



GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

June 21, 2017

Kirk Nicholes, Resident Agent
Alton Coal Development, LLC
463 North 100 West, Suite 1
Cedar City, Utah 84720

Subject: Approval of North Private Lease Areas 2 & 3, Coal Hollow Mine, Alton Coal Development, LLC, C/025/0005, Task ID #5369

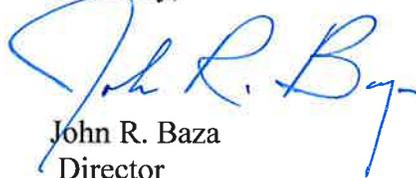
Dear Mr. Nicholes:

The Division hereby approves the revision of the Coal Hollow Mine Permit to include Areas 2 and 3 of the North Private Lease. I have attached a copy of the Division's Decision Document which includes the Technical Analysis and Findings for this revision. A revised permit document is also enclosed. Please note the special conditions to the permit including the requirement to provide clean copies of the final application.

While we have approved your application, please note that mining activity is only authorized for those areas covered by the performance bond. Currently, you have posted bond adequate to allow mining through pit #12. For mining to continue beyond pit #12 you will need to post additional bond or reduce your liability through the bond release process.

Thank you for your help in completing this important permitting action. If you have any questions, please call me at (801) 538-5334 or Daron Haddock at (801)538-5325.

Sincerely,



John R. Baza
Director

JRB/DRH/sqs
Enclosure
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State Decision Document

**Alton Coal Development, LLC
North Private Lease
Area 2 & 3
Coal Hollow Mine
C/025/0005**

June 21, 2017

**UTAH DIVISION OF OIL, GAS AND MINING
STATE DECISION DOCUMENT AND
TECHNICAL ANALYSIS**

Alton Coal Development, LLC
North Private Lease Areas 2 & 3
Coal Hollow Mine
C/025/0005

CONTENTS

- * Administrative Overview
- * Location Map
- * Permitting Chronology
- * Findings, dated June 21, 2017
- * Permit with conditions, dated June 21, 2017
- * Technical Analysis, dated June 21, 2017
- * CHIA dated June 7, 2017
- * Affidavit of Publication (Southern Utah News)
- * AVS Recommendation, dated June 21, 2017
- * Concurrence Letters (SHPO) (NRCS)

ADMINISTRATIVE OVERVIEW

Alton Coal Development, LLC
North Private Lease Areas 2 & 3
Coal Hollow Mine
C/025/0005

Kane County, Utah

June 21, 2017

PROPOSAL:

Alton Coal Development, LLC continues to develop a parcel of privately owned land north of the Coal Hollow Project. The development is called the North Private Lease of which area 1 was approved on February 2, 2016 and expanded on December 21, 2016. The center of the North Private Lease is located approximately 0.8 miles south east of the town of Alton, Utah. At this time Alton Coal Development, LLC is proposing to expand the development of the North Private Lease to include areas 2 & 3. The North Private Lease Boundary will now contain 295.633 acres.

BACKGROUND:

The Alton coal field is located in T39S, R6W and T39S, R5W SLB&M, Kane County, Utah. The town of Kanab, which is the Kane County Seat, is located about 30 miles south of the Alton coal field. Alton Coal Development, LLC (ACD) is the company responsible for the development of a portion of the Alton coal field which is known as the Coal Hollow Mining Project. The center of the Coal Hollow Project (CHP) is located approximately 3 miles south of the town of Alton, Utah.

In 2004, ACD negotiated surface and coal leases for the private or fee areas of the Alton coal field. In 2004 ACD submitted a Lease by Application (LBA) to the Department of the Interior, Bureau of Land Management State Office, Salt Lake City, Utah for federal coal acreage contiguous to the secured private lease area. Starting in 2006, ACD submitted an application for a mine permit along with a Mining and Reclamation Plan (MRP) to the Utah Division of Oil, Gas and Mining (UDOGM). It took until November 8, 2010 to complete the permitting process when the Division issued a permit for the Coal Hollow Mine.

The Coal Hollow Project started as a surface mining operation that intended to produce approximately 2,000,000 tons of coal annually using pit mining. Midway through the project, ACD initiated Highwall mining which was used in a portion of the mine. Recently the Company has instigated underground mining, which is still being developed. Production at the mine has been much slower than anticipated.

A portion of the North Private lease (area 1) was approved for mining on February 2, 2016. This allowed the mine to continue operations on areas not affecting wetlands. Area 1 was later expanded on December 21, 2016 to allow additional mining through pit #9 in the North Lease.

ANALYSIS:

This permitting action will allow for mining in the remaining parts of the North Private Lease, which has been labeled as areas 2 & 3. Mining will be accomplished by using Surface mining methods (pits in area 2 and highwall miner in area 3). Special care has been taken during the review of this expansion as part of the area contains prime farmland. Findings have been made which show that the area can be mined while protecting the prime farmland areas. Since mining in area 2 & 3 could affect water of the U. S., the Army Corp. of Engineers has been involved in reviewing the proposal and will need to issue a 404 permit. Authorization to mine under the DOGM permit will be conditioned upon the Company receiving the required 404 permit.

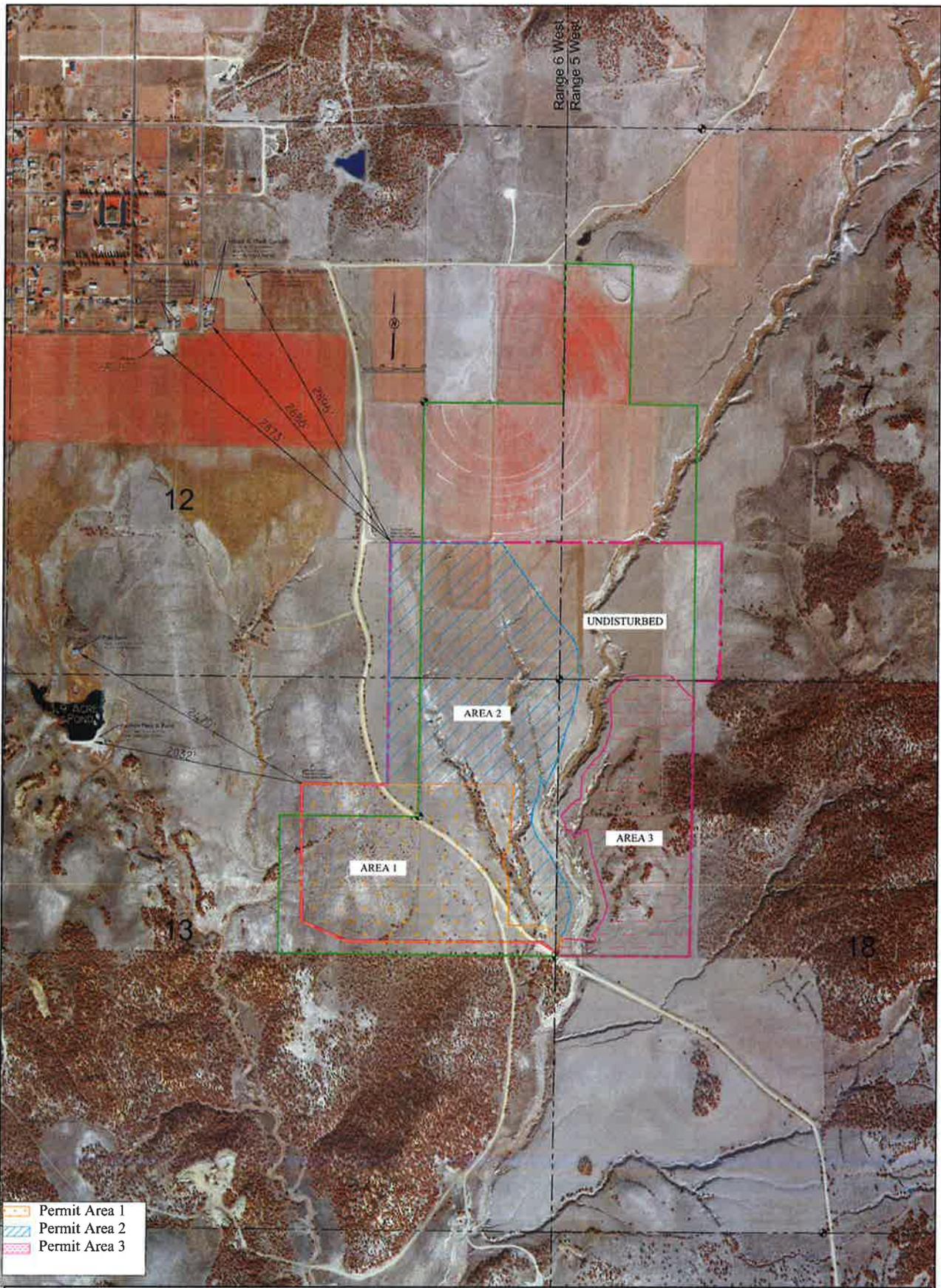
A bond in the amount of \$12,750,000 has been posted to cover the reclamation of the site using incremental bonding. The mine has been reclaiming the pits as they are mined out. Currently, pit 10 remains open as it is the access to the underground mine area and will be left open to facilitate the underground mine. The Company has applied for and received phase I bond release on 134.29 acres of disturbance. This has allowed them to roll some of the bond money to the North Private Lease. The amount of bond currently posted will allow mining to proceed through pit #12. Before proceeding to mine beyond pit #12, additional bond will need to be posted or a bond release will need to be granted for reclamation work completed on the existing disturbance.

The Division of Oil Gas and Mining has conducted an Administrative and Technical Analysis of the proposed mine Permit Application Package and has produced a written TA. All appropriate State and Federal agencies have been consulted regarding this proposal. It has been determined that the Applicant has the legal right to enter and conduct mining operations in the proposed permit area through acquired lease. All requirements for public participation have been satisfied. The application meets the requirements of the Utah Coal Regulatory Program.

RECOMMENDATION:

This recommendation is based on the complete permit application package (PAP), the Technical Analysis (TA) conducted by the Division and the administrative record. Alton Coal Development, LLC has demonstrated that mining within the North Private Lease boundary can be done in conformance with the Surface Mining Control and Reclamation Act, and the corresponding Utah Act and performance standards. The 510(c) report on the Applicant Violator System was verified for this mine on June 21, 2017 and there are no violations.

It is recommended that approval be given for mining in the Area 2 & 3 boundary of the North Private Lease at the Coal Hollow Mine with the conditions summarized as Attachment A to the Permit.



- Permit Area 1
- Permit Area 2
- Permit Area 3

LEGEND:

- PERMIT BOUNDARY
- PRIVATE COAL OWNERSHIP
- SECTION LINE
- FOUND SECTION CORNER
- FOUND PROPERTY CORNER

DRAWN BY:	K. NICHOLAS
CHECKED BY:	DWG
DRAWING:	1-7
DATE:	12/10/15
SCALE:	1" = 400'
JOB NUMBER:	0001
SHEET	

REVISIONS	
DATE:	BY:
1/8/16	AC
8/15/16	AC
9/7/16	AC
10/3/16	AC
11/23/16	AC
2/2/17	AC
5/4/17	AC

Permit Boundary and Nearest Alton Town Buildings

NORTH
COAL HOLLOW
PROJECT
ALTON, UTAH

DRAWING: 1-7



463 North 100 West, Suite 1
Cedar City, Utah 84721
Phone (435)867-5331
Fax (435)867-1192

PERMITTING CHRONOLOGY

Alton Coal Development, LLC
North Private Lease Areas 2 & 3
Coal Hollow Mine
C/025/0005

Kane County, Utah

June 21, 2017

June 22, 2015	Alton Coal Development, LLC, submits the permit application package for the North Private Lease addition to the Coal Hollow Mine.
July 15, 2015	The permit application was determined administratively complete. Alton Coal Development, LLC is instructed to publish a Notice of Complete Application in the local newspaper and place a copy of the application in the county courthouse.
July 28, 2015	The Division sent letters to state, federal and local planning agencies notifying them of the complete permit application and soliciting their comments.
July 23, 30 and August 6 and 13, 2015	This permitting action for the addition of the North Private Lease, is published in the <u>Southern Utah News</u> for four consecutive weeks.
September 13, 2015	End of public comment period.
February 2, 2016	Permit approved to allow mining in area 1 of North Private Lease
June 24, 2016	The Division receives a supplemental application for ongoing permitting of areas 2 & 3.
August 19, 2017	The Division determines the application to be deficient and returns it for more information.
February 21, 2017	Division receives a revised application for permitting areas 2 & 3.
May 15, 2017	Received additional information as part of the PAP.
June 12, 2017	Divisions sends Company additional deficiencies.
June 19, 2017	Company submits final corrections to the PAP.
June 21, 2017	Division issues Permit with conditions to allow mining in areas 2 & 3 of North Private Lease.

FINDINGS

Alton Coal Development, LLC
North Private Lease Area 2 & 3
Coal Hollow Mine
C/025/0005

Kane County, Utah

June 21, 2017

1. The permit application for the expansion of mining of coal from the North Private Lease Areas 2 & 3 at the Coal Hollow Mine is accurate and complete and all requirements of the Surface Mining Control and Reclamation Act, and the approved Utah State Program (the "Act") are in compliance. See Technical Analysis dated June 21, 2017 (R645-300-133.100)
2. The applicant proposes acceptable practices for the reclamation of disturbed lands. The Division has determined that reclamation, as required by the Act can be feasibly accomplished following the approved plan with the attached permit conditions. (R645-300-133.710)
3. The proposed lands to be included within the permit area are:
 - a. Not included within an area designated unsuitable for underground coal mining operation (R645-300-133.220);
 - b. Not within an area under study for designated land unsuitable for underground coal mining operations (R645-300-133.210);
 - c. Not on any lands subject to the prohibitions or limitation of 30 CFR 761.11 {a} (national parks, etc), 761.11 {f} (public buildings, etc.) and 761.11 {g} (cemeteries);
 - d. Not within 100 feet of a public road except at the location where the public road accesses the property. The County road previously transecting the lease area has been relocated by Kane County after public notice. (R645-300-133.220); and
 - e. Not within 300 feet of any occupied dwelling (R645-300-133.220).
4. The operation would not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats as determined under the Endangered Species Act of 1973. See Technical Analysis dated June 21, 2017. (16 USC 1531 et seq.) (R645-300-133.500).
5. The Division's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800). See Technical Analysis dated June 21, 2017 and SHPO letter dated May 16, 2017. (R645-300-133.600)

6. A 510 (c) report has been run on the Applicant Violator System (AVS), which shows that: prior violations of applicable laws and regulations have been corrected; neither Alton Coal Development, LLC nor any affiliated company, are delinquent in payment of fees for the Abandoned Mine Reclamation Fund; and the applicant does not control and has not controlled mining operations with demonstrated pattern of willful violations of the Act of such nature, duration, and with such resulting irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (A 510 (c) report was run on June 21, 2017). (R645-300-133.730)
7. The applicant has posted a surety bond for the Coal Hollow Mine in the amount of \$12,750,000 issued by Ironshore Indemnity Inc. (Surety Number SUR60000010). As the mine is doing incremental bonding, the bond is sufficient for the new disturbance proposed through pit #12. (R645-300-134).
8. No lands designated as alluvial valley floors occur on the permit area. See Technical Analysis dated June 21, 2017 (R645-302-313.100 and R645-302-321.100).
9. The proposed postmining land-use will not be affected by this action.
10. The Division has made all specific approvals required by the Act, the Cooperative Agreement, and the Federal Lands Program.
11. All procedures for public participation required by the Act, and the approved Utah State Program are in compliance. The public advertisement was published on July 23, 30, August 6 and 13, 2015 in the Southern Utah News (R645-300-120).
12. All existing structures at the mine comply with performance standards. This application is an extension of an existing mine with no new surface facilities being proposed (R645-300-133.720).
13. The permit incorporates a specific plan in consultation with the State Conservationist for handling and reclaiming prime farmlands. The applicant has the technological capability to restore the prime farmland, within a reasonable time, to equivalent or higher levels of yield as required and the proposed coal mining and reclamation operations will be conducted in compliance with the requirements of R645-302-317 and other environmental protection performance and reclamation standards for mining and reclamation of prime farmland of the State Program. See Technical Analysis dated June 21, 2017. (R645-302-316)


Permit Supervisor


Associate Director of Mining


Director

NON-FEDERAL

**PERMIT
C/025/0005**

June 21, 2017

**STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801
(801) 538-5340**

This permit, C/025/0005, is issued for the State of Utah by the Utah Division of Oil, Gas and Mining (DOG M) to:

**ALTON COAL DEVELOPMENT, LLC
463 North 100 West, Suite 1
Cedar City, Utah 84720
(435)867-5331**

for the Coal Hollow Mine. Alton Coal Development, LLC is the lessee of the entire surface estate encompassing 1017.153 acres. A performance bond is filed with the DOGM in the amount of \$12,750,000.00, payable to the state of Utah, Division of Oil, Gas and Mining. DOGM must receive a copy of this permit signed and dated by the permittee.

