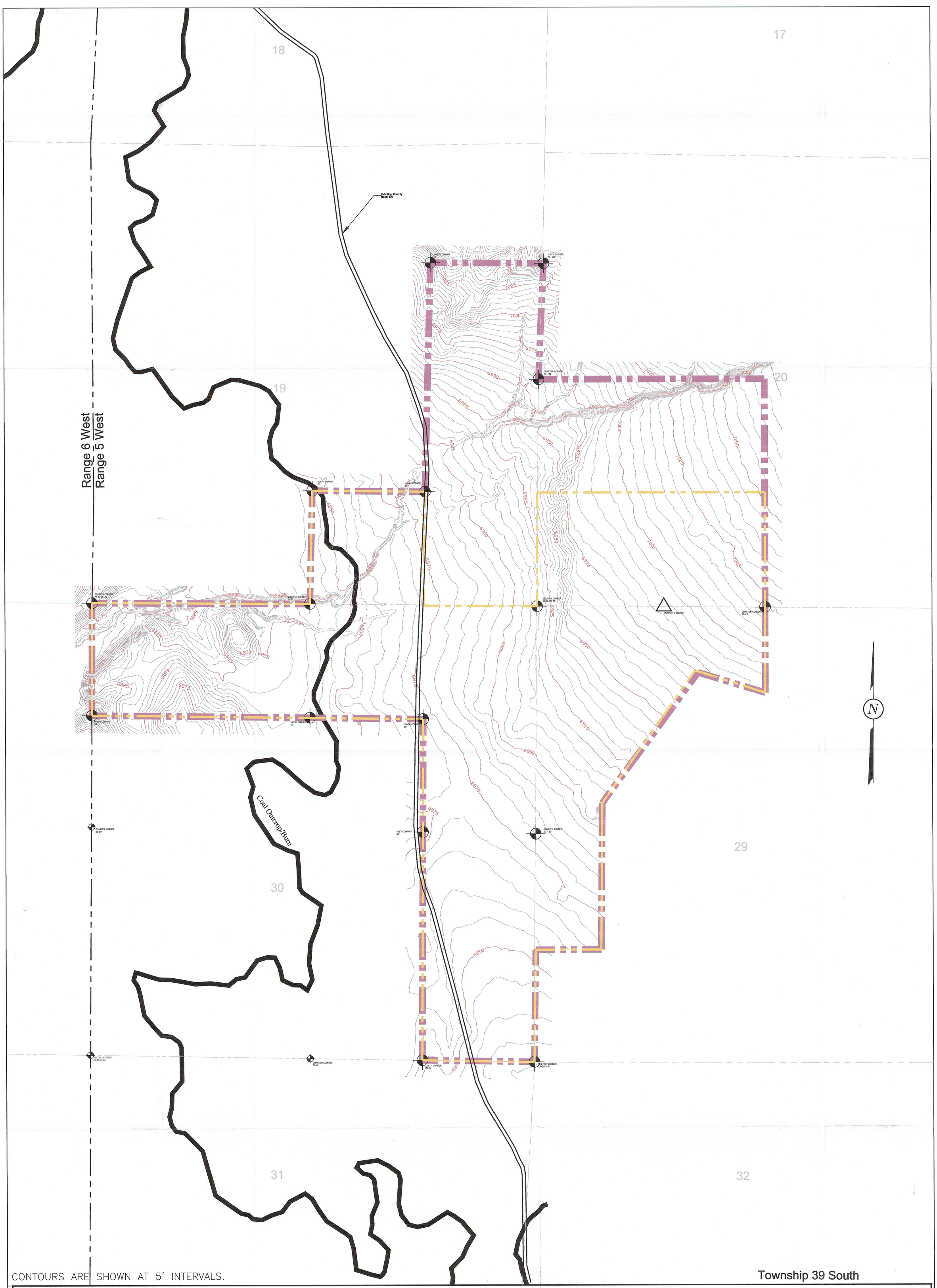
Fax (435)867-1192



CONTOURS ARE SHOWN AT 5' INTERVALS.

Township 39 South

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY: J. STANSFIELD C. McCOURT	CHECKED BY: GG
DRAWING: 5-1	DATE: 04/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
11/26/08	CRM
10/18/13	LWJ

PRE-MINING TOPOGRAPHY

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-1

UTAH REGISTERED #154168 DAN W. GUY 10/25/13 PROFESSIONAL ENGINEER

Alton Coal Development
Coal Hollow Project
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Cedar City, Utah 84721
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Fax (435)867-1192

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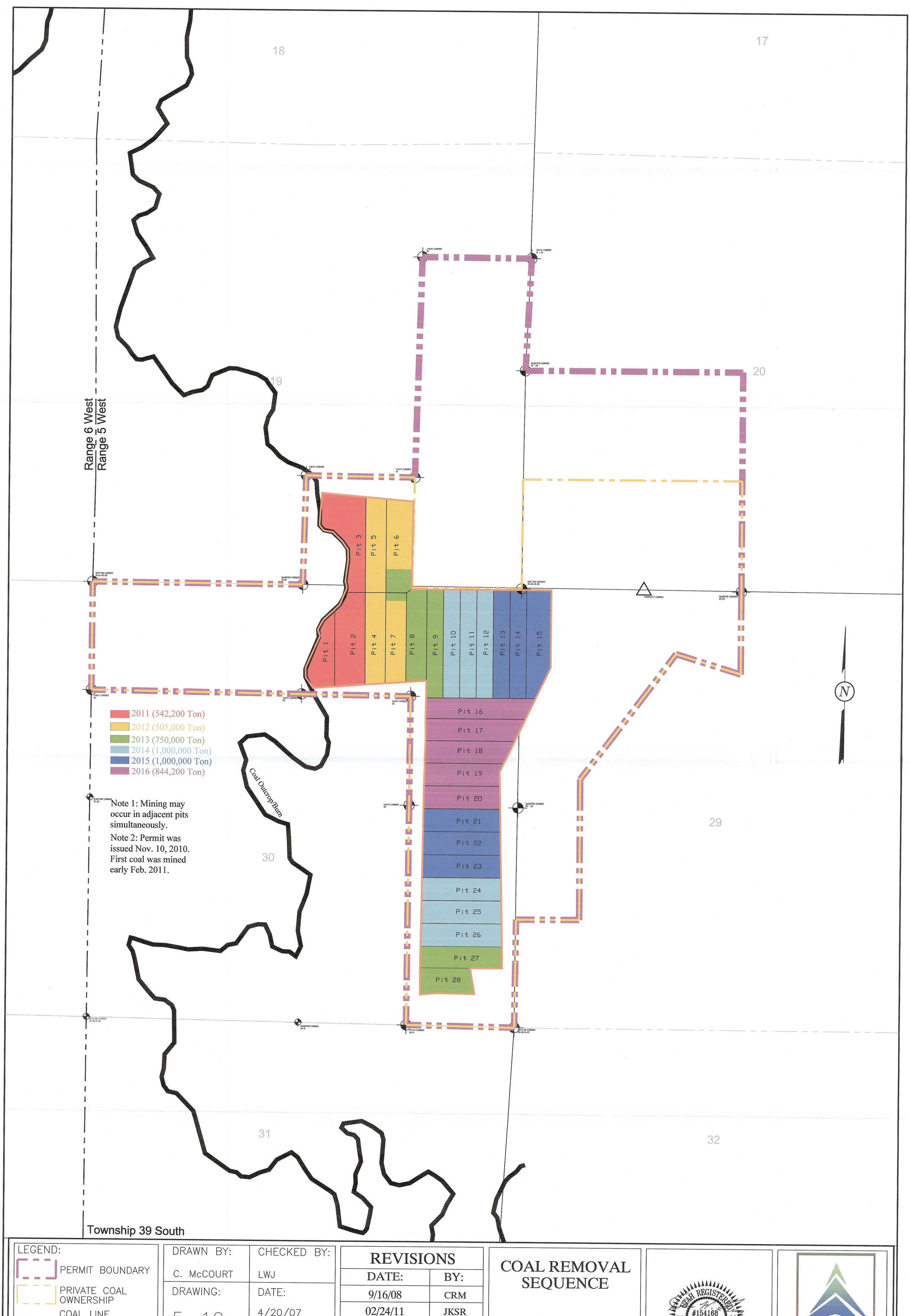
JAN 16 2014
DIV. OF OIL, GAS & MINING



LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- COAL RECOVERY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-10	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
9/16/08	CRM
02/24/11	JKSR
06/28/11	KN
01/16/13	KN
03/18/13	KN
10/19/13	KN
02/27/14	KN