- Sec. 1 STATUTES AND REGULATIONS** - This permit is issued pursuant to the Utah Coal Mining and Reclamation Act of 1979, Utah Code Annotated (UCA) 40-10-1 et seq, hereafter referred to as the Act.
- Sec. 2 PERMIT AREA** - The permittee is authorized to conduct coal mining and reclamation activities on the following described lands within the permit area at the Coal Hollow mine, situated in the state of Utah, Kane County, and located:

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M

Section 30: All of Section Lot #1 (NW $\frac{1}{4}$ NW $\frac{1}{4}$); NE $\frac{1}{4}$ NW $\frac{1}{4}$; N $\frac{1}{2}$ NE $\frac{1}{4}$; ALSO: BEGINNING 3.50 chains West of the East Quarter corner of Said Section 30, and running South 34° 34' West 22.64 chains of the 1/16 section line; thence West 2.64 chains to the Southwest corner of NE $\frac{1}{4}$ SE $\frac{1}{4}$ 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: SW $\frac{1}{4}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$...containing 160.0 acres, more or less.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M

Section 20: SW $\frac{1}{4}$...containing 160.00 acres, more or less.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M

Section 30: BEGINNING at a point 5.3 I chains North of the E $\frac{1}{4}$ 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.

TOWNSHIP 39 SOUTH-RANGE 05 WEST, SLB&M

Section 29: BEGINNING at the Northeast Corner of the Northwest Quarter of Said Section 29, 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; thence South 36 degrees 45 minutes West 15.61 chains; thence South 5.20 chains to the center section line of Section 29; thence South 20.0 chains; thence West 10.96 chains to the west section line of Section 29; thence North 20.0 chains to the Quarter Section Corner of Section 29; 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; thence East 17.77 chains to the point of beginning....containing 85.88 acres, more or less.

NORTH PRIVATE LEASE AREA

The following described lands located in Kane County, Utah within Sec. 12 &13, T39S, R6W and within Sec. 7 &18, T39S, R5W:

Beginning S 58 degrees 16' 29" W a distance of 1,920.87 ' from Section Corner 7-18-12-13, T39S, R5R6W; thence N 89°29'27" W a distance of 823.81'; thence S 00°00'38" E a distance of 1313.93'; thence S 65°46'32" E a distance of 479.40'; thence S 89°44'30" E a distance of 1861.86'; thence S 54°58'33" E a distance of 226.53'; thence S 89°45'07" E a distance of 1235.50'; thence N 00°41'09" E a distance of 1322.97'; thence N 00°41'09" E a distance of 1322.97'; thence S 89°30'20" E a distance of 241.42'; thence N 00°51'49" E a distance of 1323.52'; thence N 89°22'59" W a distance of 249.30'; thence N 89°56'02" W a distance of 2923.34'; thence S 00°24'59" W a distance of 2326.09'; which is the point of beginning, having an area of 12,877,780.47 square feet, or **295.633 acres**

This legal description is for the permit area (1017 acres) of the Coal Hollow Mine and included in the operation and reclamation plan on file at the Division. The permittee is authorized to conduct coal mining and reclamation operations on the foregoing described property subject to the leases and Conditional Use Permit issued by Kane County, including all conditions and all other applicable conditions, laws and regulations.

Sec. 3 COMPLIANCE - The permittee will comply with the terms and conditions of the permit, all applicable performance standards and requirements of the State Program.

Sec. 4 PERMIT TERM - This permit expires on November 8, 2020.

Sec. 5 ASSIGNMENT OF PERMIT RIGHTS - The permit rights may not be transferred, assigned or sold without the approval of the Director, DOGM. Transfer, assignment or sale of permit rights must be done in accordance with applicable regulations, including but not limited to 30 CFR 740.13(e) and R645-303.

Sec. 6 RIGHT OF ENTRY - The permittee shall allow the authorized representative of the DOGM, including but not limited to inspectors, and representatives of OSMRE, without advance notice or a search warrant, upon presentation of appropriate credentials, and without delay to:

- A. have the rights of entry provided for in 30 CFR 840.12, R645-400-110, 30 CFR 842.13 and R645-400-220; and,
- B. be accompanied by private persons for the purpose of conducting an inspection in accordance with R645-400-100 and 30 CFR 842, when the inspection is in response to an alleged violation reported by the private person.

Sec. 7 SCOPE OF OPERATIONS - The permittee shall conduct coal mining and reclamation operations only on those lands specifically designated as within the permit area on the maps submitted in the mining and reclamation plan and permit application and approved for the term of the permit and which are subject to the performance bond.

Sec. 8 ENVIRONMENTAL IMPACTS - The permittee shall minimize any adverse impact to the environment or public health and safety through but not limited to:

- A. accelerated monitoring to determine the nature and extent of noncompliance and the results of the noncompliance;
- B. immediate implementation of measures necessary to comply; and
- C. warning, as soon as possible after learning of such noncompliance, any person whose health and safety is in imminent danger due to the noncompliance.

Sec. 9 DISPOSAL OF POLLUTANTS - The permittee shall dispose of solids, sludge, filter backwash or pollutants in the course of treatment or control of waters or emissions to the air in the manner required by the approved Utah State Program which prevents violation of any applicable state or federal law.

- Sec. 10 CONDUCT OF OPERATIONS** - The permittee shall conduct its operations:
- A. in accordance with the terms of the permit to prevent significant, imminent environmental harm to the health and safety of the public; and
 - B. utilizing methods specified as conditions of the permit by DOGM in approving alternative methods of compliance with the performance standards of the Act, the approved Utah State Program.
- Sec. 11 EXISTING STRUCTURES** - As applicable, the permittee will comply with R645-301 and R645-302 for compliance, modification, or abandonment of existing structures.
- Sec. 12 RECLAMATION FEE PAYMENT** - The operator shall pay all reclamation fees required by 30 CFR part 870 for coal produced under the permit, for sale, transfer or use.
- Sec. 13 AUTHORIZED AGENT** - The permittee shall provide the names, addresses and telephone numbers of persons responsible for operations under the permit to whom notices and orders are to be delivered.
- Sec. 14 COMPLIANCE WITH OTHER LAWS** - The permittee shall comply with the provisions of the Water Pollution Control Act (33 USC 1151 et seq,) and the Clean Air Act (42 USC 7401 et seq), UCA 26-11-1 et seq, and UCA 26-13-1 et seq.
- Sec. 15 PERMIT RENEWAL** - Upon expiration, this permit may be renewed for areas within the boundaries of the existing permit in accordance with the Act, the approved Utah State Program.
- Sec. 16 CULTURAL RESOURCES** - If during the course of mining operations, previously unidentified cultural resources are discovered, the permittee shall ensure that the site(s) is not disturbed and shall notify DOGM. DOGM, after coordination with OSMRE, shall inform the permittee of necessary actions required. The permittee shall implement the mitigation measures required by DOGM within the time frame specified by DOGM.
- Sec. 17 APPEALS** - The permittee shall have the right to appeal as provided for under R645-300.
- Sec. 18 SPECIAL CONDITIONS** - There are special conditions associated with this permitting action as described in Attachment A.

The above conditions (Secs. 1-18) are also imposed upon the permittee's agents and employees. The failure or refusal of any of these persons to comply with these conditions shall

be deemed a failure of the permittee to comply with the terms of this permit and the lease. The permittee shall require his agents, contractors and subcontractors involved in activities concerning this permit to include these conditions in the contracts between and among them. These conditions may be revised or amended, in writing, by the mutual consent of DOGM and the permittee at any time to adjust to changed conditions or to correct an oversight. DOGM may amend these conditions at any time without the consent of the permittee in order to make them consistent with any new federal or state statutes and any new regulations.

THE STATE OF UTAH

By: John R. Boyer

Date: 6/21/17

I certify that I have read, understand and accept the requirements of this permit and any special conditions attached.

Authorized Representative of the Permittee

Date: _____

ATTACHMENT A
SPECIAL CONDITIONS

1. Alton Coal Development, LLC (ACD) will submit water quality data for the Coal Hollow Mine in an electronic format through the Electronic Data Input web site, <http://linux3.ogm.utah.gov/cgi-bin/appx-ogm.cgi>.
2. In the event that ACD encounters large volumes of groundwater (a sustained flow of more than 1 cfs) in any pit, they will be required to notify the Division, and assess and submit plans to curtail inflows to the pit and reestablish groundwater movement.
3. The Applicant will be required to monitor for selenium where water leaves the minesite, during operational and reclamation phases.
4. The Applicant will be required to evaluate discharges from the mine to determine any impacts to the designated AVF on Kanab Creek. An annual finding should be placed in the Annual Report during operation and reclamation of any adverse impacts to the channel, diminution of water quality and impacts to wildlife.
5. Prior to conducting coal mining and reclamation operations within areas 2 & 3 of the North Private Lease, Alton Coal Development will obtain the necessary 404 permit from the U. S. Army Corp. of Engineers.
6. As part of the incremental bonding scenario, prior to mining beyond pit #12 of the North Private Lease, Alton Coal Development will post additional performance bond or will reduce their reclamation liability by acquiring additional bond release.



State of Utah
 DEPARTMENT OF NATURAL RESOURCES
 MICHAEL R. STYLER
Executive Director
 Division of Oil, Gas and Mining
 JOHN R. BAZA
Division Director

Technical Analysis and Findings

Utah Coal Regulatory Program

June 21, 2017

PID: C0250005
TaskID: 5369
Mine Name: COAL HOLLOW
Title: NPL AREAS 2 & 3

General Contents

Identification of Interest

Analysis:

The minimum requirements of R645-301-112 were met.

The Division performed a cross check with the Applicant/Violator System. No errors in the ownership and control information were identified.

Appendix 1-10, Ownership and Control, of the MRP is current. No updates are required at this time.

ssteab

Violation Information

Analysis:

The minimum requirements for R645-301-113 were met.

An AVS evaluation was generated on 4/7/17. No suspensions, revocations or unabated violations were reported.

ssteab

Legal Description

Analysis:

The application meets the requirements of R645-301-820.113

The application Chapter 1, contains the updated legal description to include the North Private Lease, Areas 1, 2 & 3 for a total of 295.633 acres.

Drawing 1-1 Permit Area and Drawing 1-7 Permit Boundary and Nearest Alton Town Buildings have been updated to include Areas 2 & 3 in the North Private Lease.

ssteab

Public Notice and Comment

Analysis:

The minimum requirements for R645-301-117 were met.

The addition of the North Private Lease was determined administratively complete on July 15, 2015.

Publication took place for four consecutive weeks. The first publication on 7/23/15 and the last on 8/13/15.

ssteab

Filing Fee

Analysis:

Not applicable.

ssteab

Permit Application Format and Contents

Analysis:

The minimum requirements of R645-301-120 were met.

The application to add the North Private Lease Areas 2 and 3 contained current information and was filed in a format required by the Division.

ssteab

Permit Application Format and Contents

Analysis:

pburton

Permit Application Format and Contents

Analysis:

The amendment meets the State of Utah R645 Clear and Concise requirements.

The amendment clearly directs the reader to the appropriate appendix when a narrative is expanded upon. Appendix 7-18, Appendix 7-19, and Appendix 7-20 have been added to the amendment and are clearly referenced in the narrative in Chapter 7 when needed.

The amendment includes Appendix 7-3N providing water right data associated with the NPL. The drawing associated with this amendment Drawing 7-3N Project Area Water Rights is also included.

kstorrrar

Reporting of Technical Data

Analysis:

The amendment meets the State of Utah R645 requirements for Reporting of Technical Data.

The amendment includes well completion data for the wells within and adjacent to the North Private Lease. The data is found in Table 3 in Appendix 7-16 and in Table 1 in Appendix 7-18. The data includes the following: 1. Location, date drilled, and aquifer represented. 2. Ground elevation and elevation of the measuring point. 3. Drill bit and casing diameter. 4. Packer base depth and elevation. 5. Casing depth and total depth. 6. Total hydraulic head elevation. 7. Method of measuring formation pressure. 8. Gravel pack - yes or no. 9. Casing material. 10. Well development techniques.

kstorrrar

Environmental Resource Information

General

Analysis:

The amendment meets State of Utah R645-301-300 requirements for a description of the vegetative, fish, and wildlife resources of the permit area and adjacent areas.

The amendment describes vegetative, fish, and wildlife resources of the permit area and adjacent area (North Private Lease and Coal Hollow Lease) in Section 321. Detailed vegetation information and reports are provided in Appendix 3-2, 3-4 and 3-9. Potential impacts to those resources are discussed in the Operations Plan Sections 331 and 332. Proposed reclamation design to restore or enhance those resources is described in Section 342 and Appendix 3-9.

Ireinhart

Historic and Archeological Resource Information

Analysis:

The amendment meets the State of Utah R645-301-411.140 requirements for cultural and historic resources information.

Based on previous inventories, planned mining operations within the North Private Lease area will result in an adverse effect on two eligible cultural sites, 42KA3077 and 42KA3097. One additional site, 42KA6080 is present along the southern edge of the lease area and can be avoided. A data recovery treatment plan is in Appendix 4-7 and identifies mitigation measures that shall be implemented. See Appendix 4-7 pages 28-36 for details on Tier 1 and Tier II testing plan.

Tier I testing on sites 42DA3077 and 42KA3097 was completed in February and March 2016 by Bighorn Archaeological. ACD submitted the Testing & Historic Road Reconnaissance with the 2016 annual report. Bighorn recommended that no further data recovery work be conducted (Tier II) on the two cultural sites as the testing suggested that cultural materials were relegated primarily to the surface of the site which has been disturbed by agricultural use. The historic road reconnaissance concluded the historic fabric of the original road has been obliterated, thus, the road does not meet the requirements established for documentation as either a site or isolated linear feature. This report provides documentation of all tested and excavated components and associated features, synthesis of analytical data, a technical report summarizing findings and results of analysis, updated maps, and photographs.

ACD is also committed to presenting a public presentation on the results of the mitigation work and how the work furthered our knowledge concerning the past.

One final inventory of the North Private Lease area will occur once the weather permits in 2017. This survey will cover all of the project area beyond the 1986 boundaries of sites 42KA3077 and 42KA3097, which were intensively surveyed as part of the mitigation work on those sites.

A map pursuant to R645-301-411.141 is provided in the confidential aforementioned reports and Exhibit 4-4 on page 4-12 of the amendment. There are no public parks or cemeteries within 100 feet of the permit area. Utah has approximately 169.3 miles of designated Wild and Scenic River, all of which are tributaries of the Virgin River in southwest Utah and outside the adjacent area. National System of Trails in Utah are inclusive of the Pony Express, California National Historic Trail, Mormon Pioneer Trail, and Old Spanish National Historic Trail. None of the trail systems are within the adjacent area.

Ireinhart

Climatological Resource Information

Analysis:

The amendment meets the State of Utah R645 requirements for Climatological Information.

Monthly wind direction and velocity data are updated within the approved MRP. The data is presented in windrose plots in Appendix 7-6 Climate Data. Precipitation and maximum and minimum temperature and daily and average precipitation data collected at the weather station are also provided in Appendix 7-6 Climate Data.

kstorrrar

Vegetation Resource Information

Analysis:

The amendment meets the State of Utah R645-301-321 requirements for vegetation resource information.

Section 321.100 describes plant communities within the permit area and drawing 3-1 shows reference areas. Detailed vegetation information is available in Appendix 3-2, 3-4, and 3-9. Vegetation surveys identify if any listed or proposed endangered or threatened species of plants may occur in the permit area. The description is adequate to predict the potential for reestablishing vegetation and includes productivity measurements on all lands that will be disturbed. Productivity is expressed as pounds/acre and is listed in Table 3-34. The NPL contains approximately 6.34 acres of palustrine emergent wet meadow wetlands, 0.04 acre of stock pond and 4,632 feet (0.14 acre) of the Kanab Creek stream channel that was delineated and verified by the U.S. Army Corps of Engineers (SPK-2011-01248) September 2015. More information on the wetland can be found in Volume 10 of the MRP.

Ireinhart

Fish and Wildlife Resource Information

Analysis:

The amendment meets the State of Utah R645-301-322 requirements for fish and wildlife resource information.

In Section 322 the amendment describes fish and wildlife resource information within the proposed permit area and any reference areas. It also includes a history of agency consultation and studies conducted in an effort to design the protection and enhancement plan required under R645-301-333.

On 2/28/2017, the Division conducted analysis using IPaC (U.S. Fish and Wildlife Service) for species determinations. Listed species that could potentially be impacted include: (birds) California Condor, Mexican Spotted Owl, Southwestern Willow Flycatcher, Yellow-billed Cuckoo, (plants) Jones Cycladenia, Siler Pincushion Cactus, and (mammals) Utah Prairie Dog.

The area is not likely to include any listed proposed endangered or threatened species of plants or animals as evidenced by USFWS Consultation Code 06E23000-2017-E-00481 and analysis in Table 3-35. Table 3-35 does not evaluate impacts to the California Condor which is listed as "Experimental Population, Non-Essential". However, they inhabit the forests, rocky shrubland and oak savannas which are not abundant within the permit area.

The permit area contains habitats of unusually high value for the Greater Sage-grouse. As such, Appendix 3-8 has been developed in consultation with Utah Division of Wildlife to outline specific monitoring and mitigation measures required by the Permittee.

The Division determined that approval of this amendment would not affect a listed species or designated critical habitat and therefore did not initiate informal consultation with U.S. Fish and Wildlife Service.

Ireinhart

Soils Resource Information

Analysis:

Analysis:

The application meets the requirements of R645-301-220, soils Environmental Description for Area 2 (97.8 acres) and Area 3 (57.2 acres) which lie on either side of Kanab Creek within the North Lease Permit Boundary, shown on Dwg 1-7.

The soil survey of the North Lease is found in Volume 11. The soil survey was revised with the Area A1 application in December 2015, but was not revised with this application. The survey was completed by Robert Long Associates in 2014.

Soil data point locations are identified on Soil Map 1. The soil map units are outlined on Soils Map 2 - Order 2 Soil Survey, which is reproduced in the application as Dwg 2-3. Limiting soil features for reclamation suitability are outlined by map unit on Soils Map 4.

The soil survey was included in the Alluvial Valley Floor determination (Task 4704) and therefore contains the following additional soil maps: soil parent materials (Map 3), Irrigation Areas (Map 5), subirrigated lands (Map 6), and the Prime Farmlands (Map 9).

In December 2016, Map 9 (with revision date of September 2015) was accepted by the Utah NRCS State Soil Scientist as a more detailed evaluation of the Prime Farmland than the conservation planning map used by the NRCS, which is reproduced as Map 8. Correspondence from the NRCS on this matter is found in Volume 9, Appendix A.

Volume 11 soil survey profile descriptions are in Appendix B. Soil Laboratory Analysis is found in Appendix C. The list of parameters analyzed is shown in Table 3 and include density and total metals (SW 846 method) for some samples. Soil samples were analyzed by Intermountain Laboratory-Sheridan, WY. Soil profile photographs are in Appendix D. Piezometers were installed at several aquic soil profile locations (Table 2) and the seasonal groundwater fluctuation is described in the NPL geo-hydrology report.

pburton

Land Use Resource Information

Analysis:

The amendment meets the State of Utah R645-301-411 requirements for land use information.

In Section 411.100 on pages, 4-2 through 4-5 pre-mining land-use is described as grazing and wildlife (undeveloped rangeland), pastureland, and wetlands. The narrative analyzes the landuse in conjunction with other environmental resources and provides analysis of the capability of the land before any coal mining and reclamation operations to support a variety of uses. Exhibit 4-2 on page 4-5 is a land use map.

ireinhart

Prime Farmland

Analysis:

Analysis:

The application meets the requirements of R645-301-221, Prime Farmland Investigation and R645-302-313.200, Soil Survey of Prime Farmland Soils. Prime Farmlands and Farmlands of Statewide Importance within the permit area that have historically been used as cropland or pastureland, that are both irrigated and non irrigated, and used for agriculture are illustrated on Soil Map 9 in Volume 9. (The elk fence shown on Map 9 is the southern boundary of irrigated lands and thus forms the southern boundary of the Prime Farmlands.) Irrigated and non-irrigated pastureland are also designated on Exhibit 4-2 Land Use Map - Vegetation Types.

In December 2016, Map 9 (dated September 2015) was accepted by the Utah NRCS State Soil Scientist as an Order 1 evaluation of the Prime Farmland of the North Lease. The NRCS described Map 9 as more detailed than the conservation planning map used by the NRCS (Vol 11, Map 8). The NRCS had used the original Map 9 (dated November 2014) to identify 292 acres of Prime Farmland in the North Lease in 2012 (Vol 9, Appendix A). The Prime Farmland and Farmland of Statewide importance acreage subject to more intensive survey was 251 acres (Chap 2, pg. 2-2). The Prime Farmland and Farmland of Statewide Importance acreage was reduced to 153 acres within the North Lease permit area after the intensive survey (Vol 11, p. 36). Additional farmlands North of the farm road were removed from the permit when the permit area was reduced to its present boundary. (The farm road is a faint white line North of the elk fence on Soil Survey Map 9.)

Prime farmland within the permit boundary was further reduced by eliminating non-irrigated lands (Table 11, Vol 11). The Order II Soil Survey of Map 9 shows approximately 60 acres of irrigated Prime Farmland and Farmland of Statewide Importance South of the farm road. (The exact acreage is difficult to determine, since Map 9 does not have the current permit boundary on the map.)

Map 9 shows that within the revised permit boundary, soils in Areas 2 & 3 are mapped as either Prime Farmland or Farmlands of Statewide Importance and either irrigated or non-irrigated. Drawing 5-46 outlines Area 2 and states that it is 97.8 acres. Area 3 is outlined and described as 57.2 acres. The total acreage in Areas 2 & 3 to be disturbed is 155 acres. Drawing 5-57 shows the projected pit boundaries and Dwg 5-53 illustrates the auger mining.

South of the Elk fence in Areas 2 & 3, non irrigated soil map units are not considered Prime Farmland or Farmlands of Statewide Importance due to lack of irrigation.(Map 9). Chapter 3, Appendix 3-9, Table 43 provides productivity information for the North Private Lease Prime Farmlands. Chapter 4, pages 4-19 to 4-21 provides the current specific management practices of each landowner.

pburton

Geologic Resource Information

Analysis:

The application meets the minimum requirements for Geologic Resource information as required by the R645-301-620 regulations.

Chapter 6 was not changed with the latest submittal associated with Task #5369 but was updated in the previous submittal which was found to meet the regulatory requirements for Geologic Resource information. Chapter 6 describes the Geology of the North Private Lease Area. Appendix 6-2 provides an overburden assessment on 8 drill holes located throughout the North Private lease. Information from a 2012 drilling program in the North Private Lease is found in Appendix 7-16.

Cross-section showing stratigraphic relationships and overburden thicknesses are found in Appendix 7-16. A geologic map of the North Private lease area is found as Figure 6 in Appendix 7-16. An update to the information, dated July 20, 2016, was submitted and is now found in Appendix 7-18 Characterization of Alluvial Groundwater Systems in the North Private Lease Area at the Alton Coal Development, LLC Coal Hollow Mine. The entire report was stamped by Erik Petersen, Professional Geologist. Figure 2 is the Geologic map of the North Private lease area. It contains the monitoring wells in relation to the geologic boring locations that were drilled in 2012. The map identifies the strike and dip of the Smirl coal seam as well as identifying the areas of coal outcrop within and adjacent to the proposed permit area.

Attachment A to the report contains the Geologic logs for 2016 boreholes. There are 15 logs that depict the stratigraphy above the coal seam in the North lease area. There are basically three geologic formations involved. The Dakota Formation, the Tropic shale just above the coal seam and then the Quarternary alluvium overlying much of the 2 and 3 area.

Chemical information on acid and toxic forming potential are presented in Appendix 6-2 and information on the Smirl Coal Zone is in Appendix 6-1. The overburden suitability was judged on levels of pH, Boron, Selenium, Organic Carbon and Acid Base potential. There are specific zones within the overburden (specifically in the Tropic Shale) where the material would be considered unsuitable for use as growth medium or placed within the upper 4 feet of the backfill. However, the backfill would be selectively placed to avoid having the unacceptable materials within this root zone. Overburden materials and coal from the 8 drill holes in the North Private Lease were analyzed and described in Appendix 6-2 and Appendix 6-1 respectively. The Stratum immediately below the coal seam was also analyzed. Appendix 6-1 is labeled as confidential.

There are no oil or gas wells within the proposed permit boundary.

dhaddock

Hydro Baseline Cumulative Impact Area

Analysis:

The amendment meets the State of Utah R645 requirements for Baseline Information.

The amendment provides adequate baseline information for the alluvial aquifer within the permit area. The narrative discusses the mining method, extent of disturbance, depth of the pit, duration of the mining, and potential impacts to surrounding water resources and water rights. The detailed narrative, with maps, and supporting calculations of the hydraulic characteristics are located in Appendix 7-18.

The Permittee conducted a robust aquifer test and thoroughly analyzed the results from the study. Hydraulic characteristics of the alluvial aquifer were determined using a constant-rate pumping test. The pumping test ran for a 56 hour period, while simultaneously measuring the cone of depression in 22 surrounding observation wells. Attachment B in Appendix 7-18 include monitoring well data logged during the aquifer test. The drawdown results of two observations are analyzed in Aqtesolv and provided in Table 2 and Attachment C of Appendix 7-18.

The responses seen in the monitoring wells during the drawdown test suggests the aquifer is a leaky-confined system. Draw down in monitoring well CN4-49 occurred on the opposite side Kanab Creek, while little or no change in water quality was detected in the creek. The response from the well on the opposite side of the creek suggests the creek is not a constant head boundary. Instead, it likely flows as a semi-perched feature through the permit area. In addition to this detailed narrative and supporting analysis and calculations a more broad discussion of the alluvial aquifer is provided in Appendix 7-16.

The amendment includes a discussion on Kanab Creek's interaction in terms of its Gain/Loss with the alluvial aquifer within the permit area. The discussion details how the two water resources interact, thus affecting quality and quantity through gaining and losing sections within the permit area. The stream gains flow volume from groundwater discharge as the stream flows from the northern end of the permit area to the southern end. The groundwater discharge to the stream causes an increase in TDS along the stream length through the permit area.

The amendment has expanded upon the statement on p. 15, Appendix 7-16, "It is common for Kanab Creek to have little or no discharge south of the tract during much of the year". The amendment now refers to the surface water monitoring site SW-2 to support this claim.

The total volume of surface and groundwater outflow from the permit is calculated. The outflow is determined at the monitoring well matrix just south of the permit area. The calculation is the combined volumes of surface flow and groundwater discharge along the cross-sectional area of the alluvial aquifer.

A well planned and methodical study was conducted to determine total discharge at this location. The groundwater discharge was determined using Darcy's Law of $Q = KIA$. A pumping test was conducted on well CLEM-4 to determine the hydraulic conductivity of the aquifer within the vicinity of the wells. The gradient at the location of the wells was the difference in head between the two up-gradient wells and the two-down gradient wells. The cross-sectional area is the width and depth of the geologic bottle neck of the quaternary alluvial sediments at the southern end of the permit area. Using these data it is determined the total groundwater discharge at the southern end of the permit area is 4.6 gpm. In early May when this study was conducted Kanab Creek was flowing at a rate of about 330 gpm. Therefore, the total calculated outflow at the southern boundary of the NPL permit area is 335 gpm.

kstorrrar

Hydro Modeling

Analysis:

The amendment meets the State of Utah R645 requirements for Modeling.

The amendment includes a groundwater model of the aquifer within and adjacent to the permit area. The model utilizes the hydraulic characteristics determined from the results of the drawdown test. The aquifer was modeled as leaky-confined using the program THWELLS. Three drawdown scenarios are modeled and presented in Figure 2 and Attachment F in Appendix 7-18. The areal extent of the cone of depression for each scenario is provided. The model used pumping wells along a north south orientation to simulate a 1000 linear foot open-pit face. The extraction rates varied from a low of 0.74 cfs to 1.84 cfs. Modeled drawdown of the aquifer ranged in depth from 20 feet to 50 feet and the cone of depression extending out laterally 450 ft to 500 ft. The model results are used to calculate inflows into open-pits. Saturated sediments are estimated to produce 35 gpm per 100 linear feet of exposed highwall.

The amendment includes a commitment to update the groundwater model every mid-term. The updated groundwater model will include water levels in backfilled pits and the surrounding undisturbed alluvial aquifer. At the time of the update the groundwater recharge rate of the backfilled sediments and the surrounding undisturbed alluvial aquifer will be estimated.

At the time of the model update, more information about the response of the aquifer to mining will be known. With this knowledge the amendment includes a commitment to estimate how long it will take the alluvial to reach pre-mining aquifer characteristics of the water table elevation, recharge/discharge rates.

kstorrrar

Probable Hydrologic Consequences Determination

Analysis:

The amendment meets the State of Utah R645 requirements for Probable Hydrologic Consequences.

The amendment provides a narrative on the pre-mining groundwater conditions and the anticipated post-mining groundwater conditions. The amendment discusses potential impacts to the local and regional groundwater system. A description of the anticipated post-reclamation aquifer characteristics and recharge sources is provided. Estimates of the final hydraulic properties of the aquifer including hydraulic conductivity, storativity, the saturated thickness are included. A rough estimate has been given of the anticipated time it will take the mined out pits to resaturate. Limited effects to adjacent aquifers, wells, springs, and surface waters are anticipated post-reclamation. This is because the major water body, Kanab Creek, is primarily a perched stream or losing along its length as it flows through the permit area.

The amendment provides a discussion on the water quality of the alluvial aquifer following reclamation. The Tropic Shale backfill in Pits 20 and 21 will likely act as an aquaclude. Post-mining groundwater flow paths will flow around rather than through these sediments reducing the likelihood of increasing TDS into the alluvial aquifer.

kstorrrar

Hydro GroundWater Monitoring Plan

Analysis:

The amendment meets the State of Utah R645 requirements for Baseline Ground-water Monitoring.

The groundwater monitoring plan has adequately monitored the alluvial aquifer within and adjacent to the permit area. Shallow wells have monitored the upper aquifer on a quarterly basis for many years. Deeper monitoring wells that are also in direct communication with the shallow wells have been monitoring the aquifer for over a year within and adjacent to the NPL. Additionally, a well network directly adjacent and on either side of Kanab Creek has been monitoring the groundwater discharging from the permit area for over a year as well. This well network accurately characterizes the aquifer to the north and south and within the permit area.

Many of the wells in the well monitoring network will not be destroyed by mining activities. This will allow for long term monitoring well data before and during operations, and after reclamation. The monitoring well network was developed in consultation with the Division hydrologist Keenan Storrar. The monitoring well locations were selected to be undisturbed by mining operations and in locations that accurately characterize the aquifer and monitor its response to mining activities.

The gridded monitoring well network downstream of the permit area is a critical location to establish long-term monitoring of groundwater and surface flows in the incised channel of Kanab Creek. Groundwater passing southward through the alluvial aquifer is most accurately quantified at this location because it is forced into the narrow bedrock outcrop or bottleneck of the Dakota sandstone near the southern permit boundary. As groundwater enters this transition zone it up-wells and discharges into Kanab Creek leaving a relatively low volume of groundwater held within the shallow gravel alluvial deposits. At this location both the groundwater discharge and surface runoff from the permit area can be readily and accurately monitored to detect any changes in the hydraulic balance caused by mining.

kstorrar

Maps Affected Area Boundary Maps

Analysis:

The application meets the requirements of R645-301-521 for Affected Area Boundary Maps.

The requirements of R645-301-521 are met in regards to including relevant maps detailing the affected area in regards to environmental impacts in Area 1 through 3 extent in Drawing 5-46 Drawing 5-46 details the North Private Lease permit area with the premining topography at four foot contour intervals. Drawing 5-74 and 5-77 were updated in the December 18, 2015 resubmission to show enough detail of topography and hydrology for the Division to be able to identify what areas will be affected by mining operations. Drawings 5-74A through 5-74C were added to show the specific post mining topography for each sub areas.

Drawing 5-46 details the different sub areas where mining operations will take place, i.e. Area 1 through Area 3. All activates displayed on drawings and narratives throughout the current MRP application that are relevant to Area 2 and Area 3 were reviewed by the Division at this time.

To address the December 18, 2015 deficiency number 8 the Permittee will always address Alton Coal Mine road with both the name and county road number K3100. The original deficiency was written due to the confusion between the historic Alton Coal Mine, for which the county road K3100 leads to and is named after, with the current Coal Hollow Mine owed by Alton Coal Development. The Permittee has reaffirmed that indeed the legal name of the road is Alton Coal Mine Road, therefore, will keep the name on the drawings but will add the county road number to help clarify that it is the historic mine road.

cparker

Maps Affected Area Boundary Maps

Analysis:

The amendment meets the State of Utah R645-301-323 requirements for maps and aerial photographs.

Drawing 3-1 shows vegetation types and plant communities, including sample locations. Drawing 3-5 shows habitats of high value for the Greater Sage-grouse. Detailed maps and photos of vegetation are provided in respective appendices.

reinhart

Maps Existing Surface Configuration

Analysis:

The application meets the certification requirements of R645-301-512.150 for Existing Surface Configuration Maps.

To address deficiency #21 of the December 18, 2015 submission and to meet R645-301-121.200 requirements the Chapter 6 drawings 6-12, 6-13, and 6-14 were added to the MRP to detail the geology drawings consistent with the current Coal Hollow MRP.

The original submission contained a deficiency as the application did not meet the requirements of R645-301-121.200 by following the establish MRP outline of the current Coal Hollow lease geologic maps contained within Chapter 6, e.g drawing 6-1 through 6-5. The North Private Lease geologic drawings were contained within Chapter 7 Appendix 7-16 sub Figures 6 through 7 and simple referenced as Appendix 7-16 within Chapter 6. Appendix 7-16 remains a detailed PHC that contains extensive information beyond the geologic drawings. The appropriate information was moved to new Chapter 6 drawings discussed above.

cparker

Maps Mine Working

Analysis:

The application meets the requirements of R645-301-512.110 for Mine Workings Maps.

The original application did not meet the requirement of R645-301-512.110, -512.130, and R645-301-521.140 which require certified maps that clearly show all mine plans. Drawings 5-53, 5-55, and 5-77 all detailed the North Lease mining sequence operations footprints throughout the proposed North Private Lease area for various sequences of mining and reclamation.

The updated drawings meet the requirements of R645-301-512.110, -512.130, and R645-301-521.140 as the Permittee amended Drawing 5-53 and 5-77 to show the correctly calculated pit floors and pit crests that remain within the permit boundary. Notes have been added to Drawings 5-53, 5-57, and 5-77 describing the different footprints that are depicted on each of the specific drawings. The pit boundaries depicted on this drawing detail the pit crests or maximum surface disturbance associated with each pit. Drawing 5-53 shows the coal removal sequence and the pit boundaries depicted represent the maximum extent of coal extracted within each pit. Drawing 5-57 shows the overburden removal sequence for each pit. Drawing 5-77 shows the bond polygons and each pit polygons details the approximate crest of the backfill slope during reclamation to achieve the post-mining topography.

cparker

Maps Permit Area Boundary

Analysis:

The application meets the requirements of R645-301-521.140 for Permit Area Boundary Maps.

The application meets the requirements of R645-301-521.140 as Drawing 5-45 details the new permit boundary, lease boundary, and adjacent areas to the current mine plan in a clear and concise fashion. Narrative in Chapter 5 Section 521.132 details that the proposed permit areas are shown on all applicable drawings within the MRP.