COAL REMOVAL SEQUENCE

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-10

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 3/3/14

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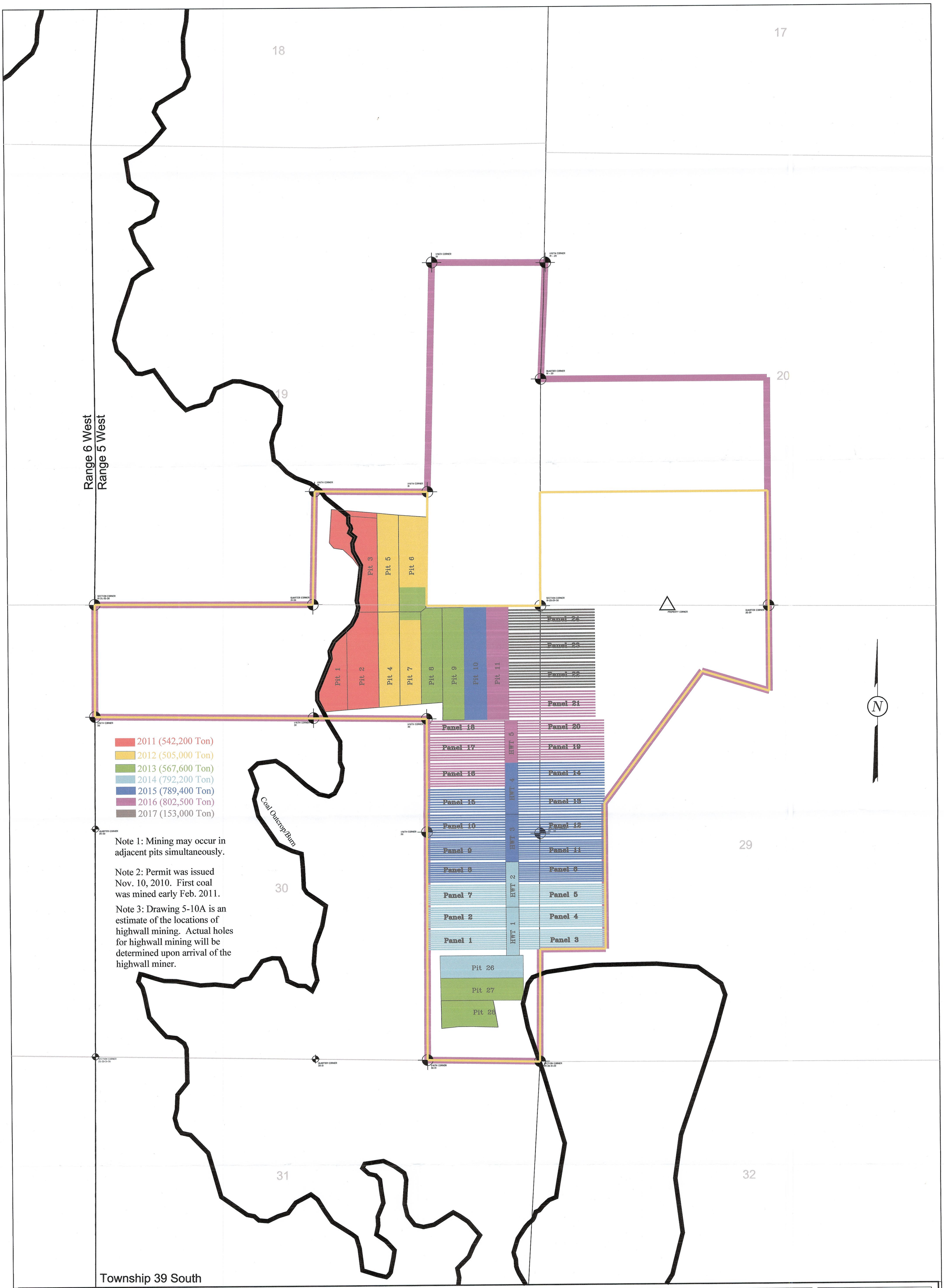

Note 1: Mining may occur in adjacent pits simultaneously.

Note 2: Permit was issued Nov. 10, 2010. First coal was mined early Feb. 2011.

Note 3: Drawing 5-10A is an estimate of the locations of highwall mining. Actual holes for highwall mining will be determined upon arrival of the highwall miner.

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- COAL RECOVERY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-10A	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
9/16/08	CRM
02/24/11	JKSR
06/28/11	KN
01/16/13	KN
03/18/13	KN
10/15/13	KN

COAL REMOVAL SEQUENCE

SURFACE & HIGHWALL MINING

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-10A

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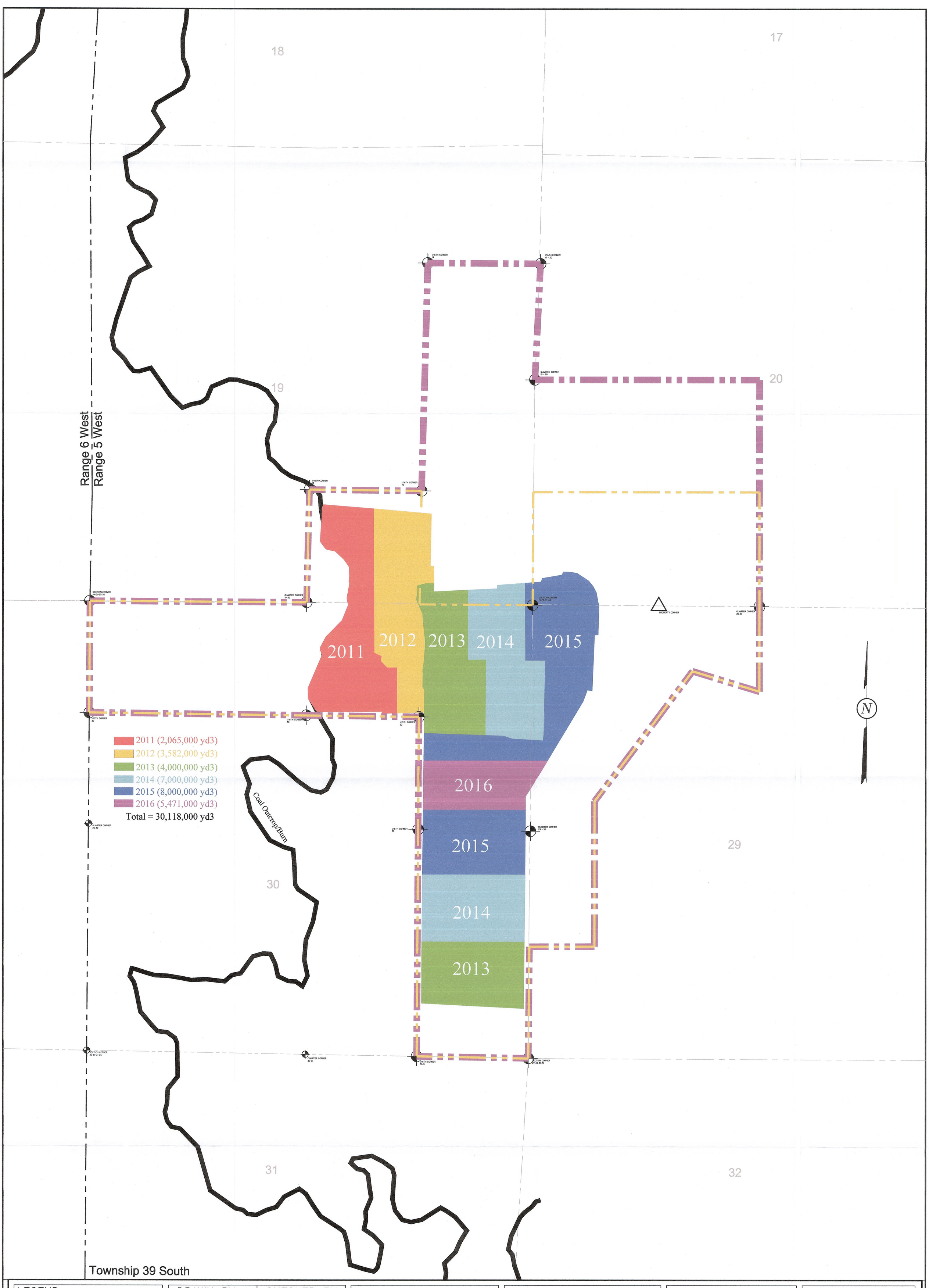

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5–16	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
9/16/08	CRM
1/16/13	KN
10/19/13	KN
02/26/14	KN

OVERBURDEN REMOVAL SEQUENCE

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-16

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 3/3/14

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

Range 6 West
Range 5 West

Township 39 South

18
17
19
20
30
29
31
32

1/16TH CORNER 19
1/16TH CORNER 19 - 20
QUARTER CORNER 19 - 20
1/16TH CORNER 19
1/16TH CORNER 19
SECTION CORNER 25-24-25-30
QUARTER CORNER 19-30
SECTION CORNER 19-25-29-30
PROPERTY CORNER
QUARTER CORNER 20-29
1/16TH CORNER 30
1/16TH CORNER 30
1/16TH CORNER 30
QUARTER CORNER 25-30
1/16TH CORNER 30
QUARTER CORNER 29 - 30
SECTION CORNER 25-30-31-36
QUARTER CORNER 30-31
1/16TH CORNER 30-31
SECTION CORNER 29-30-31-32

2011
2012
2013
2016
2015
2014
2013

2011 (2,065,000 yd3)
2012 (3,582,000 yd3)
2013 (4,000,000 yd3)
2014 (1,630,000 yd3)
2015 (1,500,000 yd3)
2016 (1,250,000 yd3)
Total = 14,027,000 yd3

Coal Outcrop/Burn

N

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-16A	DATE: 10/15/2013
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
LWJ	10/17/13
KN	02/26/14