The Permittee addressed the previous deficiency (#25) within the December 18, 2015 resubmission in the January 18, 2016 resubmission. The Permittee addressed the clarification on the drawing in two sentences added to the Chapter 5 narrative Section 521.140 and 521.150, and updated relevant sections within the narrative describing transitions between the various Areas of development.

cparker

Maps Subsurface Water Resources

Analysis:

The amendment meets the State of Utah R645 requirements for Cross Sections and Maps.

The plan view map geologic map Figure 2 in Appendix 7-18 and the geologic cross-section in Appendix 16, Figure 7 adequately portray the geologic and hydrologic features within and adjacent to the permit area.

Maps Surface and Subsurface Manmade Features

Analysis:

The application meets the requirements of R645-301-521.122 for Surface and Subsurface Manmade Features Maps.

The application meets the requirement of R645-301-521.122 as Chapter 5 Section 521.122 details existing surface and subsurface facilities within, passing through, or over the permit area throughout the North Private Lease.

The application meets the requirements of R645-301-521.123 by detailing the two public roads operated by Kane County roads (K3900 and K3100) that are within or in 100 feet of the permit areas as shown on Drawing 5-47 for the North Private Lease.

The application now meets the requirements of R645-301-121.200, R645-301-521.122: at the Permittee updated Drawing 7-7 to show the North Private Lease surface and subsurface information on single map.

cparker

Maps Well

Analysis:

The amendment meets the State of Utah R645 requirements for Cross Sections and Maps.

The amendment includes multiple plan view maps and a cross sections map of the NPL. In both Appendix 7-16 and Appendix 7-18 the following features are shown: Potentiometric surface(s) and equipotential lines; Lithologies; The mineral to be mined; Geologic features such as faults, paleochannels, gravel deposits, etc.; Extent of mining, open-pit and highwall in Drawing 5-52; Aquifers and aquitards; Hydrologic boundaries; Recharge and discharge areas; and Wells used for hydrogeologic interpretations. Additionally, Attachment A in Appendix 7-18 includes the Geologic logs for the boreholes drilled in the NPL. These provide a very accurate picture of the lithology and water table elevation in the permit area.

kstorrar

Operation Plan

Mining Operations and Facilities

Analysis:

The application meets the State of Utah R645 requirements for Mining Operations and Facilities.

Narrative was included in the Mine Facilities section committing to send the Division a copy of the Mitigation Completion report as well as an Individual Section 404 permit once it has been completed and approved by the U.S. Army Corps of Engineers.

cparker

Existing Structures

Analysis:

The application meets the State of Utah R645 requirements for Existing Structures.

The application meets the requirements of R645-301-526.110-.116 by including narrative describing complete removal of ponds outlined on Drawing 7-7 as per landowners request. Pond removal will be completed once approval of Individual Permit 404 has been obtained.

Relocation or Use of Public Roads

Analysis:

The application meets the requirements of R645-301-521.133 for Relocation or Use of Public Roads. The application now meets the requirements of R645-301-521.133 due to information detailing measure to be used such as a general mining method that will be employed under or within 100 ft of public roads to protect interest of the public. Chapter 5 section 521.133.2 details how County Road 136 (k3900) and Alton Coal mine road (K3100) will be temporarily relocated outside the North Private Lease permit area. Temporary bypass roads will be constructed by Alton Coal as detailed in Drawings 5-61 through 5-63. Appendix 1-11 contains the Grant of Easement, Permit and Design by Kane County DOT. The appendix details how the County will hold the required bond amount for the reconstruction of the roads which are expected to be diverted around the mine for approximately 5 years. Chapter 5 Section 521.133.2 details how the public will be protected by each bypass road will be constructed, inspected, and certified for public prior to closure of the exiting public road. The Permittee provides a letter from Kane County date January 28, 2016 for the Division to be able to determine that Kane County road K3100 bypass is not a significant bypass or relocation that does not require the same level of grant easement, Permit and Design by Kane County DOT. The relocation of K3100 includes moving approximately 500 feet of roadway and moving the intersection of K3100/K3600 approximately 500 feet south of the current intersection. K3100 is missing from all legal descriptions of the lease signed with Kane County.

The application now meets the requirements of R645-103.224.422 as the North Private Lease area requires rerouting public road K3900 and K3100 as shown in Drawing 5-45. In accordance with R645-103.224.420 through -103.224.422 the Permittee provided proof of a weekly public notice from 7/30/2015 until 8/13/2015 in the Southern Utah New. An affidavit was submitted to the Division on 9/9/2015 detailing the above. Appendix 1-11 details the finding in writing that the interests of the affected public and landowners will be protected. The appendix also include a letter from Kane County date January 28, 2016 for the Division to be able to determine that Kane County road K3100 bypass is not a significant bypass or relocation that does not require the same level of grant easement, Permit and Design by Kane County DOT.

The Permittee incorrectly submitted a request for finding to the Division on December 15, 2015. The Division makes their findings in the official Findings Database, sent to the Permittee in response to any amendment. The Division's findings are based off information presented in the application. The findings determine if all the R645 required information is present and the application meets the requirements of the R645 regulations. All the information submitted in the "Request for Finding-Relocation of Public Roads..." matches the information presented within Appendix 1-11 and is missing all reference to the 500 feet relocation of K3100 and intersection of K3100/K3600 in the legal description, Grant easement, Permit and Design approved by Kane County DOT. The cover letter incorrectly states that K3100 is included in the information. No such information could be found.

Narrative is added to Chapter 5 Section 526.116.1 detailing how K3100 and K3900 will be relocated due to North Private Lease Mining operations. Text details that a fence will be installed between the public roads and the mining operations to protect the public interests.

Air Pollution Control Plan

Analysis:

The amendment meets the State of Utah R645-301-422 requirements for air pollution control plan.

A description of the coordination and compliance efforts with the Utah Division of Air Quality is discussed in Section 422 page 4-24. The Fugitive Dust Control Plan is provided in Appendix 4-5. Alton Coal development began coordination preparation of the NOI with Jon Black of UDAQ on June 4, 2015. The North Private Lease will be an amendment to the Coal Hollow Mine Approval Order and will require dispersion modeling. Ramboll Environ has completed the dispersion modeling in coordination with UDAQ. The final NOI and dispersion model was submitted to UDAQ on September 9, 2015 with the model being accepted September 24, 2015 and the engineering review approved September 25, 2015. Public Notice was advertised in the Southern Utah News October 1, 2015. The revised Air Approval Order including all of the North Private Lease was received November 10, 2015 (DAQE-AN140470005-15)

Subsidence Control Plan Renewable Resource

Analysis:

The amendment meets the State of Utah R645-301-332 requirements for describing impacts of subsidence to fish, wildlife, and vegetative resources.

Anticipated impacts of subsidence on wildlife and vegetation are described in Section 332 and 525. Although the Permittee does not project mining induced subsidence, they will conduct surface observation walkovers of each of the 4 developed panel areas. If surface cracking, sinkholes or other surface impacts are noted, they will be reported to the Division and subsequently repaired. Appendix 7-15 describes the PHC and in the event that diminution of discharge rates from seeps and springs occurs, any lost water will be replaced using the water replacement source specified in R645-301-727. Due to the nature of disturbance associated with surface mining, the Permittee has committed to compensatory mitigation efforts as identified in Appendix 3-8.

Ireinhart

Subsidence Control Plan Subsidence

Analysis:

The Applicant has met the minimum regulatory requirements for this section of the regulations. Mining in the North Private Lease area will only be conducted by surface methods (Open pit and Highwall mining). No underground mining is planned. As such, no subsidence is projected to occur and no subsidence monitoring plan is required.

dhaddock

Fish and Wildlife Protection and Enhancement Plan

Analysis:

The amendment meets the State of Utah R645-301-333 requirements to describe how using best technology currently available to minimize adverse impacts to fish and wildlife, including compliance with the Endangered Species Act.

A discussion of practices implemented to avoid or minimize impacts on fish and wildlife species is located in Section 333. The Greater Sage-grouse requires protection and enhancement measures. Since quality sage-grouse habitat is synonymous with quality sagebrush ecosystems, sage-grouse habitat improvement projects will also provide benefits to the resident wildlife population.

Because of the unavoidable impact on Greater Sage-grouse habitat, ACD has committed to compensatory mitigation at a rate of 1,700 acres for the disturbance associated with the Coal Hollow Lease and 4:1 (habitat improvement: disturbance) for the North Private Lease. On page 3-24, ACD commits to 1,000 acres of habitat improvement in accordance with Appendix 3-8. Habitat improvement treatments will be completed prior to mining disturbance. Other compensatory mitigation includes work to reestablish connectivity between Alton and Hoyt's Ranch, the establishment of a core sage-grouse conservation area, predator control plans, and restoration of quality brood rearing habitat through reclamation. At the time of this analysis, ACD has completed 591.79 acres of a habitat improvement.

Other measures include a wildlife awareness program, posted speed limits, safety meetings regarding awareness of important wildlife species in the area, designing transmission facilities to minimize electrocution hazards to raptors, and wildlife friendly fence designs.

Ireinhart

Topsoil and Subsoil

Analysis:

The application meets the requirements of R645-301-230, topsoil handling and storage.

Dwg 2-4 provides estimated salvage quantity for topsoil and subsoil salvage for the 17.86 acre Area 1 extension, for the 65.97 acres of non-prime farmland in Area 2, for 31.9 acres of Prime Farmland soils in Area 2 and for 57.05 ac in Area 3.

Dwg 2-4 specifies that within Areas 2 & 3 only 40 acres will be live hauled. Non-prime farmland stockpiled soil will be stockpiled in the designated area for topsoil and subsoil stockpile locations shown on Dwg 2-4.

Section 232.100 provides an estimated salvage recovery table for the North Lease, which includes Areas 2 & 3 (p. 2-27 to 2-28). The table indicates that on average 11-12 inches of topsoil and 37 inches of subsoil (48 inches total) will be salvaged from all map units within Areas 2 & 3. Estimated topsoil and subsoil quantities for Areas 2 & 3 prime farmland and non-primefarmland soils are stated in Tables on Dwg 2.4. Volume 11, Map 10 provides the estimated salvage depth of topsoil and subsoil by Map Unit in all areas of the North Lease. Soil Map Units and recovery depths are also depicted on Dwg 2-3. An evaluation of the representative pedons suggests that the estimated recovery of 48 inches topsoil and subsoil stated on Dwg 2.3 is the best case scenario, as follows.

AREA 2

Soil sample locations 12SA018, 12SA019, 12SA019A represent a third of the non-prime farmland soils in Area 2. These soils are in Map Unit G which is classified as the AAA family 0-5% slopes. These soils were previously plowed and have a mixed BA topsoil layer. Within the salvage zone of 48 inches, these soils are silty clay to clay in texture, are alkaline (pH 7.7 - 8.4), have low EC values (less than 0.6 mmhos/cm) and have moderately high CaCO₃ content of 50 – 60%.

Soil sample locations 12AS012 and 12AS011 also represent a third of the non-prime farmland soils in Map Unit E in Area 2. These soils are classified as the Atlatl –CCC family 0-4% slopes. Dwg 2-3 describes 48 inches of recovery from Map Unit E, but the sample pedon descriptions indicate that the salvage zone of these soils should not be below 45 inches, due to extremely alkaline pH values of 8.9 and 9.0 below this depth. In the salvage zone, these soils are clay in texture, are alkaline (pH 7.9 – 8.4), have low EC values (less than 0.54 mmhos/cm) and have moderately high CaCO₃ content of 38 - 62%.

Map Units A1, A2 and A3 represent the last third of dominant soils in Area 2. These soils are classified as Sideshow Families of 0-4% (sample location DP 28 and 12AS015); Sideshow-Teremote family 4-8% slope (sample location 12AS013, 12AS016 and 12AS032 in Area 1), and Sideshow Family 8 – 18% slope (12AS014), respectively. These soils are slightly alkaline (pH 7.7 – 8.4), much lower in carbonate content (below 15%) and are shallow to rock. Soft shale bedrock is exposed at 39 – 40 inches. In Map Unit A1, the recovery is limited by gypsum accumulation at 34- 39 inches. Limitations of gypsum or bedrock in Map Units A1, A2, and A3 will not produce the expected 48 inches of recovery shown on Dwg 2-3.

AREA 3.

In Area 3, Map Units A2, B, D, E and C will be salvaged. Map Units A2 and C are shallow to bedrock. (Map Unit A2 and Map Unit E are discussed above.) Map Unit B is the Flugle-Brumley Family, 0-8% slope, represented by sample locations 12AS04 and 12AS07. These are sandy clay loam to clay loam soils, slightly alkaline (pH 7.4 – 7.8), low in carbonate (1.4 – 20%), low EC values (0.26 to 0.4 mmhos/cm). The only limitation on salvage of 48 inches from Map Unit B is that bedrock is encountered at 30 – 32 inches.

Map Unit D is the Wimmer-Terremote-Bobknoll Family, 2-8% slopes, represented by sample locations 13AS02, 13AS03, and 13AS05. These are clay loam soils slightly alkaline (pH 7.6-8.5), low in carbonate (14 – 24%), moderate EC values 1.8 to 2.2 mmhos/cm. Map Unit D soils can supply the 48 inch recovery depth, except at the far south end of the permit, where bedrock is exposed (sample 13AS02).

Map Unit C. Vol. 11 soil survey describes the soils in map unit C as having three major components. These components are sandstone outcrop (12AS006) and soils that are shallow to bedrock, varying only in substrate, as follows. The Vesilla Family (sample location 12SA008) has a 3.5 in A horizon with 0.75 ft total soil depth over sandstone. The Quezcan family (sample location 12AS005) has a 2 inch A horizon with a total soil depth of 0.83 ft over Tropic Shale. The third component of Map unit C is sandstone outcrop. A fourth component identified in Table 3 of Vol. 11 is the Brumley soil, represented by sample 12SA007. This component is deeper and will be salvaged to a depth of 30 inches (correspondence from ACD, dated 6/19/2017).

Salvage and Storage Plans

Estimated topsoil and subsoil quantities for Areas 2 & 3 prime farmland and non-primefarmland soils are stated in Tables on Dwg 2.4. Volume 11, Map 10 provides the estimated salvage depth of topsoil and subsoil by Map Unit in all areas of the North Lease. Soil Map Units and recovery depths are also depicted on Dwg 2-3.

The salvage plan in Section 231.100 (and Sec. 523) states that the depth of soil salvage will be determined in the field by a Coal Hollow environmental technician in consultation with a certified soil scientist (p. 2-24). The oversight of this process by a Certified Professional Soil Scientist is stressed several times within the Order II Soil Survey (Vol 11, p. 41-43), because

the topsoil and subsoil salvage depths described are for planning purposes, but actual depths will vary in the field. Section 231.100 and Section 232.100 of the topsoil salvage plan includes the use of pedestals for quality control and for later confirmation of topsoil and salvage depth by the CPSS.

Sediment control during soil salvage is shown on Dwgs. 5-48, 5-48A, 5-65 and 5-65A. Soil will be recovered using dozers or scrapers (Section 231.100). Stockpiles will be constructed with 3h:1v slopes and will be bermed as described in Section 231.400. In accordance with the requirements of R645-301-234.230, all piles will be stabilized by seeding either with an interim mix or in the off-season, a cover crop (Quick Guard) (Sections 231.100 and 231.400 and Section 244.100). Stockpiles in place for longer than a year will also be mulched (Section 231.100). During contemporaneous reclamation activity, tackifier will be used to stabilize slopes of partially consumed, reshaped topsoil stockpiles, pending re-seeding in appropriate season (late fall, Sections 234.230 (c) and Section 244.100).

All topsoil and subsoil from Area 1 (through Pit 11) will be stockpiled in the location shown on Dwg 2-4. Topsoil and subsoil stockpiles replaced on backfill in Area 1 will be seeded and replaced on Heaton Brothers, LLC property (refer to note on Dwg 2-4). The depleted Area 1 topsoil and subsoil stockpiles will be replaced by one Area 3 Map Unit C topsoil/subsoil, which will be used to reclaim Area 3. Dwg 2-4 indicates the remaining map units in Area 3 will be live hauled.

The timing of topsoil removal (R645-301-232.600) precedes overburden removal. The sequence for overburden removal is shown on Dwg 5-57 and described on page 5-56 as occurring first in Pits 1 – 10 , then 11 – 21, then HWT 1. Chapter 5, p. 5-88 describes a possible exception to backfilling and grading that could occur due to a delay in Pond 7 construction which would keep Pit 9 open. (After Pond 7 is constructed, Pond T1 will be mined through and Pit 9 will be completed (Dwg 5-49 and Dwg 5-57). Dwg 5-57 shows overburden removal in Pit 11 occurring in the same year as the North half of Pits 9 & 10.

The Area 1 temporary topsoil stockpile straddling the location of proposed Route 136 bypass will be relocated prior to construction of the bypass, a.k.a. North Haul Road, as shown on Dwg 5-51B. The volume of this topsoil pile is currently unknown, because the pile has been partially consumed for reclamation and has been re-stocked with soil salvaged from Pit 7 and Pond T1. In accordance with R645-301-234.240, prior to moving topsoil from its current location, MRP Section 234.240(d) states that the Permittee will notify the Division in advance of the volume of stored topsoil to be moved and the timing for this movement from the County Road 136 bypass.

In Area 2: Prime farmland soils will be encountered above the N and East of Pit 15 all the way through Pit 21. Prime Farmland handling procedures are discussed under Special Categories of Mining/Prime Farmland Operation Plan.

Deficiencies Details:

pburton

Vegetation

Analysis:

The amendment meets the State of Utah R645-301-331 requirements for protection of vegetation.

The amendment describes measures to disturb the smallest practicable area at any one time and prompt establishment and maintenance of vegetation for interim stabilization of disturbed areas to minimize surface erosion in Section 331.

Each mine segment will be contemporaneously reclaimed as the next segment is developed. The exceptions to this are semi-permanent locations such as loadout, office buildings, underground access and pit 10. These locations needed for mining operations have been designed to disturb the smallest practicable area and areas not needed for immediate use will be stabilized with interim vegetation seeding.

Ireinhart

Road System Plans and Drawings

Analysis:

The application meets the State of Utah R645 requirements for Road Systems Plans and Drawings.

The application meets the requirements of R645-301-526, R645-301-527.220, and R645-301-541.400 by including a

commitment to send the Division a copy of the Mitigation Completion report required for the Nationwide SPK 2011-01248 with the Divisions annual report in the year which the mitigation is completed.

The application meets the requirements of R645-301-731 by including narrative describing complete removal of ponds outlined on Drawing 7-7 as per landowners request. Pond removal will be completed once approval of Individual Permit 404 has been obtained.

Deficiencies Details:

cparker

Road System Certification

Analysis:

The application meets the requirements of R645-301-512.250 for Road Systems Primary Road Certification.

The application meets the requirements of R645-301-512.250 by having all primary haul roads designed and certified by Dan Guy, a professional engineer. All primary haul roads will be built in a stable manner to ensure environmental protection and safety with no stream fords.

The application now meets the requirements of R645-301-521.170 by addressing deficiency # 51 by updating the narrative to include reference to required USACE NWP permit acquired. Narrative was also added detailing NWP and that the pre-construction notification was acquired and a copy of all documents was included in Appendix 5-14.

The application meets the minimum certification requirements by submitting plans and drawing for each road to be prepared by or under the direction of and certified by a qualified registered professional engineer. Chapter 5 Section 521.170 details each road that will be constructed and maintained within the North Private Lease. Drawing 5-60 details the primary haul road that will be located within the North Private lease permit area. The above stated drawing details that the haul road will be approximately 2,700 feet long with three culverts. The maximum grade of the haul road will be 7.1% to get the haul around the location of Pond 6.

cparker

Spoil Waste Disposals of Noncoal Mine Wastes

Analysis:

The application meets the requirements of R645-301-528.330 for Disposal of Noncoal Mine Wastes.

The application meets the requirements of R645-301-528.330 due detailing the disposal of noncoal mine waste disposal located in the current MRP Chapter 5 Section 528.330. Noncoal mine waste will be temporary stored in appropriate containers and removed from the permit area to be properly disposed of according to applicable State and Federal regulations.

Section 528.332 contains a discussion of the proposed alluvial ground water drains to be left in place. These drains were not installed at the site due to the site spoil having such a low permeability that the drains would not facility any collection. This narrative was removed in December 18, 2015 to address deficiency # 54.

cparker

Spoil Waste Coal Mine Waste

Analysis:

The application meets the requirements of R645-301-513.300 for Coal Mine Waste.

The application meets the minimum standards of R645-301-513.300 due to no changes in the MRP text. The application does not change the approved MRP that states no underground development, coal processing waste, or excess spoils will be disposed of underground.

The application original application did not meet the requirements of R645-301-528.320, -301-536.300- through 563.330, and -542.730 due to missing information detailing the handling of the coal mine waste associated with the development of

Pit 1 to meet R645-301-528.333. The text meets the requirements of R645-301-528.320 as all coal mine waste generated past Pit 1 will be backfilled in other subsequent pits as part of the contemporaneous reclamation and operations meeting R645-301-528.333.

To address deficiency #55 the December 18, 2015 submission added clarifying text detailing that coal mine waste developed during the extraction of Pit 1 will be stored on top of the unmined coal until enough coal has been removed to place the coal mine waste on the floor of the pit. This narrative was added to Chapter 5 Section 522 and 528 to meet the requirements of R645-301-528.320, -301-536.300- through 563.330, and -542.730.

cparker

Spoil Waste Impounding Structures

Analysis:

The application meets the requirements of R645-301-512.140 for Impounding Structures.

The application meets the minimum requirement of R645-301-512.140 by having all hydrology maps as described under -301-722 certified by a professional geologist Eric Petersen.

The application meets the requirements of R645-301-512.240 by having a professional engineer, Dan Guy, who has experience in design and construction of impoundments certify the designs of Ponds 5 through Pond 9.

The Permittee amended text within Chapter 5 Section 512.240 to clarify that a detailed geotechnical analysis was only conducted for the south Coal Hollow private lease in and the report can be found in Appendix 5-1. Text was added to the section stating how the detail field investigation that was conducted for the North Private Lease found the soils to be representative of the south lease negating the need for another detailed geotechnical analysis, specific slope stability, as demonstrated in Appendix 5-11 for the North Private Lease. The original text did not take into account the additional ponds added since the last submission of the permit application. The Permittee amended this section to address all ponds in the North Private Lease. The December 18, 2015 submission did update the pond and ditch information to match the updated proposed structures.

The application meets the requirements of R645-301-513.200 by detailing within the MRP that no impoundments and sedimentation ponds meet the size or other qualifying criteria of MSHA 30 CFR 77.216.

The application meets the requirements of R645-301-514.310-313 by text within Section 514.310-313 and 514.320 detailing inspection made regularly during construction, upon completion, and at least yearly until removal at final reclamation.

The application meets the requirements of R645-301-532 by adding a detail to Drawing 5-48 stating the sediment control measures carried out within the disturbed area to prevent untreated runoff along the eastern edge of disturbance with a berm and silt fence.

The application meets the requirements of R645-301-533.110 -220 by detailing that a geotechnical report was completed for the impoundments. The expected consolidation of the native soils around the ponds is expected to be minimal, approximately 1%.

The application meets the requirements of R645-301-533.300 due to similar soils experienced in the south lease, as detailed in Appendix 5-11, so an expected slope stability factor range of 1.2 to 1.9 can be expected.

The application meets the requirements of R645-301-533.400-500 by detailing that slopes will be protected by seeding and prior to construction all vegetation, topsoil, and sub soil will be removed.

The application meets the requirements of design drawings as detailed on Drawing 5-67 and 5-68 for the north private lease permit areas. Drawing 5-76B details the reclamation sequence of the facilities to meet R645-301-356.300 and -763 by retaining all ponds until the second year of seeding to facility erosion control treatment.

cparker

Spoil Waste Excess Spoil

Analysis:

The application meets the requirements of R645-301-521.143, R645-301-745.111, R645-745.113 for Soil Waste Excess

Spoil.

To address deficiency # 58 of the December 18, 2015 resubmission and to meet the requirements of R645-301-521.143, R645-301-745.111, R645-745.113: The Permittee added reference to Appendix 7-16 to Chapter 5 Section 521.143 subsection 745.111 and 745.113 to support the statements made in regards to the soil toxicity within each section.

The application meets the requirements of R645-301-512.210 due to new slope stability calculations provided for the North Lease temporary excess spoil pile in Appendix 5-11. Chapter 5 Section 512.210, 521.143 and various other sections call out that a professional engineer has certified the designs of the North Private Lease temporary excess spoil pile according to 535.100 and that the analysis can be viewed in Appendix 5-11. The Permittee submitted text detail the design, placement, and disposal sequencing of the North Private Lease temporary spoil pile with applicable designs and slope stability analysis as required by R645-301-535.

The application meets the requirements of R645-301-514.100 detailing inspection of the excess spoil pile during construction, completion and quarterly. There was no change was made to Chapter 5 Section 514.100-.120.

To address deficiency # 60 of the December 18, 2015 resubmission and to meet the requirements of R45-301-532.200: The permittee amended the narrative of Section 532.200 to state that in the event the temporary spoil pile is left in place beyond six months it will be covered with tackifier or some other means of stabilization.

The application in Chapter 5 Section 521.143, subsection 745.111 and 745.113 states that the excess spoil piles in the current Coal Hollow Mine permit are and the temporary North Private Lease spoil pile will be composed of high-clay tropic shale that will limit infiltration and has a minimal potential for leaching of pollutants.

Section 528.310 does detail that the temporary spoil will be in place for less than six months before being rehandled as pit backfill.

To address deficiency # 61 of the December 18, 2015 resubmission and meet the requirements of R645-301-528.200 the Permittee added a reference to Appendix 5-11 for geotechnical properties of spoil to section 528.310.

R645-301-535.100 Long term static safety factor for the temporary spoil pile is 1.6 to 1.7 with lifts not to exceed four feet. The MRP states that the spoil structure will be rehandled to backfill the open pit in a short time frame, defined as six months. The spoil pile within the North Private Lease will not be covered with subsoil or topsoil. The geotechnical report in Appendix 5-11 contains a sufficient foundation investigation for the temporary spoil pile, with an expected consolidation of the area of approximately 5% meeting R645-301-535.112, -535.151, and -535.152.

cparker

Hydrologic General

Analysis:

The amendment meets the State of Utah R645 requirements for Water Rights and Replacement.

The amendment includes a commitment for Water Rights and Replacement. The Permittee commits to replace water rights if it is shown mining has damaged the hydrologic balance within or adjacent to the permit area.

kstorrar

Hydrologic Ground Water Monitoring

Analysis:

The amendment meets the State of Utah R645 requirements for Groundwater monitoring.

Coyote seep's elevation will be measured quarterly in addition to flow when it is discharging. Coyote seep is the alluvial aquifer's water table exposed at the surface. It is in equilibrium, needing no recharge to be full of water and it has no baseflow discharge like a spring. Measuring water elevation and flow at this location will adequately quantify this surface water feature.

In Appendix 7-20 the amendment proposed to install a monitoring well the backfilled alluvial sediments. This well will quantify the recharge characteristics within the backfill with respect to the adjacent undisturbed well monitoring network.

The water monitoring map 7-10 has been updated to show the water monitoring locations detailed in Table 7-5. The number and spacing of wells within and adjacent to the NPL adequately quantify the groundwater within the area. The wells will track any mining induced up-gradient and down –gradient influences through time.

kstorrar

Hydro Surface Water Monitoring

Analysis:

The amendment meets the State of Utah R645 requirements for Surface Water Monitoring.

The water monitoring program has been updated to comply with Special Condition 4 of the permit which is to, "monitor for selenium where water leaves the minesite, during operational and reclamation phases". Water monitoring sites downstream of the NPL have been updated to include the water quality parameter of Protocol #8 from Table 7-4 in the Water Monitoring Program.

kstorrar

Hydrologic Water Quality Standards

Analysis:

The amendment meets the State of Utah R645 requirements for Water-Quality Standards and Effluent Limitations.

The mine plan is designed to treat all disturbed area runoff through sediment ponds and one small BTCA area. These are shown on Drawing 5-65, 'Diversion Ditch and Sediment Impoundment Plan View'. The Permittee has acquired UPDES outfalls for all the sediment ponds at the mine site that will discharge to Waters of the State. The BTCA area will treat road runoff with an engineered check dam prior to discharging from the permit area.

kstorrar

Hydrologic Diversion General

Analysis:

The amendment meets the State of Utah R645 requirements for Diversions.

Diversion ditches will be constructed within Area 2-3 to convey all disturbed area runoff to sediment ponds. The diversion ditches are shown on Drawing 5-65, 'Diversion Ditch and Sediment Impoundment Plan View'.

Diversion DD-13 will capture and route disturbed area runoff from watershed DA-1 to Pond 7. Undisturbed diversion UD-14 will capture undisturbed area runoff from UA-4 and route it around the site and into Kanab Creek. In the northern area of watershed DA-1 disturbed area runoff will flow south, away from UD-14, so there is no need to install DD-13 to the northern boundary of the permit. In order to have a distinct boundary between disturbed and undisturbed areas the excavated material for UD-14 will be placed on the disturbed area side of the ditch to form a berm. This berm will prevent any minor amount of disturbed area runoff from reaching UD-14.

kstorrar

Hydrologic Diversion Perennial and Intermittent

Analysis:

The amendment meets the State of Utah R645 requirements for the Diversion of Perennial Streams Draining a watershed of at Least One Square Mile.

The removal of the haul road crossing Kanab Creek and reconstruction of the channel will be overseen by the USACE.

kstorrar

Hydrologic Diversion Misc. Flows

Analysis:

The amendment meets the State of Utah R645 requirements for Diversion of Miscellaneous Flows.

Appendix 5-12 includes an additional narrative on the boundary of the undisturbed watershed UA-4 in Drawing 5-66. This narrative helps clear up confusion about the runoff flow paths and the total catchment area of the watershed. This narrative adequately addresses deficiencies within earlier amendments.

kstorrar

Hydrologic Stream Buffer Zones

Analysis:

The amendment meets the State of Utah R645 requirements for Stream Buffer Zones.

The approved MRP currently details Stream Buffer Zones will be established by posting signage and installing appropriate sediment control structures between the disturbed area and Kanab Creek.

kstorrar

Hydrologic Sediment Control Measures

Analysis:

The amendment meets the State of Utah R645 requirements for Sediment Control Measures.

The amendment will implement sediment control structures and the best technology currently available to prevent sediment from exiting the permit area and causing offsite impacts. The amendment provides narratives, maps and supporting calculations for all sediment control measures in the NPL.

kstorrar

Hydrologic Siltation General

Analysis:

The amendment meets the State of Utah R645 requirements for Siltation Structures.

The amendment includes an adequate narrative on the open-pit dewatering system for the open pits. Ultimately, all excess water encountered within the mining area will be discharged through UPDES the outfall issued for Pond 7. All water discharged through this outfall must meet all applicable Clean Water Act effluent standards.

kstorrar

Hydrologic Discharge Structures

Analysis:

The amendment meets the State of Utah R645 requirements for Diversions and Discharge Structures.

The post-mining topography map shows multiple areas where water is routed from the elevation of the fields down to the elevation of Kanab Creek. The most notable diversion is the new bowl that will be created instead of reforming the ephemeral channels to the west of Kanab Creek. The amendment includes a narrative with the supporting Drawing 5-79 for the post-mining topography of permanent diversions within the NPL. These diversions are designed to be stable while routing miscellaneous flows from the height of the fields bordering Kanab Creek down to the elevation of Kanab Creek.

kstorrar

Hydrologic Impoundments

Analysis:

The amendment meets the State of Utah R645 requirements for sediment ponds.

The amendment proposes to construct three additional sediment ponds in the North Private Lease in addition to the two ponds currently included in the NPL. Pond 7 will sit west of Kanab Creek and will capture all disturbed area runoff prior to discharging through the UPDES outfall issued for the treatment structure. Ponds 8 and 9 will be constructed to the east of Kanab Creek within Area 3. These ponds will be used in series to treat runoff from the disturbed area. All disturbed area

Maps Affected Area

Analysis:

The application meets the requirements of R645-301-521.100 for Affected Area Maps.

Drawings 5-45 and 5-46 of the pre-mining topography meets the requirements of R645-301-521.100 by accurately showing the proposed North Lease permit boundary according to the pre mining topography.

The original application did not meet the requirements of R645-301-141 in Drawing 5-74 and 5-75 due to the scale. The reclamation scenario drawings must match the scale of bond release figures. Division standard in Technical Directives and R645-301-141 regulations require a larger scale (1":100') for the post mining topography and two foot contour intervals. To address this deficiency, #78 of the December 18, 2015 resubmission, and meet the requirements of R645-301-141, R645-301-121.200, R645-301-521.151: Drawing 5-57 was amended to include alluvium overburden. Drawings 5-74 and 5-75 scales and contours were amended to two foot contours to match the bond release map designs of a 1:100 scale with two foot contours. The Permittee also added Drawing 5-74A through Drawing 5-74C detailing the post mining topography for each Area 1 through 3.

The application meets the requirements of R645-301-521.110 which requires previously mined areas to be show. Within the application Chapter 5, Section 521.110 details the previously historic mining operations within the Alton Amphitheater. The text also details how none of these previous mining operations are within the permit areas or adjacent to the permit areas, as defined in R645-100-200.

cparker

Maps Facilities

Analysis:

The application meets the requirements of R645-301-521.161 for Mining Facilities Maps.

The application meets the requirements of R645-301-521.161 by detailing the proposed facilities to be constructed within the permit area on Drawing 5-47 for the life of the North Private Lease.

The application meets the requirements of R645-301-521.162 by providing a map detailing the yearly and overall disturbance for the North Private Lease within Drawings 5-46 through 5-50 for each of the respective Areas 1 through 3.

The application meets the requirements of R645-301-521.163 as there is a clear narrative, or reference to a narrative or drawing, that details what pits will be bonded for within the permit area in Drawing 5-53 and 5-77.

cparker

Maps Mine Workings

Analysis:

The application meets the requirements of R645-301-521.140 for Mine Workings Maps.

The application meets the requirements of R645-301-521.140 which requires maps that clearly show all mine plans. Drawings 5-53, 5-57, and 5-77 we updated with notes detailing the specific phase of operations or reclamation depicted by each pit extent shown respectively.

cparker

Maps Monitoring and Sampling Locations

Analysis:

The amendment meets the State of Utah R645 requirements for Monitoring and Sampling Location Maps.

Section R645-301-731.200 of the amendment commits to update Figure 18 in Appendix 7-16 during operational and

reclamation phases. The map will be updated every three years. The commitment discusses all available monitoring data will be used to update the map.

kstorrar

Reclamation Plan

General Requirements

Analysis:

The application meets the State of Utah R645 requirements for General Reclamation Requirements.