OVERBURDEN REMOVAL SEQUENCE

SURFACE & HIGHWALL MINING

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-16A

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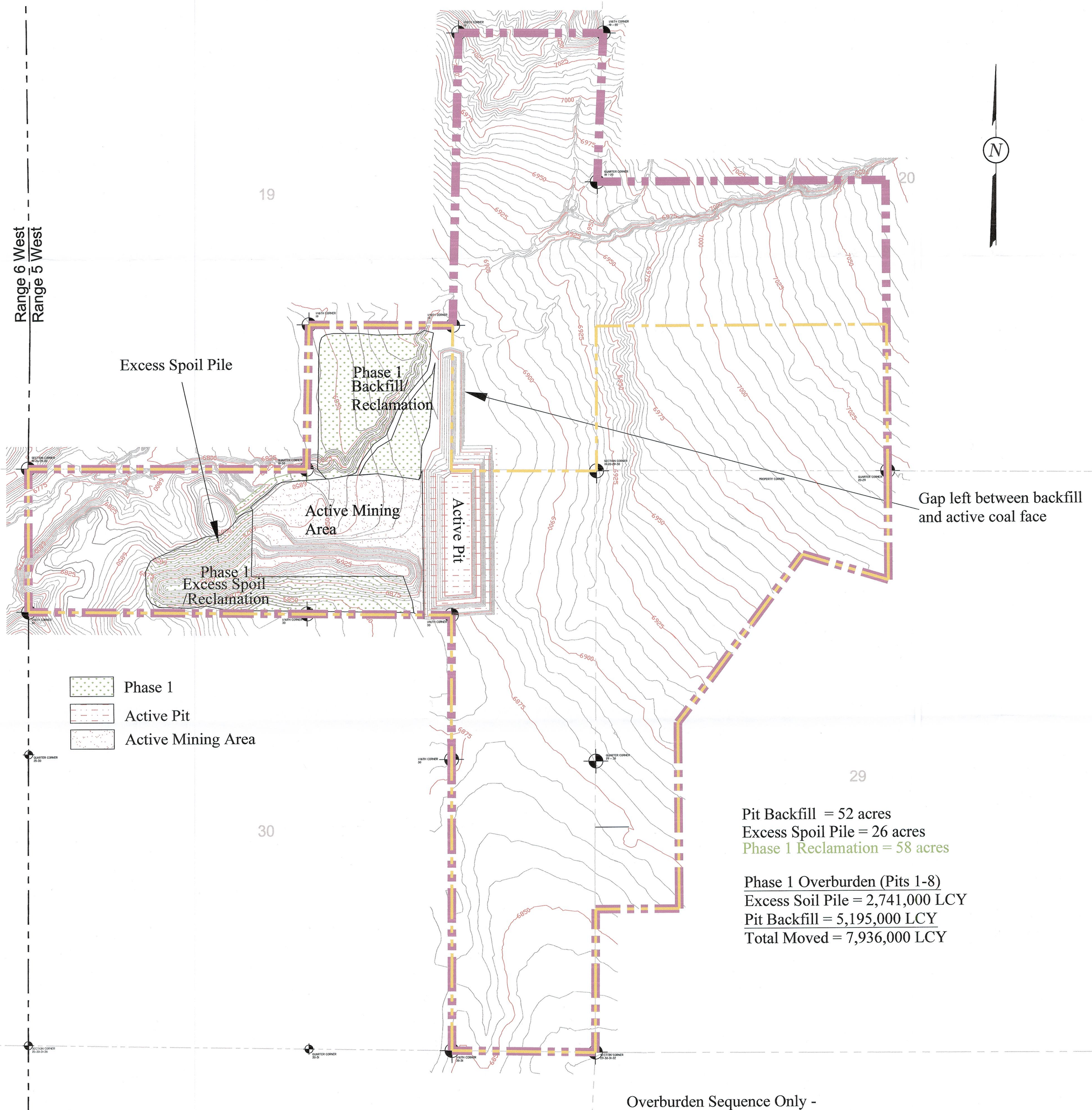

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CONTOURS ARE SHOWN AT 5' INTERVALS.

Township 39 South

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY: C. McCOURT	CHECKED BY: LWJ
DRAWING: 5–17	DATE: 04/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
11/28/08	CRM
01/21/13	KN
03/16/13	KN
12/26/13	KN

OVERBURDEN REMOVAL PHASE 1

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-17

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 1/14/14

Alton Coal Development
Coal Hollow Project
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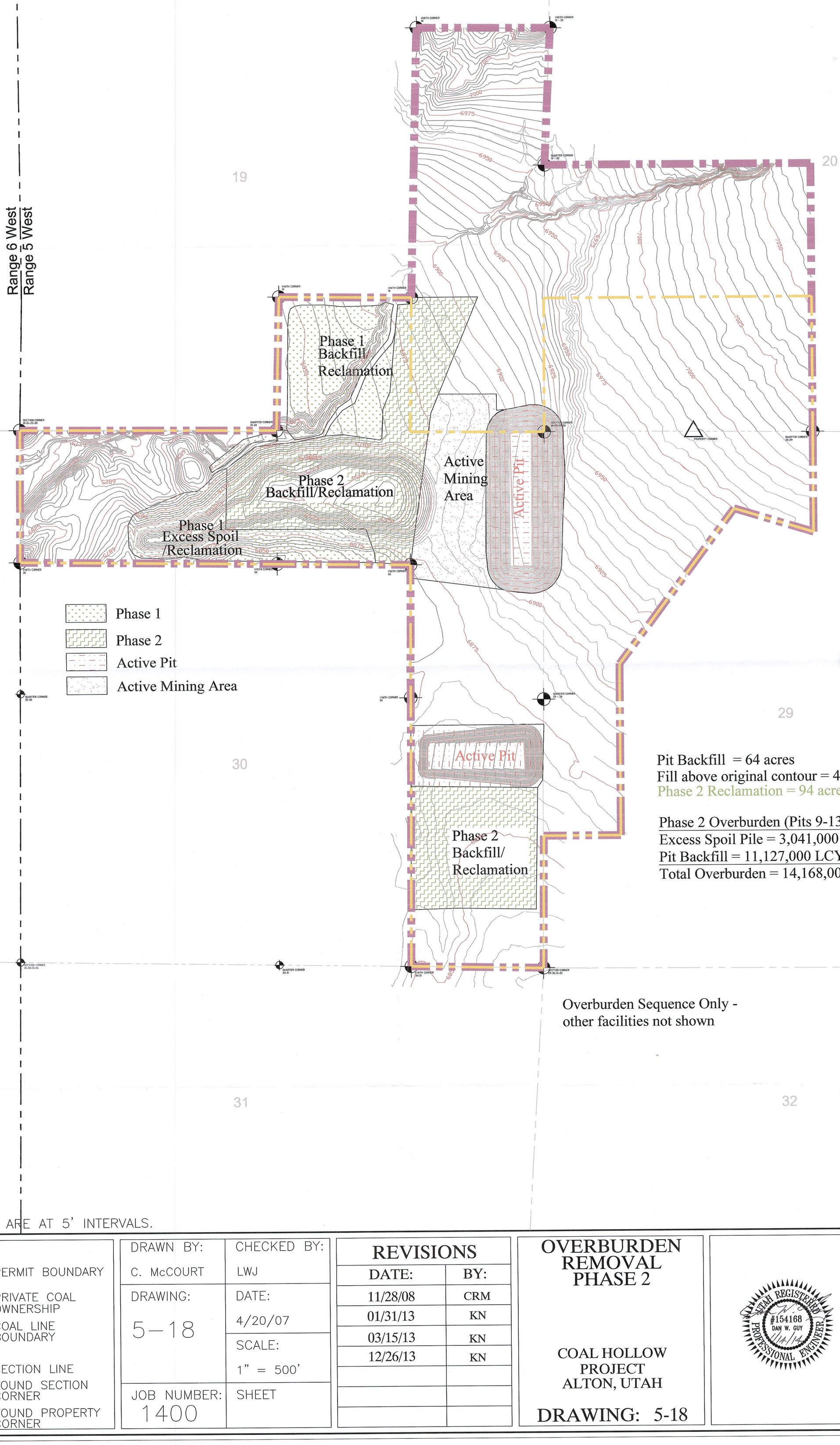

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JAN 16 2014
DIV. OF OIL, GAS & MINING

CONTOURS ARE AT 5' INTERVALS.

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-18	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
11/28/08	CRM
01/31/13	KN
03/15/13	KN
12/26/13	KN

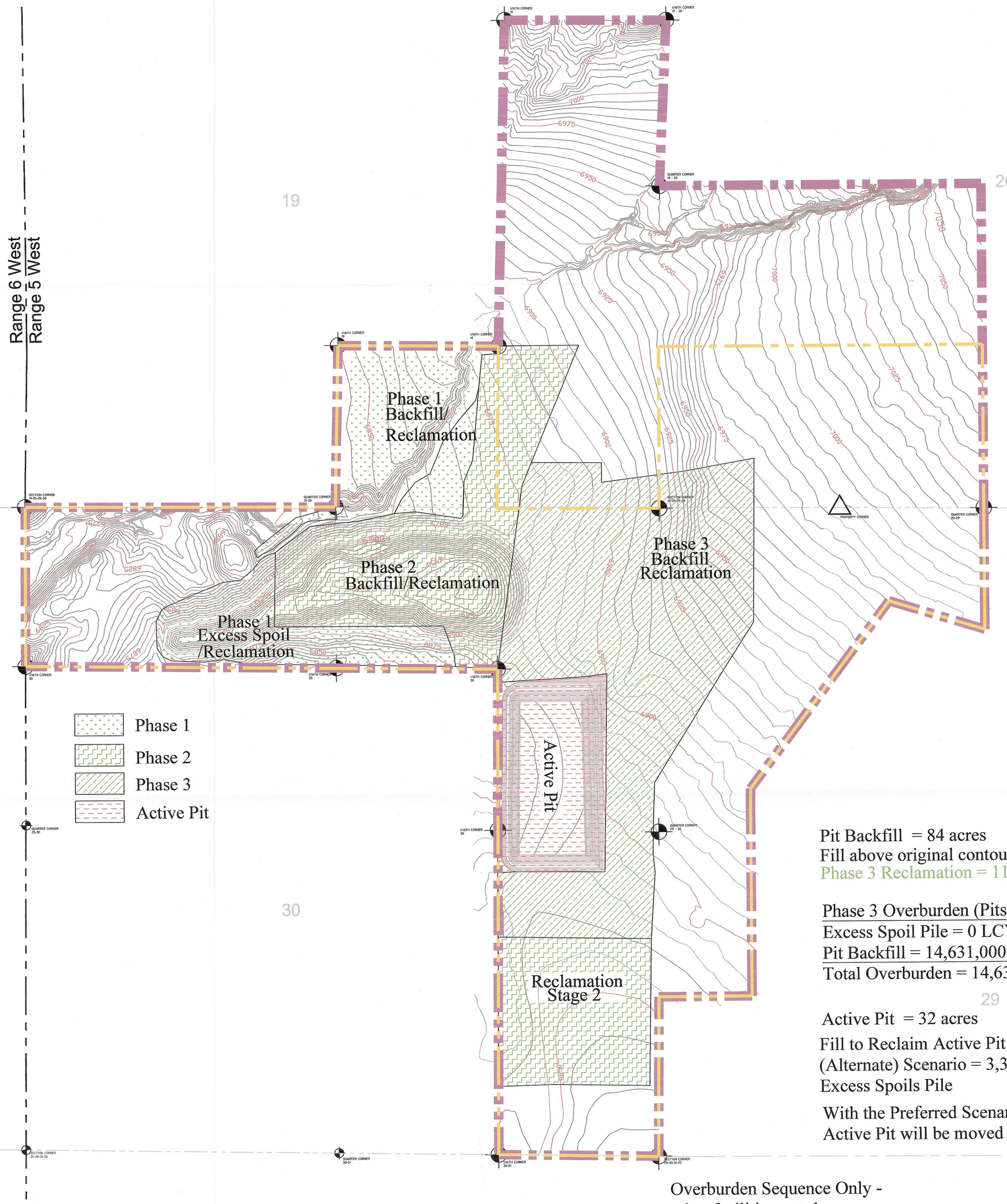
OVERBURDEN REMOVAL PHASE 2

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-18

UTAH REGISTERED PROFESSIONAL ENGINEER
#154168
DAN W. GUY
1/14/14

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192



Pit Backfill = 84 acres
Fill above original contour = 0 acres
Phase 3 Reclamation = 111 acres