The application meets the requirements of R645-301-526, R645-301-527.220, R645-301-541.400, and R645-301-731 by committing to send the Division a copy of the Mitigation Completion report required to the USACE for the Nationwide SPK 2011-01248 with the Division's annual report in the year which the mitigation is completed.

Additionally, the requirements of R645-301-521.124 and R645-301-541 are met by the addition of narrative addressing the complete removal of ponds outlined in Drawing 7-7 as per landowner's request after obtaining an appropriate Individual Section 404 permit.

Deficiencies Details:

cparker

PostMining Land Use

Analysis:

The amendment meets the State of Utah R645-301-412 requirements for postmining land use.

A description of the post-mining land use is located in Section 412.100 of the MRP with a summary in Chapter 3, Section 356.120. The discussions include the utility and capacity of the reclaimed land and the relationship of the proposed uses to existing land use policies and plans, as well as the desires of the current landowners. Post-mining land use will be achieved by following the detailed reclamation plan included in the MRP. The reclamation plan includes descriptions for structure removal, excess spoil, and mine waste disposal, backfilling, compacting, and regrading (Chapter 5); soil handling and stabilization (Chapter 2); revegetation techniques (Chapter 3); measures to control sediments during mining and reclamation activities (Chapter 7).

The majority of the area in the North Private Lease, especially those areas south of Farm Road, are comprised of rangelands that have been converted to pasture lands. Surface landowners of the permit area provided written comments (Appendix 4-3 and 4-4) expressing grazing and wildlife habitat would be the desired postmining land use, with emphasis on grazing by domestic livestock in most of the pasture land areas (these areas are shown on Vegetation Map, Drawing 3-1 of the MRP and on Vegetation Map 1 in Appendix 3-9 (Vegetation & Wildlife Habitat of the North Private Lease Area). One exception is pre-mining pasture land will be reseeded appropriately to provide additional habitat for Greater sage-grouse, a sensitive species in the area. A land ownership map of the current Coal Hollow Mine and North Private Lease areas is in the MRP (Drawing 1-3).

The channels support some riparian and wetland communities including riparian wet meadows, mixed riparian scrub/shrubs, as well as narrow bands of sagebrush communities on the adjacent upland terraces. The field studies found that the Private North Lease study area supports 9.44 acres of jurisdictional wetlands, most of which were identified in the Kanab Creek drainage. Wetlands will be restored to conditions required by the Army Corps of Engineers Individual Permit. Kanab Creek and the plant communities supported within it will not be disturbed by mining activities. The other channels, however, may be disturbed by mining, some of which support wetland and upland communities. The landowner has indicated that the erosional features be eliminated, therefore areas of the channels will be reclaimed and seeded to support pasture land.

ireinhart

WildLife Protection

Analysis:

The amendment meets the State of Utah R645-301-342 requirements for a fish and wildlife plan for the reclamation and postmining phase of operation.

Enhancement measures are identified in Section 342 and include restoration efforts (both through reclamation and offsite mitigation) aimed at improving sagebrush ecosystems and wetlands pursuant to the Army Corps of Engineers requirements. Because most of the premining rangeland conditions consist of heavy brush (pinyon-juniper and decadent sage) and low-quality herbaceous vegetation (grasses and forbs) on the native rangelands, reclamation efforts are aimed at restoring these ecosystems to an earlier seral state dominated by grasses and forbs.

Although not the primary PMLU, wildlife species will benefit from the final reclamation seed mix identified in Table 3-37. These mixtures include plant species that provide nutritional value and cover for wildlife.

The Division has determined the proposed operation will not affect the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitats, as determined under the Endangered Species Act.

Ireinhart

Backfill and Grading General

Analysis:

The application meets the requirements of R645-301-553 for General Backfill and Grading.

The application now meets the general requirements of R645-301-553 by detailing a general backfill and grading plan. The plan details how disturbed areas will be backfilled and graded to achieve the approximate original contour, eliminate all highwalls, spoil piles, and depressions, and achieve a post mining slope that does 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 to prevent slides, minimize erosion and water pollution both on and off the site, and support the approved post mining land use. The application of the 1500 linear feet is the linear distance in the direction of the working face and that backfill and grading must commence within 60 days of coal removal. The pits as depicted on Drawing 5-53 show that no pit is longer than approximate 1000 linear feet, therefore the ruling factor of R645-301-553 is that rough backfill and grading will begin in each pit 60 days after coal removal for the area within the pit. The pit development, as discussed and depicted in the Chapter 5 drawings, show work will move from south to north. Backfill and grading of each pit will then progress 60 days following from south to north behind the working coal removal face.

To address deficiency #92 of the December 18, 2015 submission R645-301-121.200: The narrative stating R645-301-553.800 applies to the North Private Lease area was removed. The narrative in the Section -553.800 was corrected to only reference the current south Coal Hollow Mine and all North Private Lease references will be removed. Section 553.110 originally incorrectly stated that R645-301-553.800 apply as the North Lease Permit area does not meet the conditions listed within R645-301-553.110. A site having a swell factor alone does not qualify the -553.800 thick overburden regulations. Thick overburden regulations only apply when the site has a swell factor, cannot achieve AOC due to underground coal mining fill, has permanent features such as spoil, waste, or refuse piles, previously mined areas, and underground mining regraded fills.

To address deficiency # 93 of the December 18, 2015 resubmission meet the requirements of R645-301-553.140,-527.220, 542.620 the Permittee added a new Drawing 5-79 and discussion in Appendix 5-12, Chapter 5 section 527.220 and chapter 5 section 542. Clarify if any of the culverts will remain and how the changed slope will control drainage without erosion. The original application contained no discussion how R645-301-527.220 and R645-301-542.

To address deficiency # 77 the Permittee added additional narrative along with supplemental bonding information to clarify that all pits will be backfilled within 60 days to Section 553.

cparker

Mine Openings

Analysis:

The applicant has met the minimum regulatory requirements for the closure of wells and boreholes. The plans for Casing and Sealing of holes is located in the original MRP Section 631. No changes have been proposed with this application. 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. Permanent closure methods will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, and machinery and to keep acid or other toxic drainage from entering water resources.

dhaddock

Topsoil and Subsoil

Analysis:

Analysis:

The application meets the requirements of R645-301-240, Soils Reclamation Plan.

Section 232.300 refers to Table 14, Vol. 11 (p. 44) for the estimated salvage quantities and replacement depths of topsoil and subsoil from the non-prime farmland map units. The estimated topsoil replacement depth will follow the average recovery for non-prime farmland soils as stated in Section 232.200 and restated in Section 233.100-400, as follows: 18 inches in Area 1, 11 inches in Area 2, and 12 inches in Mine Area 3.

Overall for Areas 2 and 3, an average subsoil replacement depth of 37 inches is stated in Section 232.100 (Table p. 2-28). Where replacement falls short of three feet depth, the Division will request that the graded spoils are sampled for suitability within the root zone.

Note: Recent reclamation of Pits 1 & 2 in Area 1 replaced only 8 inches of topsoil rather than 18 inches described in MRP Section 232.300. Replacement depths are critically dependent on the monitoring of topsoil and subsoil recovery. For instance, much less subsoil was recovered from Area 1 than anticipated. This is likely due to the imperfect method of recovering subsoil stored in situ beneath the spoil pile that was observed during inspections. This method of insitu subsoil is not proposed again. Using soil pedestals will improve monitoring of the activity and help ensure the average recovery for the disturbance area (Section 231.100 and Section 232.100).

Substitute subsoil testing is described in Section 232.300, following procedures described in Section 232.720. Testing of the re-graded spoil surface is described in this section for Area 1 and Area 1 extended. Dwg 5-76A shows the sample locations on a grid within Area 1 & Area 1 Extended. No areas of sampling are proposed for Areas 2/3 on Dwg 5-76A, because the Permittee believes that there are sufficient sources of native subsoil to provide the 48 inches of total cover (Section 232.720, p. 2-33).

The Permittee will track the salvage, stockpiling and replacement of topsoil and subsoil using a balance sheet (Chapter 2, p. 3-36 and Appendix 2-2). New Appendix 2-7 contains tables with soil balance for bond release areas.

Soil redistribution to a uniform, stable thickness, prevention of compaction, ripping, discing on the contour, and seeding and mulching is described in Chapter 2 Sections 242 through Sections 244.200. These sections have not changed except to add that the results of topsoil and subsoil nutrient analysis prior to salvage are found in Appendix C of Vol 11.

Earthwork reclamation sequence is found on Dwg 5-76A (including locations of subsoil sampling in Area 1 extended).

Facilities reclamation is described on Dwg 5-76B. Bond polygons are shown on Dwg 5-77.

Final reclamation topography is provided on Dwg 4-74A (Area 1); 5-74B (Area 2); 5-74C (Area 3). Post mining surface hydrology is found on Dwg 5-79.

pburton

Road System Reclamation

Analysis:

The application meets the requirements of R645-301-534 for Road Systems Reclamation.

The requirements of R645-301-534 are met within the application as all primary roads will be designed to R645-301-534.300 and all temporary ancillary roads will meet the general 534 design requirements. There are not any roads with the permit area that R645-301-537 would apply.

The minimum requirement of R645-301-542.600, R645-103-224.420 through -224.422 are met due to mention of K3100

Contemporaneous Reclamation General

Analysis:

The application meets the requirements of R645-301-553 for Contemporaneous Reclamation.

The requirements of R645-301-553 in regards to contemporaneous reclamation and backfilling activities are met within the application. The MRP details the sequencing of mining and backfilling of the operation in Chapter 5 Section 526, 528 and 553.

cparker

Contemporaneous Reclamation General

Analysis:

The amendment meets the State of Utah R645-301-352 requirements for contemporaneous reclamation.

Section 352 discusses contemporaneous reclamation. A detailed schedule and timetable for the completion of each major step in the mine plan are in Chapter 5 of the MRP. Drawing 5-76 shows the schedule for the North Private Lease. Operations will be conducted in one area (segment) at a time. 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.

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 are included in Chapter 5, Section 540 of the MRP.

ireinhart

Revegetation General Requirements

Analysis:

The amendment meets the State of Utah R645-301-341 requirements for revegetation plan.

The reclamation plan for final revegetation is located in Section 340. The plan describes how all lands disturbed by mining and operations (except water areas and surface of roads approved as part of the postmining land use) comply with the biological protection performance standards. The plan includes a detailed schedule and timetable for each major step in Chapter 5, seed mixtures (341.210), planting methods (341.220), and mulching (341.230). Measures proposed to determine the success of revegetation are identified in Section 356 and include production, cover, and shrub density requirements. Grazing and pasture are the primary post-mining land uses. Wildlife use is a secondary use and therefore, seed mixtures have been developed to include shrubs and forbs beneficial to wildlife.

The amendment meets the State of Utah R645-301-357 requirements for extended responsibility period.

The average annual precipitation is less than 26.0 inches and therefore, the extended responsibility period will be 10 years.

ireinhart

Revegetation Timing

Analysis:

The amendment meets the State of Utah R645-301-354 for revegetation timing.

The planting schedule is identified in Section 354 and 341.100 and identifies early spring and late fall for the seeding period

which is the favorable planting time for this location.

Ireinhart

Revegetation Mulching and Other Soil Stabilization

Analysis:

The amendment meets the State of Utah R645-301-355 requirements for mulching and soil stabilizing.

Mulching and soil stabilizing practices are identified in Section 355 and 340. Suitable mulch and other soil stabilizing practices will be used on all areas that have been regraded and covered by topsoil or topsoil substitutes.

Ireinhart

Revegetation Standards for Success

Analysis:

The amendment meets the State of Utah R645-301-356 requirements for revegetation standards for success.

The Permittee commits to using approved sampling techniques for measuring success as identified in DOGM's Vegetation Information Guidelines, Appendix A. Success standards are identified in Section 356. The primary PMLU is grazing land or pastureland, and the ground cover and production of living plants on the revegetated area will be at least equal to that of a reference area or such other success standards approved by the Division. On areas identified as a wetland, and authorized by the Army Corp of Engineers, success standards will meet Corp requirements set forth in that permit. Because wildlife habitat is a secondary post-mining land use, ACD consulted with DOGM and UDWR to determine an appropriate shrub stocking densities. It was agreed that a 10% shrub density of the reference site for sagebrush/grass locations was an adequate success standard. (See email dated 9/29/16 between Lisa Reinhart and Rhett Boswell.)

Ireinhart

Cessation of Operations

Analysis:

The application meets the requirements of R645-301-515.321 and -515.322 for Cessation of Operations.

To address deficiency # 105R645-301-515.321 and -515.322 The Permittee addressed errors within said sections. Section 515.320 labeled was corrected 515.321 and is pertinent to Underground mining which requires beyond the exact number of surface acres affected, the horizontal and vertical extent of subsurface strata which have been in the permit area prior to cessation. The section labeled 515.321 within the application was corrected to 515.322 which is pertinent to Surface mining operations

The original application did not meet the requirements of R645-301-515 by not detailing a clear procedure to be followed in the event of temporary cessation of coal mining and reclamation activities after Pit 1 in the North Private Lease. The application did not detail temporary cessation procedures in the event mining and pit development may be halted beyond the 60 days allowed by R645-301-553. The application does include that 30 days or more before temporary cessation the Permittee will notify the Division and now meets the R645-301-515 requirements.

To address deficiency # 106 of the December 18, 2015 resubmission meet the requirements of R645-301-515.312 the narrative was added how the temporary excess spoil pile would be stabilized to meet R645-301-532.200 minimize erosion and sediment transport off site, e.g tackifier.

The requirements of R645-301-541 are met within the application as there is no change to the existing MRP plan of communication with the appropriate parties in the event of the cessation of operations and final reclamation.

cparker

Maps Bonded Area

Analysis:

The application meets the requirements of R645-301-800 for Bonded Area Map.

The requirements of R645-301-800 are met within the application as the bonded area map was updated in Drawing 5-77 to show the reclamation backfill crest of the individual pits.

cparker

Maps Reclamation Backfilling and Grading

Analysis:

The application meets the requirements of R645-301-542 for Reclamation Backfilling and Grading Maps.

The requirements of R645-301-542 are met within the application with extraction footprints of the individual pits detailed on Drawing 5-55 and reclamation backfill crest shown on Drawing 5-57 and 5-77.

cparker

Maps Reclamation Facilities

Analysis:

The application meets the requirements of R645-301-542 for Reclamation Facilities Maps.

The requirements of R645-301-542 are met within the application as included the addition of Drawing 5-74 through 5-74C detailing the proposed design of the replacement of the natural drainages that will be destroyed due to mining operations will be placed back in a stable manor meeting the requirements of R645-301-358.400, R645-301-521.100 through-521.130, R645-301-731.610, R645-301-527.220 and R645-301-121.200. Drawing 5-75 details the cross sections shown on Drawing 5-74 of the post mining topography.

cparker

Maps Reclamation Final Surface Configuration

Analysis:

The application meets the requirements of R645-301-542 for Final Surface Configuration Maps.

The requirements of R645-301-542 are met within the application as there engineering designs provided on Drawing 5-74 through 5-74C detailing the proposed design of the replacement of the natural drainages that will be destroyed due to mining operations will be placed back in a stable manor meeting the requirements of R645-301-358.400, R645-301-521.100 through-521.130, R645-301-731.610, R645-301-527.220 and R645-301-121.200. Drawing 5-75 details the cross sections shown on Drawing 5-74 of the post mining topography.

cparker

Maps Reclamation Surface and Subsurface Man Made

Analysis:

The application meets the requirements of R645-301-542 for Reclamation Surface and Subsurface Manmade Features Maps.

The requirements of R645-301-542 are met within the application due Drawing 5-77 showing the removal of all manmade facilities within the disturbed North Private Lease area.

cparker

Bonding and Insurance General

Analysis:

The application meets the requirements of R645-301-800 for Bonding and Insurance Requirements.

The application meets the requirements of R645-301-800 as the applicant is currently approved to mine through Pit 11 while maintaining a minimum posted reclamation bond of \$12,450,000. The Permittee's current bonding schedule, and discussion with Permittee's engineer, shows a planned increase of minimum posted reclamation bond to \$14,600,000 to mine through Pit 13.

Bonding Form of Bond

Analysis:

The application meets the Requirements of R645-301-860.100 for Form of Bond.

The application meets the requirements of R645-301-860.100 as the applicant currently maintains a surety bond amount of \$12,750,000 which is held by Lexon Insurance Co with a rider held by Ironshore Indemnity Inc for 342 disturbed acres.

bwiser

Bonding Form of Bond

Analysis:

The application meets the requirements of R645-301-860.100 for Form of Bond.

The application meets the requirements of R645-301-860.100 as the applicant currently maintains a surety bond amount of \$12,750,000 which is held by Lexon Insurance Co with a rider held by Ironshore Indemnity Inc for 342 disturbed acres.

cparker

Bonding Determination of Amount

Analysis:

The application meets the requirements of R6459301-830.140 for Determination of Bond Amount.

The application did not include any changes the currently approved bonding schedule contained in Chapter 8, Appendix 8-1 and Appendix 8-2. The applicant is currently approved to mine through Pit 11 while maintaining a minimum posted reclamation bond of \$12,450,000. The Permittee's current bonding schedule, and discussion with Permittee's engineer, shows a planned increase for minimum posted reclamation bond to \$14,600,000 to mine through Pit 13.

bwiser

Bonding Determination of Amount

Analysis:

The application meets the requirements of R645-301-830.140 for Determination of Bond Amount.