Phase 3 Overburden (Pits 14-22)
Excess Spoil Pile = 0 LCY
Pit Backfill = 14,631,000 LCY
Total Overburden = 14,631,000 LCY

Active Pit = 32 acres

Fill to Reclaim Active Pit under the Bonded (Alternate) Scenario = 3,300,000 LCY from the Excess Spoils Pile

With the Preferred Scenario, fill to reclaim the Active Pit will be moved from LBA Area

Overburden Sequence Only -
other facilities not shown

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LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-19	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
11/28/08	CRM
01/31/13	KN
03/17/13	KN
12/26/13	KN

OVERBURDEN REMOVAL PHASE 3

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-19

UTAH REGISTERED #154168 DAN, W. GUY PROFESSIONAL ENGINEER 1/14/14

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

Range 6 West
Range 5 West

Township 39 South

17
18
19
20
29
30
31
32

2010
2011
2012
2013
2014
2015
2016

2010 = 179 acres
2011 = 21 acres
2012 = 24 acres
2013 = 54 acres
2014 = 50 acres
2015 = 51 acres
2016 = 17 acres
Total Disturbed = 396 acres

Coal Outcrop/Burn

N

LEGEND:	DRAWN BY:	CHECKED BY:
PERMIT BOUNDARY	C. McCOURT	LWJ
PRIVATE COAL OWNERSHIP	DRAWING: 5–2	DATE: 4/20/07
COAL LINE BOUNDARY		SCALE: 1" = 500'
SECTION LINE	JOB NUMBER: 1400	SHEET
FOUND SECTION CORNER		
FOUND PROPERTY CORNER		

REVISIONS	
DATE:	BY:
11/16/08	CRM
1/12/13	KN
3/28/13	KN
10/19/13	KN

DISTURBANCE SEQUENCE

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-2

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 10/28/13

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Range 6 West
Range 5 West

Township 39 South

18 17 19 20 30 29 31 32

2010 = 179 acres
2011 = 21 acres
2012 = 24 acres
2013 = 56 acres
2014 = 12 acres
2015 = 28 acres

Total Disturbed = 320 acres

Coal Outcrop/Burn

2010 2011 2012 2013 2015 2014 2013

N

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LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-2A	DATE: 10/15/2013
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
10/19/13	KN

DISTURBANCE SEQUENCE

Surface & Highwall Mining

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-2A

UTAH REGISTERED #154168 DAN W. GUY 10/28/13 PROFESSIONAL ENGINEER

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Fax (435)867-1192

18

COUNTY RD 136

COUNTY RD INTERSECTION

TEMPORARY REROUTE COUNTY RD136

1/16TH CORNER 19

1/16TH CORNER 19 - 20

DIVERSION DITCH 3

STORAGE CONTAINERS OIL/FUEL STORAGE

PROPOSED WASHBAY

CREW

EQUIP. AREA HOT START

OFFICE PARKING AREA

RAW COAL

WATER TANKS

QUARTER CORNER 19 - 29

ROADWAY
18" Culvert 13
18" Culvert 12
18" Culvert 1
18" Culvert 2
18" Culvert 3
18" Culvert 4
Pond 1
24 INCH DROP PIPE SPILLWAY
TOP OF RISER 6918'
BOTTOM OF RISER 6917'
24 INCH PIPE
OUTLET 6915'
Pond 1B
24 INCH INLET PIPE
24 INCH DROP PIPE SPILLWAY
Straw Bale
(Sediment Control)
COUNTY ROAD 136
CLOSURE POINT
24 INCH CULVERT
OUTLET 6897'
24 INCH CULVERT
INLET 6901'

19

Range 6 West
Range 5 West

18" Culvert 7
36" Culvert 8
18" Culvert 6
12" Culvert 5
96" Culvert 9
Outfall Diversion Ditch 2B
2B
2A
DIVERSION DITCH 2
24' Culvert 10
Pond 2
24" Culvert 11

20

Lower Robinson Creek

1/16TH CORNER 19

1/16TH CORNER 19

Robinson Creek
to be Reconstructed
after mining

Robinson Creek
Temporary Diversion

Primary Haulroad

DIVERSION DITCH 4
(Configuration will change as mining progresses)

SECTION CORNER 19-24-25-30

DIVERSION DITCH 4

QUARTER CORNER 19-30

SECTION CORNER 19-20-29-32

PROPERTY CORNER

QUARTER CORNER 20-29

Diversion Ditch 1

Pond 3

DITCH TO BE PLACED IN FILL.

PHASE 1

EXCESS SPOIL

1/16TH CORNER 30

1/16TH CORNER 30

1/16TH CORNER 30 30

PHASE 3

29 - 30

PHASE 1 = 289 acres
PHASE 2 = 40 acres
PHASE 3 = 89 acres

29

30

PHASE 2

QUARTER CORNER 19-30

SECTION CORNER 19-30-31-36

1/16TH CORNER 30-31

SECTION CORNER 19-30-31-32

Pond 4

COUNTY ROAD 136
CLOSURE POINT

31

32

NOTES:
Refer to drawing 2-2 for topsoil placement.

Township 39 South

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER
- DIVERSION DITCHES
- PROPOSED SEDIMENT IMPOUNDS
- BERM
- CENTERLINE
- WATER LINE
- WATER TANK / WELL

DRAWN BY: C. McCOURT G. Grossman	CHECKED BY: LWJ
DRAWING: 5-3	DATE: 11/10/08
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
8/13/13	KN
10/18/13	LWJ
02/26/14	KN

FACILITIES & STRUCTURES

LAYOUT

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-3

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 3/3/14

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

County Road 136

Road to East
Pugh Property

Water Well

Range 6 West
Range 5 West

Coal Outcrop/Burn

Road to Capp
Ranch

CONTOURS ARE AT 5' INTERVALS.

Township 39 South

PERMIT BOUNDARY	
PRIVATE COAL OWNERSHIP	
COAL LINE BOUNDARY	
SECTION LINE	
FOUND SECTION CORNER	
FOUND PROPERTY CORNER	

DRAWN BY: C. McCOURT	CHECKED BY: GG
DRAWING: 5-35	DATE: 11/20/08
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
10/18/13	LWJ

POST MINING TOPOGRAPHY

PREFERRED SCENARIO

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-35

UTAH REGISTERED #154168 DAN W. GUY 10/28/13 PROFESSIONAL ENGINEER

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RECEIVED
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DIV. OF OIL, GAS & MINING

County Road 136

Road to East
Pugh Property

Water Well

Coal Outcrop/Burn

Range 6 West
Range 5 West

Township 39 South

CONTOURS ARE AT 5' INTERVALS.

LEGEND:	DRAWN BY: C. McCOURT	CHECKED BY: GG	REVISIONS
PERMIT BOUNDARY	DRAWING: 5-37	DATE: 11/20/08	DATE: 10/18/13 BY: LWJ
PRIVATE COAL OWNERSHIP		SCALE: 1" = 500'	
COAL LINE BOUNDARY			
SECTION LINE			
FOUND SECTION CORNER	JOB NUMBER: 1400	SHEET	
FOUND PROPERTY CORNER			