The application did not include any changes the currently approve bonding schedule contained in Chapter 8, Appendix 8-1 and Appendix 8-2. The applicant is currently approved to mine through Pit 11 while maintaining a minimum posted reclamation bond of \$12,450,000. The Permittee's current bonding schedule, and discussion with Permittee's engineer, shows a planned increase of minimum posted reclamation bond to \$14,600,000 to mine through Pit 13.

cparker

Special Categories

Prime Farmland Soil Removal and Stockpiling

Analysis:

Analysis:
The application meets the requirements of topsoil handling and storage for R645-301-316.500 no net loss of Prime Farmlands and R645-302-317.400, Prime Farmland soils handling.

The application states that the total acreage of Prime Farmland and Farmland of Statewide Importance within the permit boundary to be disturbed is 31.9 acres. It is tabulated by landowner on Dwg 2-4. The Order II soil survey states that the criteria for salvage and replacement of prime farmland soils will apply to both Prime Farmlands and Farmlands of Statewide Importance (Vol 11 p. 41).

In accordance with R645-302-317.410, prime farmland soil will be removed prior to drilling, blasting or mining and prime farmland soil handling will be minimized when soils are saturated. The Division recommends that all prime farmland within a bonding unit is sampled and recovered at one time allow for soil recovery during an appropriate season and to allow mining to continue uninterrupted.

In Area 2: Prime farmland soils will be encountered above the N and East extent of Pit 15 all the way through Pit 21 (refer to Dwg 5-57 and 5-53). Procedures described in Chapter 9 for Prime Farmland soil removal and stockpiling (Vol 9, Section 317.400 et seq). These procedures include sampling by horizon one sample per 2 acres prior to salvage; salvage by landowner and by horizon. A certified, professional soil scientist will be at the site to monitor the soil sampling and prime farmland soil salvage by horizon within land ownership boundaries.

Salvage of Prime Farmland Soils is discussed in Vol 11, pages 41-43. Volume of salvage by horizon and Map Unit is summarized in Table 13. The volume to be salvaged by landowner acreage is provided in a Table on Dwg 2-4. Prime farmland topsoil stockpiles are illustrated on Dwg 2-4 and Dwg 5-51B. The topsoil piles are shown in cross section. These stockpiles are labeled by landowner: Dean R Heaton (DRH); G. Ferril and Dorothy Heaton (GDH); and Orval & Gretta Palmer (OGP).

South of the farm road and North of the elk fence, Prime Farmlands are designated in both Areas 2 and 3 (Map 9 and Dwg 2-4). Surface ownership and permit boundary lines are shown on Dwg 1-3. The acreage of Prime Farmland to be surface disturbed is calculated as 31.9 acres in the table on Dwg 2-4. Area 2 Prime Farmland is owned by:

T 39 S, R 6 W SE1/4 SE1/4 Sec 12

Orval & Greta Palmer (6.9 acre parcel 9-6-12-3);

Dean R. Heaton (17.9 acres of a 20 acre parcel 9-6-12-2); and

G. Ferril and Dorothy M. Heaton (3.7 acres of a 10 acre parcel 9-6-12).

T 39 S, R 5 W SW1/4 SW1/4 Sec 7

G. Ferril and Dorothy M. Heaton (3.5 acres of a 30 acre parcel 9-5-7-3A)

In Area 2, the remainder of the of Prime Farmland owned by Dean R. Heaton and by G. Ferril and Dorothy M. Heaton will not be surface disturbed, but will be undermined using highwall (auger) mining techniques (refer to Dwgs. 5-46, 5-52, 5-53 and 5-57).

In Area 3, the 30 acres of Prime Farmland owned by G. Ferril and Dorothy M. Heaton in T 39 S, R 5 W, Sec 7 will not be surface disturbed, but will be undermined using highwall mining techniques (refer to Dwgs. 5-46 and Dwg 5-52).

Section 317.440 states that within 30 days, prime farmland stockpiles will be shaped to 3h:1v, protected by silt fences (as shown on Dwg 2.4) and seeded with an interim seed mix, with the addition of Quickguard (triticale) for a fast growing cover crop (personal communication with K. Nichols 6/20/2017).

pburton

Prime Farmland Soil Replacement

Analysis:

Analysis:

The application meets the requirements of R645-301-316.500 no net loss of Prime Farmlands and R645-302-317, Prime Farmland Performance Standards, because procedures described in Chapter 9 for Prime Farmland soil replacement (Vol 9, Sec.317.500, et seq) were reviewed and approved by the Utah NRCS State Soil Scientist (Incoming document 03212017.5369.pdf). Section 317.610 states that the reclamation plan for Prime Farmland soils will follow the mulching and fertilization plan given in Section 240, Chapter 2.

The NRCS recommendations for soil revegetation and productivity standards have been met, as requested by the NRCS (M. Albers, Acting State Soil Scientist, Incoming document 06122017.5369) as explained below.

Vegetation to be planted (Section 302-317.610) and Reference crop selection (302-317.626 through 317.627.2).

Chapter 9, Section 317.620 recommends that "the landowner of each parcel work with local NRCS staff to develop a seeding mix suited to their specific site (irrigated vs. non-irrigated) and operation goals." In correspondence with the Division, the NRCS noted that a specialized seeding mix will likely be more successful, more productive, and potentially less expensive than the mix recommended in Table 3-38 (M. Albers, Acting State Soil Scientist, Incoming document 06122017.5369).

Method of Prime Farmland productivity measurement (302-317.621 and 302-317.622).

Chapter 9 Section 317.622 states that for the purpose of measuring productivity, the AUM yield assessment will be at the rate of "26 pounds of dry forage consumed per 1,000 pound animal per day."

Yield Records (R645-302-627.1).

Chapter 9 Section 317.627.1 states that for the purpose of measuring soil productivity, the yield standard will be 2,000 lbs/ac for irrigated pastureland and 1,100 lbs for dry pastureland, as requested by the NRCS (M. Albers, Acting State Soil Scientist, Incoming document 06122017.5369).

pburton

Operations Alluvial Essential Hydrologic Functions

Analysis:

The application meets the minimum requirements of R645-302-322. A report entitled "Alluvial Valley Floor Field Investigation in the North Private Lease" was developed and submitted to the Division on July 17, 2014. This report is included in the application as Appendix 7-17. This report along with supplemental information submitted on October 10, 2014 allowed the Division to make a determination regarding the existence of any alluvial valley floor within the proposed permit and adjacent areas. It was determined by the Division that an alluvial valley floor does not exist in the area being proposed for mining, however, there is an alluvial valley floor to the North on adjacent property.

Further, the hydrologic monitoring data indicate that the alluvial groundwater systems present within and adjacent to the North Private Lease area do not contribute to the essential hydrologic function of agricultural lands within the North Private Lease area. No irrigation wells are present in the shallow alluvial groundwater system within the North Private Lease area. Waters that are currently or have historically been utilized for irrigation of lands within the North Private Lease area have been derived from the Kanab Creek surface-water system. The surface-water diversions to the existing and historic irrigation systems are located up-stream of the North Private Lease area. The depths to water in the shallow groundwater systems within agricultural areas in the North Private Lease area are too deep to facilitate subirrigation of agricultural vegetation within the area. Additionally, the water quality of shallow groundwaters in much of the North Private Lease area is poor (Table B-2a, Table B-2b in appendix B), which would likely limit its usefulness for flood irrigation and/or subirrigation even if it were accessible for use.

Consequently, there is essentially no potential for mining-related activities to affect the water supply of any potential AVF areas in the North Private Lease area. Also, because it is possible to successfully restore the flat land surface and associated soils during reclamation, the potential for mining-related activities to cause material damage to the land resource within potential AVF areas is very low. In other words, proposed mining operations in the North Private Lease area will not cause damage to the water source of any identified alluvial valley floors in the North Private Lease.

dhaddock

Operations Alluvial Protection of Agricultural

Analysis:

The Division finds that the regulatory requirements for the protection of farming have been met. A determination has been made that the proposed mining area does not contain an AVF, but that the AVF is to the north of the proposed permit area. Mining in the proposed permit area will not interrupt, discontinue, or preclude farming on the adjacent area AVF. Recharge to

the AVF is from the North and would not be disrupted by mining in the proposed permit area, which is to the south of the AVF.

dhaddock

Auger Mining

Analysis:

The application meets the requirements of R645-302-240 for Auger Mining and Remining Operations

The application meets the requirements of R645-302-240 as the applicant included the addition of a new Chapter 9 to address all special mining operations. Narrative in Chapter 9 details the due diligence to investigate any previous mining in the North Private lease and identify any potential environmental and safety problems related to auger mining in the area. The Permittee maintains that with thick overburden auger mining is the best design to maximize the utilization and recovery of the coal. All auger holes are located at the bottom of active pits and will be backfilled in accordance with R645-301-553 backfill and grading regulations outlined in Chapter 5 section 553.

cparker

**ALTON/SINK VALLEY
CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT
(CHIA)**

For

**PROPOSED COAL HOLLOW MINE
C/25/0005**

In

KANE COUNTY, UTAH

June 7, 2017

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I. INTRODUCTION

The Coal Hollow Mine operated by Alton Coal Development, LLC (ACD) is within the Alton/Sink Valley Cumulative Impact Area (CIA) in Kane County, Utah. The South Private Lease of the Coal Hollow Mine is in Township 39 South, Range 5 West, Sections 19, 20, 29, and 30, approximately 2.5 miles southeast of the town of Alton, Utah (Figure 1). The permitted area of the South Private Lease is 721 acres leased from private landholders. The North Private Lease (NPL) is an additional 295 acres added to the permit area in 2016 and expanded in 2017. The NPL sits 1.5 miles to the north of the original permit area in Sec. 12 & 13, T39S, R6W and within Sec. 7 & 18, T39S, R5W and is bisected by Kanab Creek. Areas 1, 2, and 3 break up the NPL with Area 1 and 2 west of Kanab creek and Area 3 east of the creek. No prior coal mines have been permitted in the area. In 1982 and 1987, the area was the subject of a large-scale mine permit application by Utah International Inc. Presently, there are Federal leases surrounding the Coal Hollow Mine permit area to the southwest, west, and northwest that are managed by the Bureau of Land Management (BLM). ACD's objective is to secure some of these leases for future mining activities. Highway 136, which is an unimproved road that is maintained by Kane County, bisects the permit area in Sections 19 and 30. Coal truck traffic runs through the towns of Alton, Panguitch and eventually to Delta, Utah where the coal is sold to Intermountain Power Agency.

The Division has the responsibility to assess the potential for mining impacts both inside and outside permit areas. The CHIA is a findings document prepared by the Division that assesses whether existing, proposed, and anticipated coal mining and reclamation operations have been designed to prevent material damage to the hydrologic balance outside the permit areas. The Division cannot issue a permit to a proposed coal mining operation if the probable, anticipated hydrologic impacts will cause material damage to the hydrologic balance outside the permit area. The CHIA is not only a determination if coal mining operations are designed to prevent material damage beyond their respective permit boundaries when considered individually, but also if there will be material damage resulting from effects that may be acceptable when each operation is considered individually but are unacceptable when the cumulative impact is assessed.

The objective of a CHIA document is to:

1. Identify the Cumulative Impact Area (CIA) **(Part II)**
2. Describe baseline conditions in the CIA; identify hydrologic systems, resources and uses; and document baseline conditions of surface and ground water quality and quantity **(Part III)**
3. Identify hydrologic concerns **(Part IV)**
4. Identify relevant standards against which predicted impacts can be compared **(Part V)**
5. Estimate probable future impacts of mining activity with respect to the parameters identified in 4 **(Part VI)**
6. Assess probable material damage **(Part VII)**
7. Make a statement of findings **(Part VIII)**

This CHIA complies with the federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) and subsequent federal regulatory programs under 30 CFR 784.14(f), and with Utah regulatory programs established under Utah Code Annotated 40-10-et seq. and the attendant State Program rules under R645-301-729.

II. CUMULATIVE IMPACT AREA (CIA)

Reviewing Permit Application Packages (PAP) and Mining and Reclamation Plans (MRP) alone is not sufficient to assess impacts to the geologic and hydrologic regimes. Specific knowledge of the geology and hydrology is crucial in assessing the dynamics and interactions of chemistry, surface and ground-water movement, and surface disturbance and subsidence impact associated with the mine sites. The Division uses pertinent information from many sources, including federal and state agencies; geological and hydrological reports; textbooks and other publications; site visits; and a knowledge base built on experience and training. The purpose of delineating the CIA is to prepare a Cumulative Hydrologic Impact Assessment (CHIA) for the entire region that evaluates the hydrologic systems that may be affected by the proposed operation and the magnitude of those effects.

Plate 1 located in Appendix A delineates the CIA for ACD's Coal Hollow Mine permit area in the Alton/Sink Valley region. Two principle drainage basins exist within the region, the Sink Valley Wash watershed and the Upper Kanab Creek watershed. A sub-drainage watershed known as Lower Robinson Creek encompasses the majority of the permit area in Sections 19, 20 and 30. In Kanab Creek, water flows south from the headwaters in Reservoir Canyon, east of the town of Alton. Sink Valley Wash is an ephemeral tributary of Kanab Creek whose headwaters originate from the canyons of the Paunsaugunt Plateau located to the east of the valley. Sink Valley Wash Drainage and the Upper Kanab Creek drainage basins are separated by upland cliffs. The two drainages intersect in T40S R6W Section 35. This is the boundary of both the Upper Kanab Creek and Sink Valley Wash Drainage Basins. This area is approximately 6.5 miles downstream of the Coal Hollow Permit area. According the Office of Surface Mining regulations (30 CFR 701.5), the physical extent of possible hydrologic impacts and type of operations located within the applicable river basin must be considered when developing the boundary of the CHIA. The confluence of these drainages represents the most downstream point where any hydrological impacts can be measured. The upgradient portion of the CHIA area is defined by Water Canyon and Swapp Hollow canyons, which are the primary sources of groundwater and surface water to the Sink Valley area and therefore are important factors in evaluating upgradient groundwater and surface water recharge areas to the permit and adjacent areas. The northern section of the CHIA is delineated by the Lower Robinson Creek Subdrainage, which is the watershed that feeds Lower Robinson Creek (in addition to Water Canyon). In addition, all Federal coal leases that surround the Coal Hollow permit area to the north, west, and southwest extend up to the southern boundary of the town of Alton are also evaluated in this CHIA for the purposes of future mining activities that may require procurement of these leases (or a portion thereof).

SCOPE OF MINING

Small-scale coal mining has occurred in the Alton Coal field region from the late 1920s to 1969 where five small mines and two prospects have been worked. Production totals from these mines ranged from 35,000 to 50,000 tons. The last operating coal mine was the Smirl Mine, which was located 1.5 miles south of the town of Alton. The Smirl portal was sealed by the Utah Division of Oil, Gas and Mining in 1992.

The coal seams of economic importance in the region are the Smirl seam with a reported thickness of 14-18 feet and the Bald Knoll coal zone located approximately 200 feet below the Smirl coal seam containing several coal seams separated by thin splits with the thickest seam being 4.8 feet thick. Studies of coal cores performed by Doelling in the 1970s, indicated that the quality of the coal in the Alton Coal field is ranked as sub-bituminous B, with average heating values of about 9,560 Btu's and an average sulfur content of 1.0 percent (Doelling 1972).

The Coal Hollow operation surface mines the Smirl coal seam. Alton Coal Development, LLC (ACD) operates the mine 24 hours per day, six days a week. The annual projected output over the next six years is in the range of ~200,000 to 800,000 tons. In 2014, an additional mining method was added to the approved MRP for highwall mining. Highwall mining uses a trench system and mines by auger method up to 1,000 ft out under the overburden.

III. BASELINE CONDITIONS OF SURFACE AND GROUND-WATER QUALITY AND QUANTITY; HYDROLOGIC SYSTEMS AND USES

BASELINE CONDITIONS

ACD's Coal Hollow Mine permit area within Alton/Sink Valley is located in Kane County, Utah, approximately 2.5 miles southeast of the town of Alton. The bedrock in the area is Cretaceous-age sedimentary rock. The Alton Coal Field is roughly a horseshoe-shaped region that is situated between the Kaiparowits Coal Field to the east, and the Kolob Coal Field to the west. Topographic relief in the area is approximately 2,800 feet. Elevations range from approximately 9,300 feet on top of the Paunsaugunt Plateau, to about 6,500 feet in the valley bottoms. The coal seams of economic viability are situated on the western and southern flanks of the Paunsaugunt Plateau.

An assessment of baseline conditions is needed to determine the land productivity, vegetation and hydrologic conditions that exist prior to mining operations.

Soils

This information was based on data obtained in the Coal Hollow Permit Application, Chapter 2, Volume 1. An Order 2 Soil Survey was prepared for this project by Long Resource Consultants of Morgan Utah January 2008. No published data was available from the National Resource Conservation Service (NCRS). A soil survey map showing the location of the principal soil units is included as Drawing 2-1 in the Coal Hollow MRP.

Field studies for an Order 2 soil survey were completed in 2007 for the Coal Hollow Project. The survey was conducted on private lands leased by by ACD and adjacent lands. The soil survey's objective was to 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. The soil survey encompasses approximately 630 acres. It should also be noted that the Natural Resources Conservation Service (NRCS) is presently actively involved in collecting soil data from the Alton/Sink Valley area for the purposes of publishing a soil survey. Currently, there is limited NRCS data available for the area, in draft format.