POST MINING TOPOGRAPHY

ALTERNATE SCENARIO

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-37

UTAH REGISTERED #154168 DAN W. GUY PROFESSIONAL ENGINEER 10/28/13

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Coal Hollow Project
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Cedar City, Utah 84721
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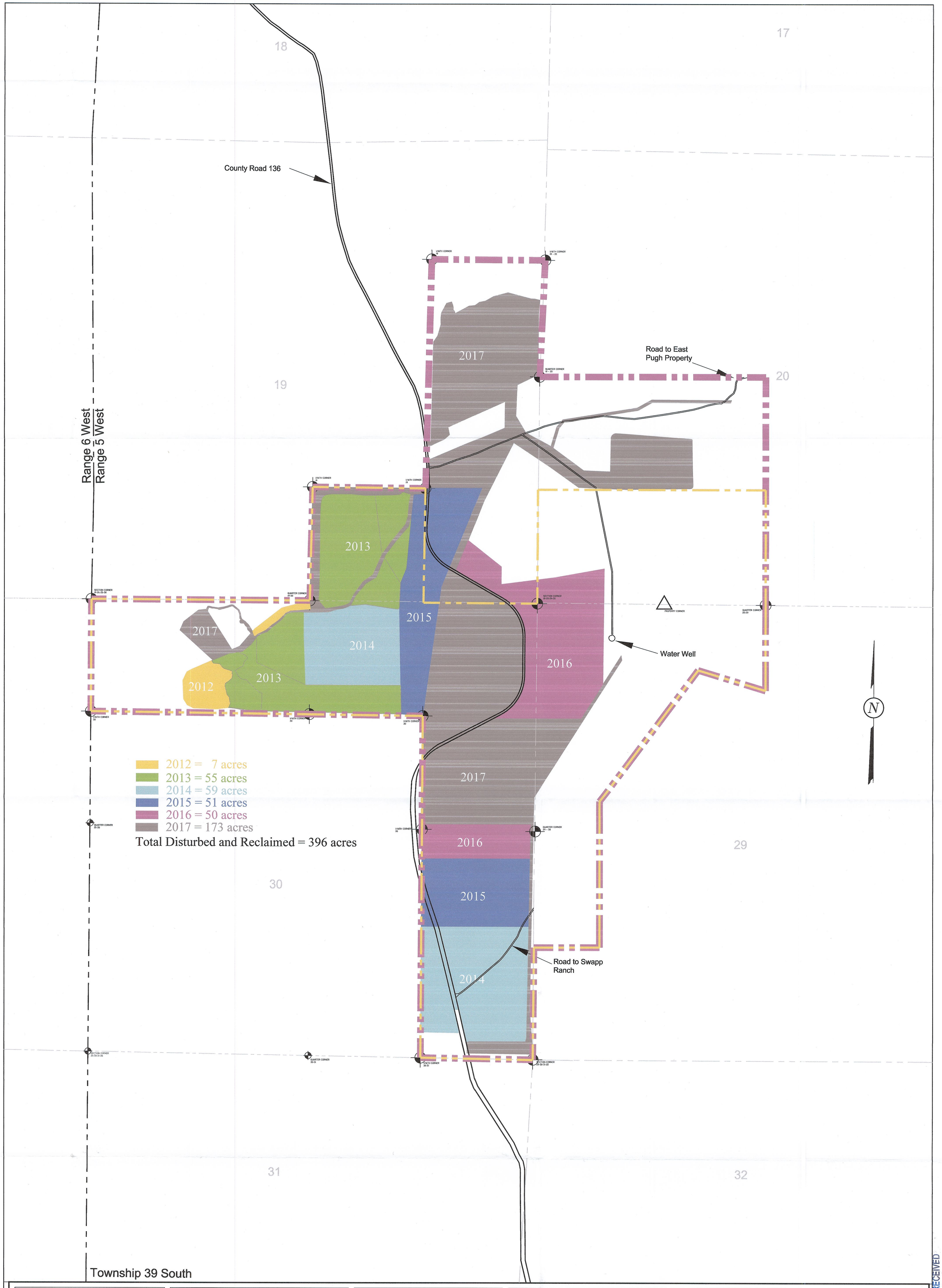
RECEIVED JAN 16 2014 DIV. OF OIL, GAS & MINING



LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER
- POSTMINING ROADS

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5–38	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
12/06/08	CRM
07/26/11	KN
01/18/13	KN
03/18/13	KN
10/19/13	KN

RECLAMATION SEQUENCE

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-38

UTAH REGISTERED PROFESSIONAL ENGINEER #154168 DAN W. GUY 10/28/13

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

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Range 6 West
Range 5 West

Township 39 South

County Road 136

Road to East Pugh Property

Water Well

Road to Swapp Ranch

2012 = 7 acres
2013 = 55 acres
2014 = 58 acres
2015 = 41 acres
2016 = 16 acres
2017 = 143 acres
Total Disturbed and Reclaimed = 320 acres

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER
- POSTMINING ROADS

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-38A	DATE: 10/18/2013
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
10/18/13	LWJ

RECLAMATION SEQUENCE
Surface & Highwall Mining

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-38A

STATE OF UTAH REGISTERED #154168 DAN W. GUY 10/28/13 PROFESSIONAL ENGINEER

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Coal Hollow Project
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Cedar City, Utah 84721
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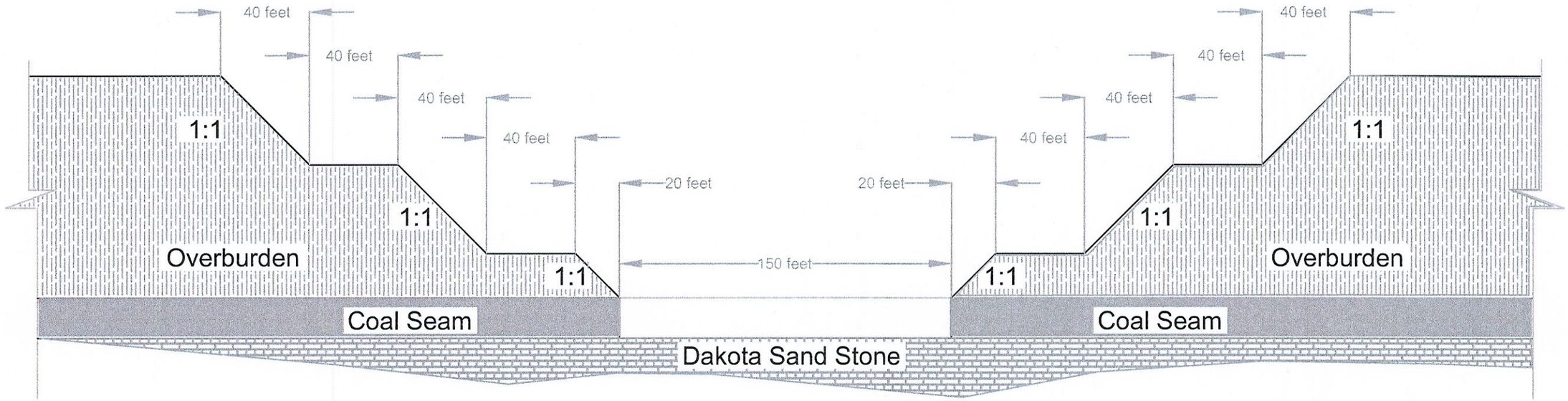

DRAWN BY: LWJ	CHECKED BY:	Typical Trench Detail for Highwall Mining COAL HOLLOW PROJECT ALTON, UTAH DRAWING: 5-41	UTAH REGISTERED PROFESSIONAL ENGINEER #154168 DAN W. GUY 10/28/13	Alton Coal Development Coal Hollow Project 463 North 100 West, Suite 1 Cedar City, Utah 84721 Phone (435)867-5331 Fax (435)867-1192
DRAWING: 5-41	DATE: 9/30/2013			
	SCALE: 1" = 50'			
JOB NUMBER: 1400	SHEET			

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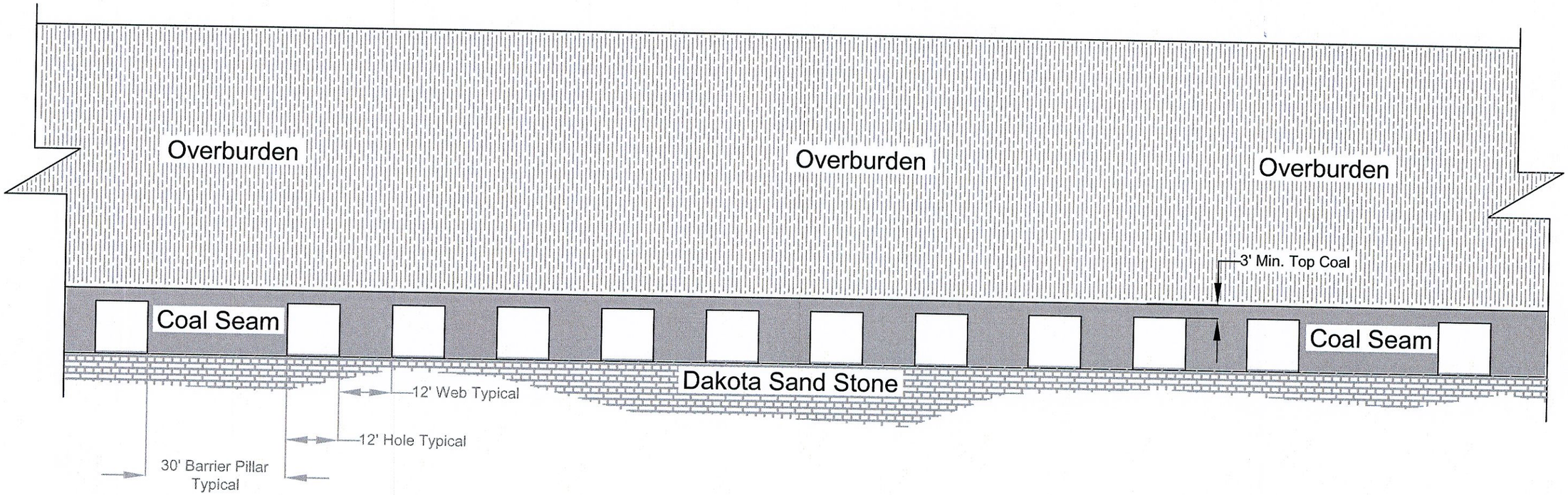
DEC 01 2013
RECEIVED



DRAWN BY: LWJ	CHECKED BY:
DRAWING: 5-42	DATE: 9/30/2013
	SCALE: 1" = 25'
JOB NUMBER: 1400	SHEET

Typical Panel Detail
10 Holes per Panel
for Under 100 feet Cover

COAL HOLLOW
PROJECT
ALTON, UTAH

DRAWING: 5-42

UTAH REGISTERED
#154168
DAN W. GUY
10/28/13
PROFESSIONAL ENGINEER

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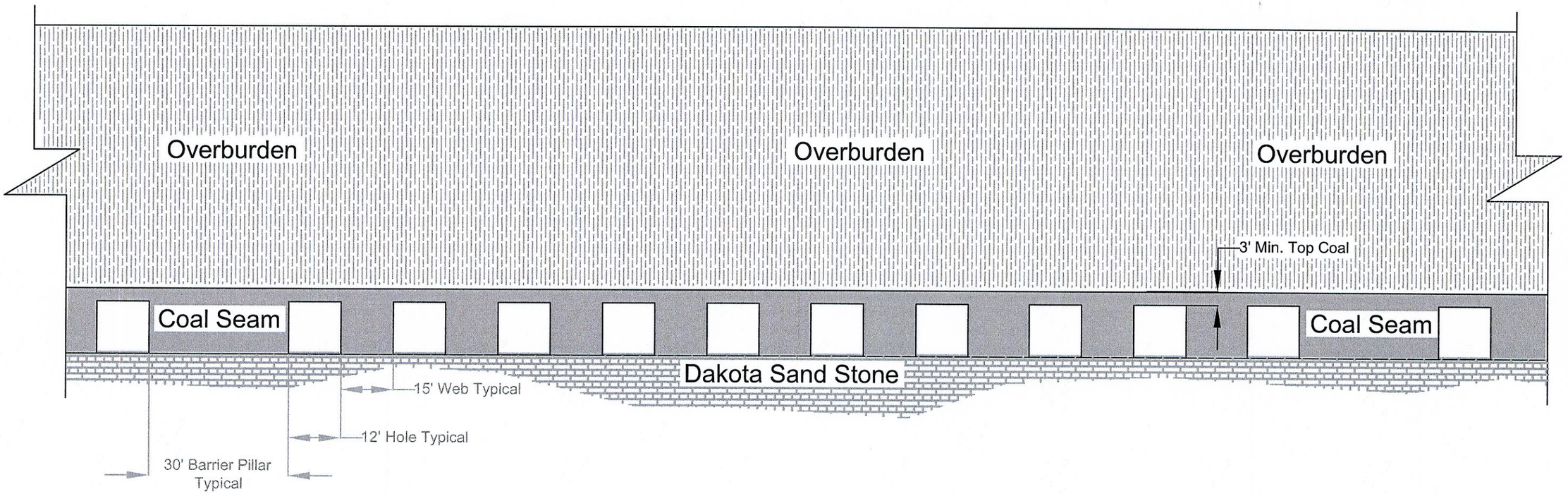

DRAWN BY: LWJ	CHECKED BY:	Typical Panel Detail 10 Holes per Panel for Under 150 feet Cover COAL HOLLOW PROJECT ALTON, UTAH DRAWING: 5-43	UTAH REGISTERED #154168 DAN W. GUY 10/28/13 PROFESSIONAL ENGINEER	Alton Coal Development Coal Hollow Project 463 North 100 West, Suite 1 Cedar City, Utah 84721 Phone (435)867-5331 Fax (435)867-1192
DRAWING: 5-43	DATE: 9/30/2013			
	SCALE: 1" = 25'			
JOB NUMBER: 1400	SHEET			

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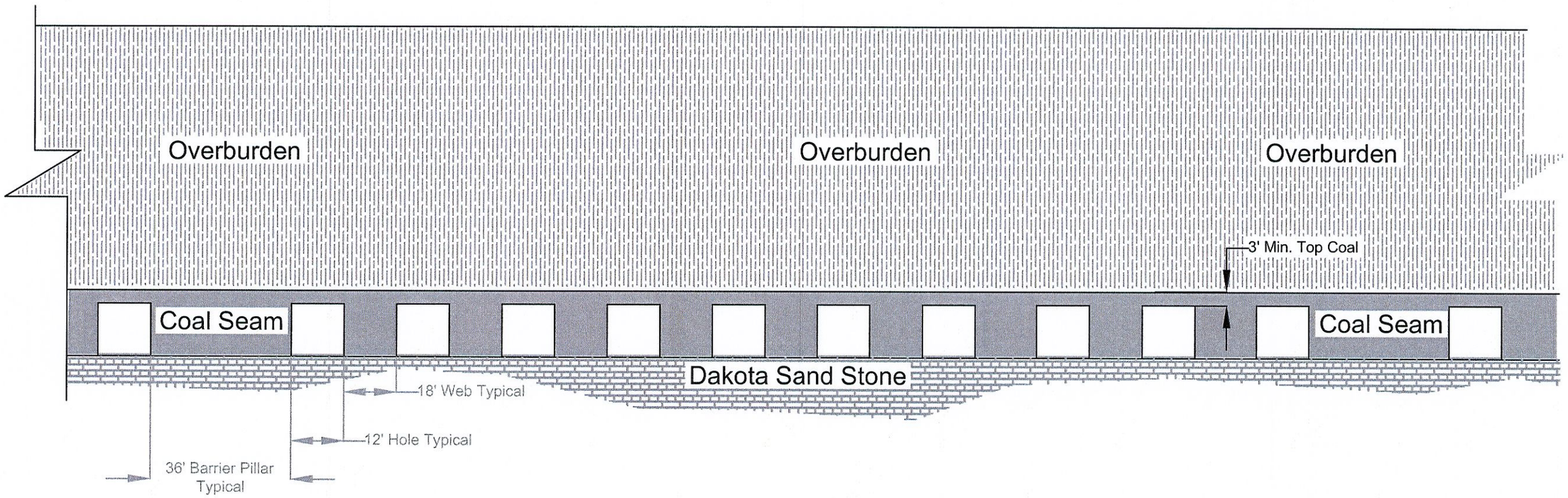

DRAWN BY: LWJ	CHECKED BY: DWG	Typical Panel Detail 10 Holes per Panel for Over 150 feet Cover COAL HOLLOW PROJECT DRAWING: 5-44	UTAH REGISTERED #154168 DAN W. GUY 10/28/13 PROFESSIONAL ENGINEER	Alton Coal Development Coal Hollow Project 463 North 100 West, Suite 1 Cedar City, Utah 84721 Phone (435)867-5331 Fax (435)867-1192
DRAWING: 5-44	DATE: 9/30/2013			
	SCALE:			

Coal under Robinson Creek Diversion (Not Mined)
Tons at 95% Recovery = 172,000

Federal Coal Ownership

High Strip Ratio Coal
Average Coal Thickness 16'
Average Cover = 240'

Coal to be Mined
Average Strip Ratio = 6.3
Average Overburden Thickness = 79'
Average Coal Thickness = 16.3'
Tons at 95% Recovery = 4,641,000

No Coal/Burn Area

High Strip Ratio Coal

Coal Outcrop/Burn

Range 6 West
Range 5 West

18 17 19 20 30 29 31 32

N

*Fee Coal Summary

Total Fee Coal	=	12,092,000 Ton
- High Strip Ratio Coal	=	4,268,000 Ton
- Coal Beneath Highwall	=	3,011,000 Ton
- Coal Beneath Diversion	=	172,000 Ton
Total Coal to be Mined	=	4,641,000 Ton

*All tons are at 95% recovery

Coal Beneath Highwall and Sedimentation Structures (Not Mined)
Tons @ 95% recovery = 3,011,000

Township 39 South

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY: C. McCOURT	CHECKED BY: LWJ
DRAWING: 5-9	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
9/16/08	CRM
1/14/13	KN
10/19/13	KN

COAL EXTRACTION OVERVIEW

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-9

UTAH REGISTERED #154168 DAN W. GUY 10/28/13 PROFESSIONAL ENGINEER

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Coal Hollow Project
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Cedar City, Utah 84721
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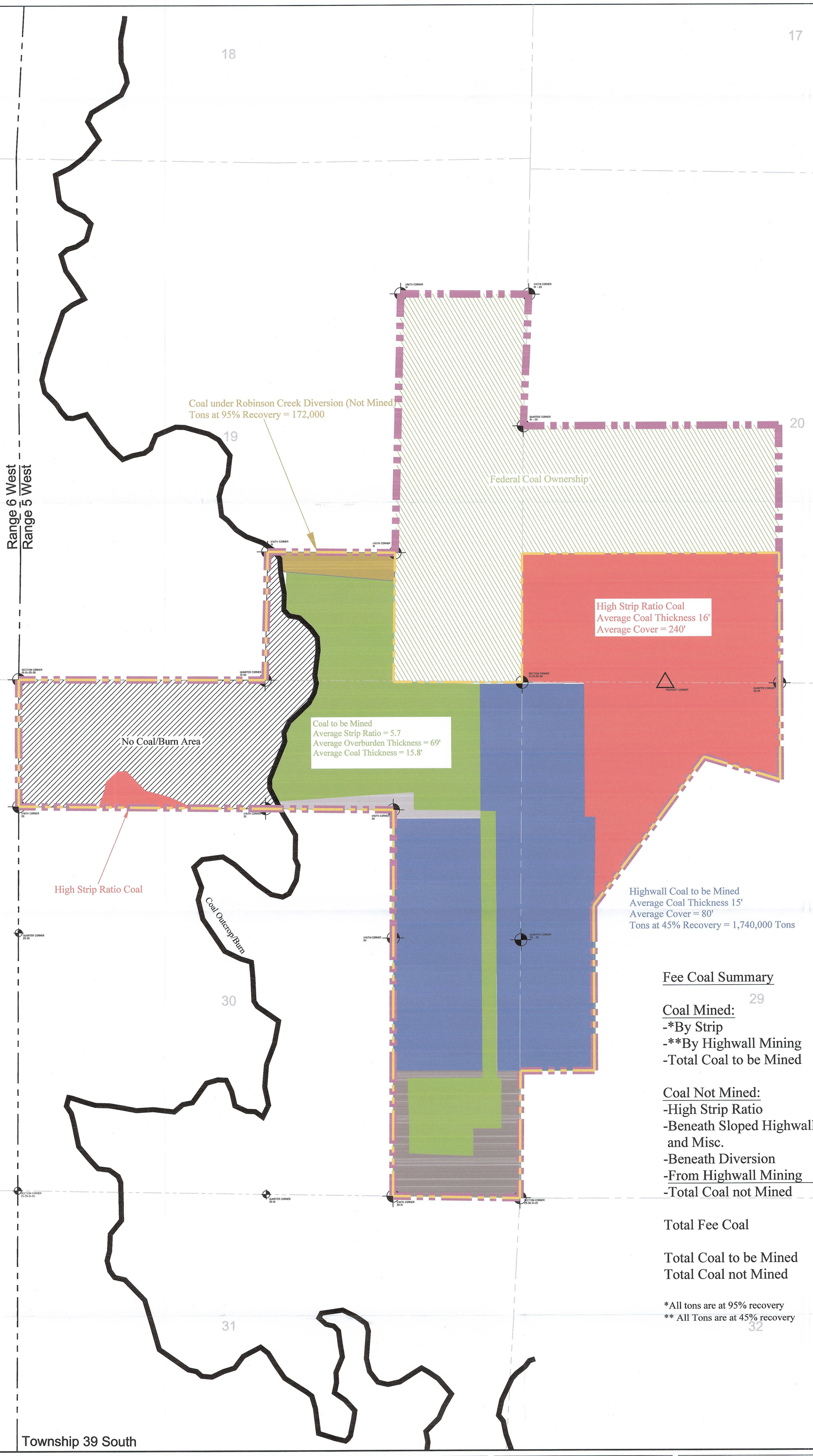

Fee Coal Summary

Coal Mined:

-*By Strip	= 2,731,000 Ton
-**By Highwall Mining	= 1,740,000 Ton
-Total Coal to be Mined	= 4,471,000 Ton

Coal Not Mined:

-High Strip Ratio	= 4,268,000 Ton
-Beneath Sloped Highwalls and Misc.	= 900,000 Ton
-Beneath Diversion	= 172,000 Ton
-From Highwall Mining	= 2,281,000 Ton
-Total Coal not Mined	= 7,621,000 Ton

Total Fee Coal	= 12,092,000 Ton
Total Coal to be Mined	= 4,471,000 Ton
Total Coal not Mined	= 7,621,000 Ton

*All tons are at 95% recovery
** All Tons are at 45% recovery

LEGEND:
- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- COAL LINE BOUNDARY
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	LWJ
DRAWING: 5-9A	DATE: 4/20/07
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
9/16/08	CRM
1/14/13	KN
10/01/13	LWJ

COAL EXTRACTION OVERVIEW

SURFACE & HIGHWALL MINING

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-9A

UTAH REGISTERED #154168 DAN W. GUY 11/28/13 PROFESSIONAL ENGINEER

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Coal Hollow Project
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Coal Hollow Mine permit boundary

Area of bank Seepage in Robinson Creek (approximate)

Primary spring and seep survey area

- Spring or seep
- Snowmelt or shallow soil water interflow dominated seep

LEGEND:			
	PERMIT BOUNDARY	DRAWN BY: N. BUTKOVICH	CHECKED BY: CRM/APC
	COAL LINE BOUNDARY	DRAWING: 7-1	DATE: 6/6/06
			SCALE: 1" = 800'
		JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
2/21/07	NLB
5/20/07	JAS
12/18/09	ECP
10/23/13	KN

SPRING AND SEEP LOCATIONS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-1

Registered Professional Geologist
ERIK CARL PETERSEN
5373615-2250
1 Nov 2013
State of Utah

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84720
Phone (435)867-5331
Fax (435)867-1192

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ALTON AMPHITHEATER

Alton Cemetery
Spring
Gravel Pit
Gravel Pits
Gravel Pits
Mine
Gravel Pits
Gravel Pit
Gravel Pits
Spring
Spring
Springs
Springs
Springs
Swapp Ranch
Sornsen Spring
Elbo Spring
Dry Creek
Robinson Creek
Lower Kanab Creek
Kanab Creek
Swapp Wash
Sink Valley Wash
Broad Hollow
Broad Valley
JEEP TRAIL
JEEP TRAIL
NATIONAL FOREST

SW-1 SW-2 SW-3 SW-4 SW-5 SW-6 SW-8 SW-9 SW-101
BLM-1
UR C1 C0 C2 C3 C4 C5 C6 C7 C9 LR LS SS
Y-102 Y-61 Y-36 Y-45 Y-38 Y-63 Y-98
SP-14 SP-16 SP-19 SP-20 SP-22 SP-23 SP-8 SP-6 SP-33 SP-4 SP-3

Coal Hollow Mine permit boundary

T 39 S
T 40 S

LEGEND:

- PERMIT BOUNDARY
- COUNTY ROAD
- SPRING MONITORING STATION
- SURFACE WATER STATION
- WELL MONITORING STATION

DRAWN BY:	CHECKED BY:
C. McCOURT	ECP
DRAWING: 7–10	DATE: 8/26/09
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
11/14/12	KN
10/25/13	KN

WATER MONITORING LOCATIONS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-10

Registered Professional Engineer
ERIK CARL PETERSEN
5373615-2250
Nov 2013
State of Utah

Alton Coal Development
Coal Hollow Project
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Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

Coal Hollow
Mine permit
boundary

Pits
Gravel
Pits
Gravel
Pit
Spring
Swapp
Ranch
Robinson
Lower
Springs
Springs
Wash
SINK
Valley
SINK
Valley
UR
Y-99
CI
C0
LR-45
LR
Y-102
C6
C2
Y-36
Y-61
Y-59
Y-4
C7
C3
C5
C8
C4
Y-38
C9
SS
LS
Y-63
6935
6920
6892
6914
6874
6883
6856
7041
7347
7200
7080
7000
6890
6880
6860
6840
6800
6769
136
19
20
29
30
31
32
N

LEGEND:			
PERMIT BOUNDARY	DRAWN BY: E. PETERSEN	CHECKED BY: ECP/CRM	
COAL MONITORING WELL	DRAWING: 7-12	DATE: 4/20/07	
ALLUVIAL MONITORING WELL		SCALE: 1" = 500'	
	JOB NUMBER: 1400	SHEET	

REVISIONS	
DATE:	BY:
12/18/08	ECP
10/25/13	KN

WELL LOCATIONS

COAL HOLLOW
PROJECT
ALTON, UTAH

DRAWING: 7-12

Registered Professional Geologist
5373615-2250
ERIK CARL
PETERSEN
1 Nov 2013
State of Utah

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

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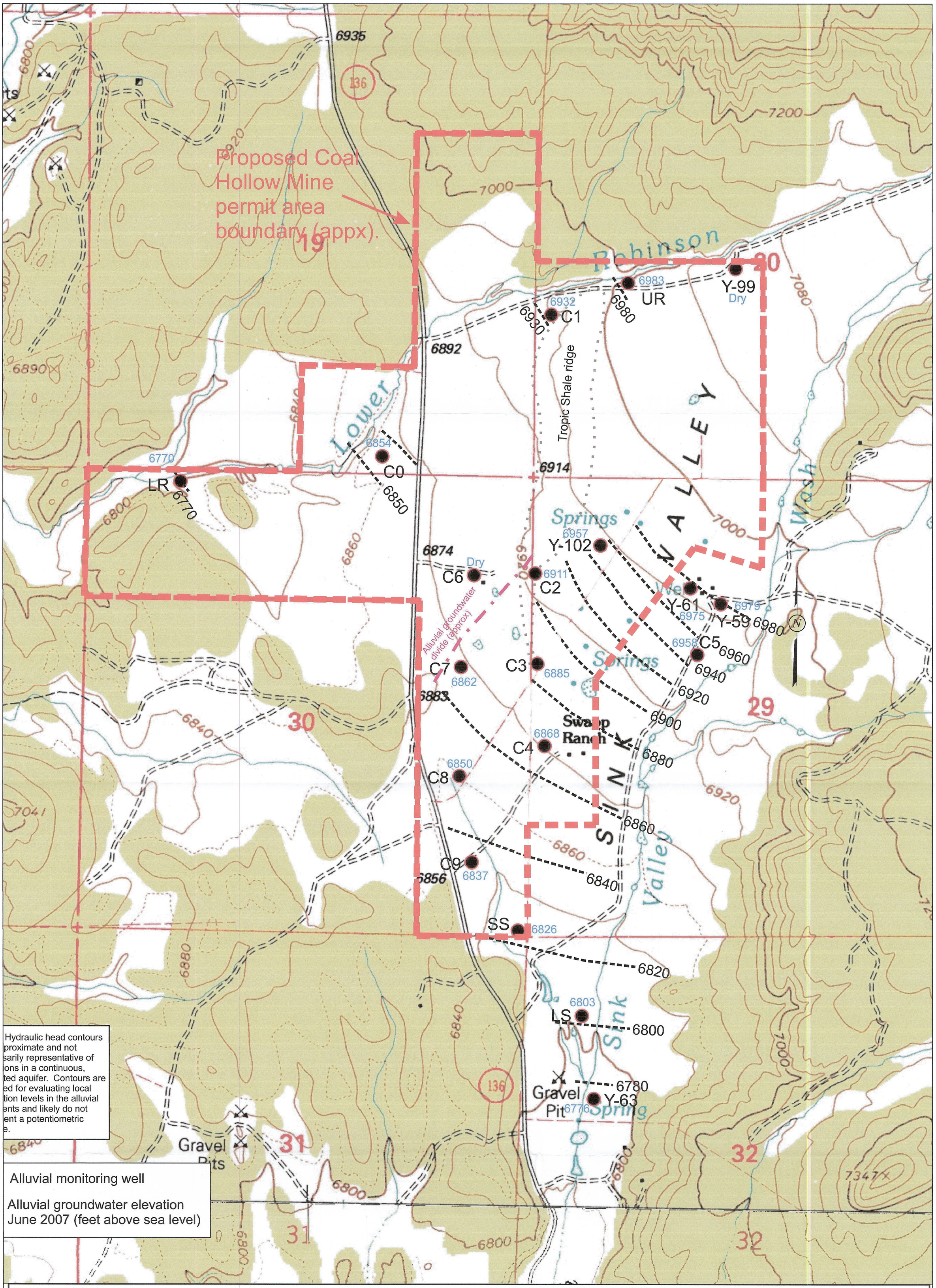

Hydraulic head contours proximate and not sarily representative of ons in a continuous, ted aquifer. Contours are ed for evaluating local tion levels in the alluvial ents and likely do not ent a potentiometric e.

Alluvial monitoring well

Alluvial groundwater elevation June 2007 (feet above sea level)

LEGEND:		
	DRAWN BY: E. PETERSEN	CHECKED BY: ECP/CRM
	DRAWING: 7-13	DATE: 4/20/07
		SCALE: 1" = 500'
	JOB NUMBER: 1400	SHEET

REVISIONS	
DATE:	BY:
8/26/09	ECP
10/25/13	KN

POTENTIOMETRIC LEVELS (In Alluvial Groundwater Systems)

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-13

Registered Professional Geologist
5373615-2250
ERIK CARL PETERSEN
Nov 2013
State of Utah

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Coal Hollow Project

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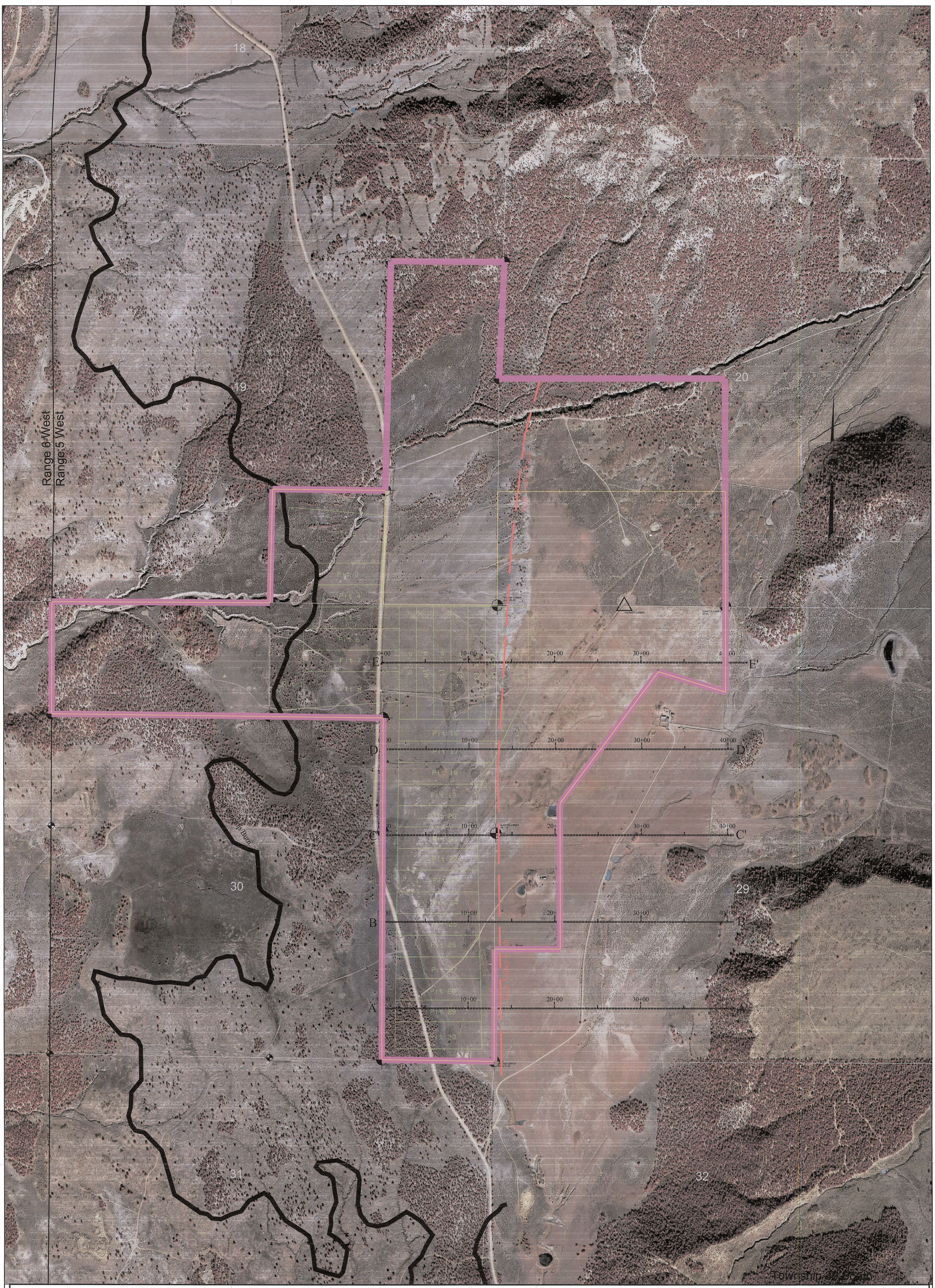

PERMIT BOUNDARY
PRIVATE COAL OWNERSHIP
COAL LINE BOUNDARY
COAL PIT OUTLINES
SECTION LINE
FOUND SECTION CORNER
FOUND PROPERTY CORNER

DRAWN BY:	CHECKED BY:
C. McCOURT	ECP
DRAWING: 7-15	DATE: 8/04/09
	SCALE: 1" = 500'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
10/25/13	KN

HYDROLOGY RESOURCE

PLAN VIEW CROSS SECTIONS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-15

Registered Professional Geologist
ERIK CARL PETERSEN
5373615-2250
Nov 2013
State of Utah

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Coal Hollow Project
463 North 100 West, Suite 1
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NOV 01 2013
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AITON

AMPHITHEATER

Alton Cemetery

Spring

Gravel Pit

Gravel Pits

Gravel Pits

Mine

Coal Hollow Mine permit boundary

LAMB CANAL

Creek

Lower Robinson Creek

Robinson Creek

Dry Creek

Kanab Creek

Wash

Springs

SINK Valley

Sink Valley Wash

Swapp Ranch

Swapp

Broad Hollow

Broad Valley

JEEP TRAIL

JEEP TRAIL

Spring

Spring

Elbo Spring

NATIONAL FORES

SW-1
SW-2
SW-3
SW-4
SW-5
SW-6
SW-7
SW-8
SW-9
SW-10
SW-18
SW-101
RD 1
BLM-1
LAMB CANAL

C0
C1
C2
C3
C4
C5
C6
C7
C8
C9
CS
LS
UR
LR-45
LR-29

Y-36
Y-38
Y-45
Y-59
Y-61
Y-63
Y-98
Y-99
Y-102

SP-3
SP-4
SP-5
SP-6
SP-14
SP-16
SP-20
SP-22
SP-23
SP-33
SP-40

SVT-01
SVT-02
SVT-03
SVT-04
SVT-05
SVT-06

T.39 S
T.40 S

LEGEND:

- PERMIT BOUNDARY
- COAL LINE BOUNDARY
- COUNTY ROAD
- ▲ SVT ALLUVIAL TRENCH
- ● SP SPRING
- ▲ SW SURFACE WATER
- ■ Y MONITORING WELL

DRAWN BY:	CHECKED BY:
C. McCOURT	ECP
DRAWING: 7–2	DATE: 8/26/09
	SCALE: 1" = 1000'
JOB NUMBER: 1400	SHEET

REVISIONS

DATE:	BY:
10/23/13	KN

BASELINE MONITORING LOCATIONS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-2

ERIK CARL PETERSEN
Registered Professional Geologist
5373615-2250
1 Nov 2013
State of Utah

ALTON COAL DEVELOPMENT
COAL HOLLOW PROJECT

463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

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Gravel Pits
6935
136
7200
7000
19
SR-5/85-209
SR-6/85-210
Robinson
7080
6892
SR-12/85-387
Wash
6840
Lower
SR-7/85-458
SR-10/85-393
SR-8/85-211
SR-9/85-459
6914
WRS-1/85-214
Springs
WRS-2/85-230
6860
6874
6920
WRS-3/85-373
SD-1
WRS-6/85-352
WRS-7/85-215
WRS-4/85-374
WRS-5/85-351
WRS-8/85-353
Springs
6883
30
29
SD-2
Swapp Ranch
SD-3
SD-4
SD-5
6920
SD-6
SD-7
6856
SR-13/85-388
SD-8
WRS-9/85-375
7041
6880
Gravel Pit
WRS-10A/85-355
WRS-10B/85-101
Spring
SD-9
136
6800
32
Gravel Pits
31
6500
31
6800

LEGEND:			
PERMIT BOUNDARY	DRAWN BY: N. BUTKOVICH	CHECKED BY: APC	
COAL LINE BOUNDARY	DRAWING: 7-3	DATE: 6/13/06	
COUNTY ROAD		SCALE: 1" = 500'	
WRS SPRING	JOB NUMBER: 1400	SHEET	
SD SURFACE DIVERSION			
SR SURFACE REACH			

REVISIONS	
DATE:	BY:
2/21/07	NLB
12/18/08	CRM
7/27/09	CRM
10/23/10	KN

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DIV. OF OIL, GAS & MINING

PROJECT AREA WATER RIGHTS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-3

Registered Professional Geologist
ERIK CARL PETERSEN
5373615-2250
1 Nov 2013
State of Utah

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

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JAN 16 2014
DIV. OF OIL, GAS & MINING

Lower Robinson Creek monitoring point (SW-4)

Gravel Pits

Coal Hollow Mine permit boundary

Lamb Canal baseline monitoring point

Lamb's Canal ditch from Kanab Creek

Ditch/pipe from Water Canyon drainage (approximate)

Pond 24-1

Pond 25-1

Pond 20-1

Sink Valley Wash supplemental flow observation point

Pond 29-1

Ditch from Swapp Hollow creek (approximate)

Springs

Probable historical domestic irrigation

Pond 29-2

Probable historical domestic irrigation

Springs

Pond 29-3

Dame irrigation ditch (appromate)

Probable historical domestic irrigation

Swapp Ranch

Pond 29-6

Pond 29-4

Pond 29

Pond 29-7

Ditch (re-route) from Swapp Hollow creek (approximate)

Pond 29-8

Pond 29-9

Pond 32-1

Pond 32-5

Gravel Pit

Pond 32-2

Spring

Johson irrigation ditches (approximate)

Pond 32-3

Gravel Pits

Lower Robinson Creek

Sink Valley Wash

Sink Valley Wash

Jeep Trail

LEGEND:	DRAWN BY:	CHECKED BY:
PROJECT AREA	E. PETERSEN	ECP/CRM
Pond	DRAWING: 7-7	DATE: 4/20/07
Ditch		SCALE: 1" = 700'
Subirrigated Lands	JOB NUMBER: 1400	SHEET
Flood irrigated Lands		

REVISIONS	
DATE:	BY:
1-22-08	ECP
8-26-09	ECP
10-25-13	KN

PONDS, DITCHES SUBIRRIGATED AND FLOOD IRRIGATED LANDS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 7-7

Registered Professional Geologist
5373615-2250
ERIK CARL PETERSEN
Nov 2013
State of Utah

Alton Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84720
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Fax (435)867-1192