A Family - Wapiti Family Complex 3 to 8 percent slopes

Clayey soils dominate the north central portions of the Coal Hollow Mine permit area just west of the Tropic Shale ridge. This unit is characterized with very slow hydraulic conductivity rates of less than 0.04 inches per hour. Sagebrush and grasses dominate on this soil

unit. This unit will underlie the first phase of surface facilities and establish topsoil and subsoil stockpiles built on the site.

M Family - Calendar Family D Family complex 3 to 8 percent slopes

This unit occurs at the north end of the permit area where surface facilities are to be built. Soils from this unit contain Tropic Shale parent material at 20-72 inches below the surface. This unit is also dominated by clayey soils with very slow hydraulic conductivity rates of less than 0.04 inches per hour. Vegetation on this unit is dominated by sagebrush and grasses with some pinion pine and Utah juniper.

Cibeque Family - Wapiti Family complex, 3 to 8 percent slopes

This unit is comprised of deposits of very deep soils from both the alluvial fan deposition and organic matter from Robinson Creek. The soil is a sandy loam found along the banks of Lower Robinson Creek on the western portion of the permit area.

Jonale Family – Graystone Cobbly Substratum Family – Wapiti Family complex, 3 to 8 percent slopes

This unit is characterized by very deep fine-loamy and course-loamy soils with mollic epipedons and calcic horizons. Lime accumulations below 12-22 inches are common. PH is strongly alkaline below 22 inches. Vegetation in this unit supports big sagebrush and grasses. This soil is primarily situated on the west side of Highway 136 with some areas located on the central and the east side of the permit area directly on the alluvial fan complex.

Calendar Family – M Family – Drifty Family complex, 8 to 25 percent slopes

This unit is characterized by moderately deep (20 to 40) inches to shallow Tropic shale. The moderately deep soils have clayey texture while the shallow soils are loamy. Vegetation in this unit supports Pinyon pine, Utah juniper, black sage and grasses. This unit is represented in the most northern and western extremes of the permit area.

Graystone - Cookcan – Jonale Family complex – 1 to 5 percent slopes

Soils within this unit have medium to course textures and are very deep. This unit is not considered good subsoil. This unit is found on the western side of the permit area. Vegetation in this unit supports grasses, sedges, and forbs.

Happyhollow Family – Alamosa complex, 1 to 5 percent slopes

This unit is located on the Tropic shale ridge on the east side of the Sink Valley fault.

Soils are characterized by clay and high water table that is perched on the heavy clay soils. Groundwater is within a foot of the surface during wet periods. This unit supports vegetation comprised of sedges and forbs.

Brumley – Graystone Cobbly - Snilloc complex, 3 to 8 percent slopes

These soils are medium to coarse textured developed in very deep alluvium on the east side of the permit area. Evidence of a fluctuating water table was noted at depths between 48 to 60 inches.

D Family – Deacon complex, 5 to 30 percent slopes

This unit is characterized by clayey soils very deep with dark surfaces. Lime content increases between 6 to 12 inches below the surface. Soils appear to have derived from the large alluvial fan deposits. This unit runs parallel to the majority of Lower Robinson Creek. This unit supports big sagebrush, rabbitbrush and grasses with Pinyon pine and Utah juniper.

Zigzag Clay – 8 to 25 percent slopes

This unit is comprised of clayey soils derived from the shallow Tropic Shale ridge area that formed along the Sink Valley escarpment. The vegetation supported by this unit includes: Pinyon pine, Utah juniper, black sage and Indian ricegrass.

A Family Clay– 8 to 25 percent slopes

These soils are situated on the footslope and backslope of the Sink Valley fault escarpment. These deep clays support grasses, rabbitbrush, and big sagebrush.

Manzanst Taxadjunct Family clay – 3 to 12 percent slopes

This unit consists of clayey soils deep to very deep to Tropic Shale formed on gentle to moderately steep slopes along the southwest side of the permit area. This unit supports vegetation consisting of Pinyon pine, Utah juniper, black sage, and Indian ricegrass.

A Family – Happyhollow Family complex – 1 to 5 percent slopes

This unit consists of clayey soils very deep to Tropic Shale and formed on nearly level to gently sloping slopes in the south central portion of Sink Valley. Vegetation is grasses.

Vegetation

Vegetation within the Coal Hollow Mine permit area consists of pinyon and juniper in the most extreme northern, western and southern sections. Sagebrush, rabbitbrush and grasses are observed on the flatter valley areas within the permit area. Most of the permit area that follows the county road on the eastern side is considered pastureland with punctuated localized areas of sagebrush and pinyon/juniper trees. Vegetation in the adjacent areas is fairly representative of what is found in the permit area. Pinyon and Juniper trees dominate the higher elevations on the Paunsaugunt Plateau and within some upland areas to the west of the permit area. The permit and adjacent area is mapped as habitat for the Greater Sage Grouse species (*Centrocercus urophasianus*). The Greater Sage Grouse utilizes open sagegrass/grassland areas as breeding grounds during their mating season (also known as “leks”). One lek exists in the Alton area and is approx. 100 yards west from the Swapp Ranch House (within an enclosed in a barb-wire fenced pasture). A roosting area is also present 0.25 miles northeast of the lek. Chapter 3 within the MRP addresses a habitat management plan for the Greater Sage Grouse.

Generalized Geology

Stratigraphic units present in the Alton Coal Field and relevant to the Coal Hollow permit area are comprised of Cretaceous-age units in the southern and south-central portion of Utah. Economic coal reserves exist within the Dakota Formation. All the stratigraphic units exposed in the Alton Coal Fields are listed in ascending order below:

Navajo Sandstone (Lower Jurassic)

The Navajo Sandstone is a light gray to tan, massive eolian sandstone deposit that underlies the entire region. Very prominent features of cross-bedding characterize this rock unit, making it a very recognizable formation. Thickness of the Navajo Sandstone in the Paunsaugunt Plateau regions exceeds 1,000 feet. The Navajo Sandstone is the principal deep aquifer in this region and provides high-quality groundwater to agriculture, municipal and domestic wells in the area. The Navajo Sandstone is located beneath 1,000 feet of overlying bedrock and is not impacted by mining activities.

Carmel Formation (Upper Jurassic)

The Carmel Formation unconformably overlies the Navajo Sandstone in the region. The Carmel Formation is heterogeneous and consists of several member units comprised of limestone, siltstone, sandstone and gypsum beds. The thickness of the Carmel formation ranges from 650 to 800 feet in the Alton Coal Field area. The Windsor member of the Carmel Formation outcrops about one mile south of the Coal Hollow permit area.

Entrada Sandstone (Upper Jurassic)

The Entrada is a massive, fine-grained, cross-bedded sandstone in the region. The formation does not outcrop in the area of the proposed Coal Hollow permit site.

Dakota Formation (Cretaceous)

The Dakota Formation is a fine to medium-grained sandstone interbedded with shale and coal. The economically viable coal seams in the Alton Coal Field are within this rock unit. In the permit area, the Dakota Formation directly overlies the Carmel Formation.

Tropic Shale (Cretaceous)

The Tropic Shale consists of gray and carbonaceous silty shale and claystone with few marine sandstone beds located mostly in the upper part. The formation typically erodes to a clayey soil that forms gentle, vegetated slopes. The Tropic Shale is found within the Coal Hollow mine permit area. The regional thickness in this area is approximately 700 feet. In the areas planned for mining, approximately 200-250 feet are present.

Straight Cliffs Formation (Cretaceous)

The Straight Cliffs formation is predominately calcite-cemented sandstone and mudstone. The sandstones of the Straight Cliffs Formation make up the lower two-thirds of the ledges radiating out from the southern Paunsaugunt Plateau. The Straight Cliffs Formation outcrops on the hillsides east and north of the Coal Hollow Mine permit area.

Quaternary Alluvium

The alluvium deposits in the area consist of poorly sorted alluvial and colluvial silt, clay, sand, and gravel. These deposits consist of stream and fan alluvium and terrace deposits. In downstream areas, the alluvial material consists primarily of mud derived from Tropic Shale. In Sink Valley and Lower Robinson Creek drainages near the Coal Hollow permit area, drill cores indicate that alluvial thicknesses in some locations range from a thin veneer overlying bedrock to at least 140 feet in thickness along eastern margins of sink valley. Much of the land surface in the Coal Hollow Mine permit area consists of fan alluvium deposited from sheet floods, debris flows and mud flows.

System	Series	Stratigraphic Unit		Thickness (Feet)	Description		
Tertiary	Eocene	Claron Formation		1000-1300	Pink, white, and varicolored limestone, cliff former eroding into picturesque slopes and forms, basal conglomerate of exotic quartzite and limestone cobbles and pebbles.		
	Unconformity						
Cretaceous	Campanian	Kaiparowits Formation		265-700	Dark gray to gray-green arkosic sandstone, friable with weak calcareous cementation.		
	Unconformity						
	Santonian ? Coniacian ? Turonian	Wahweap Formation		500-1300	Alternating sandy shale and thin- to thick-bedded resistant sandstone, ledge and slope topography.		
		Straight Cliffs Formation		80-500			
		Minor Coal					
	Tropic Shale		700-1000	Drab gray shale with subordinate thin brown fine-grained sandstone, slope former.			
Cenomanian	Dakota Formation		150-450	Yellow-gray to brown fine- to medium-grained sandstone alternating with gray shale, sandy shale, carbonaceous shale and coal, ledge and slope former creating Gray Cliffs; best coal near bottom and top of unit.			
Jurassic	Angular Unconformity						
	Upper	Entrada Sandstone	Cannonville Member		0-300	White and reddish banded fine-grained sandstone and siltstone, friable and earthy weathering, massive.	
			Gunsight Butte Member		0-300	Red-brown and light green siltstone; also red cross-bedded sandstone of the "slickrock" type.	
		Carmel Formation	Judd Hollow Tongue of Carmel	Wiggler Wash Member		0-60	Limestone, red siltstone, white and greenish gypsum.
				Winsor Member		180-250	White, pink, brown sandstone alternating with thin red siltstone and mudstone.
				Paria River Member		55-200	Interbedded light gray and red sandstone, limestone, siltstone, shale, and gypsum.
				Thousand Pockets Tongue of Navajo Sandstone		0-60	Yellowish cross-bedded friable but resistant sandstone.
				Crystal Peak Member		120-190	Dark reddish brown and white to light gray fine-grained sandstone, medium-bedded with minor thin gypsiferous or calcareous shales and conglomerate.
				Kolob Limestone		122-350	Gray and tan dense limestone with some thin sandy red shale near the base and thin gypsum near top.
		Unconformity					
Lower		Navajo Sandstone		1000+	Light gray to tan, locally red fine-grained sandstone, massive, exhibiting large-scale aeolian cross-bedding, calcareous and cliff forming.		

Figure 1. Generalized Geologic Section of Rock Formations in the Alton Coal Field (from Doelling, 1972).

Coal Seam Geology

The principal coal-bearing seam within the permit area is contained within the Dakota Formation. Coal seams are also located in the Smoky Hollow Member of the Straight Cliffs Formation but this seam is only a few inches in thickness and not of economic importance. Two regionally important coal zones are present within the Dakota Formation: the Smirl coal zone, which is planned for mining by Alton Coal Development and the Bald Knoll coal zone, located about 200 feet below the Smirl zone at the base of the Dakota Formation. The Smirl coal zone is reported to be 14 to 18 feet thick while the Bald Knoll coal zone contains several coal seams with the thickest being 4.8 feet thick.

Structure

High plateaus characterize topography in the Alton/Sink Valley CIA. The Alton Coal Field is within a horseshoe-shaped structure with the Kaiparowits Plateau comprising the eastern flank and the Kolob Coal Field comprising the western flank. Rocks within the region have undergone little structural deformation; however, rocks in the western portion of this region have been subjected to several faulting episodes that have produced north/northwest trending faults. The Alton Coal field is bounded by the Paunsaugunt Fault to the east and the Sevier Fault to the west. The displacements of these faults are about 1,000-2,000 feet and 100 to 800 feet, respectively. The Sink Valley Fault bisecting the South Private Lease permit area is only slightly offset a few feet. Bedrock formations in the permit area dip gently to the east/northeast while the surface topography slopes gently opposite to the west/southwest.

The North Private Lease permit area contains both shale outcrops and valley-fill alluvial sediments. The alluvial sediments were laid down by quaternary erosional and depositional processes of Kanab Creek. They mostly rest directly on Tropic Shale, but do contact the underlying Smirl coal seam and the Dakota Sandstone where the shale has been scoured. The deposit is most extensive laterally and vertically along the northern permit boundary. Progressing southward the alluvial sediments bottleneck between Tropic Shale ridges to the east and west and vertically thin along the updip of the Smirl Coal seam and the Dakota sandstone. At the southern permit boundary the alluvial sediments are only 160 feet wide and 50 feet deep.

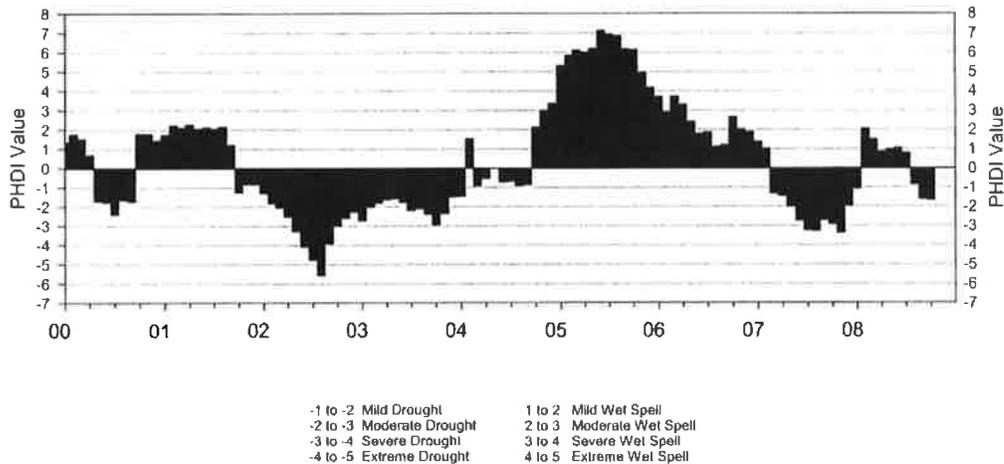
Climate

Climate in the Alton/Sink Valley area ranges from arid in the lowest elevations to sub humid atop the highest plateaus. Normal annual precipitation ranges from 6 inches in the lower elevations to 40 inches in the upper elevations. Winter snow accumulations can occur up to 10 feet in the high altitudes. Summer precipitation exists mainly as localized thunderstorms that can produce up to one inch of rain in less than an hour. Evaporation in the region is a dominant factor with annual rates of evaporation exceeding the annual rates of precipitation. Average annual pan-evaporation rates range from about 75-85 inches (UDNR, 1981). Large evaporation

rates significantly decrease the quantity of water that would otherwise runoff in streams or would recharge the groundwater system. Temperature and precipitation data have been routinely measured and recorded at the Alton, Utah weather station since 1928. Data from the weather station indicates that average annual precipitation is 16.38 inches per year.

Since the 1980s, the region has experienced cyclical periods of wetness and drought conditions. The Palmer Hydrologic Drought Index depicts long-term climate trends by illustrating monthly values of drought or wetness by assigning a value to indicate severity. For example, to show a scale of mild to extreme drought negative values ranging from -1 to -5 are assigned -5 being extreme drought. Conversely, wet conditions are shown on a positive scale from 1 - 5 with 5 being an extreme wet spell. Since September of 2008, the region has been in a normal period (with values between -2 and 2) meaning neither wet nor drought. As a result, baseline hydrologic monitoring of the permit and adjacent area since September 2008 has occurred under normal climate conditions.

Figure 2 - PHDI, Utah Region 4



The Alton/Sink Valley CIA is located within Palmer Hydrologic Drought Index (PHDI) Regions 4 (Figure 2) and shows the PHDI for 2000 through 2009. Over the past decade, the area has seen cycles of both extreme droughts to extreme wet spells.

Ground-water regimes in the CIA are dependent upon climatic and geologic parameters that establish systems of recharge, movement, and discharge. In the Alton/Sink Valley CIA, precipitation and snowmelt at higher elevations provides most of the water for ground-water recharge (USGS, Plantz, 1985). Recharge has been estimated to be 4 percent (Price and Arnow, 1974) of the average annual precipitation for areas in the Kolob, Alton and Kaiparowits coal fields. Well-developed soils and permeable or fractured lithologies exposed at the surface

facilitate recharge.

Probable Alluvial Valley Floor Areas

The Office of Surface Mining (OSM) has published study guidelines on what criteria to look for when making a determination for an Alluvial Valley Floor (AVF). The definition is presented in Section 701 of the Surface Mine Control and Reclamation Act and the Utah Coal Rules R645-100-200, and the State rules regarding AVFs are in R645.302.321 through 323. The provisions in the rules state that (1) certain types of stream valleys in the Western United States are prohibited from disturbance by coal mining activities and (2) some other types of stream valleys in the West may be allowed to be mined but must meet higher reclamation standards than other types of mined lands. Both of these descriptions of stream valleys fall into the category of alluvial valley floors.

The Division evaluated areas within and adjacent to the North and South Private Leases of the Coal Hollow mine for the presence of alluvial valley floors. The Sink Valley and lower Kanab Creek were evaluated for the South Private Lease and the Alton Amphitheater was evaluated for the North Private Lease.

The Office of Surface Mining requires the following criteria to be evaluated in order to determine the presence or absence of alluvial valley floors in the western United States:

1. located in topographic valleys having an associated stream channel,
2. underlain by unconsolidated deposits whose surface usually has the landform appearance of flood plains or terraces, and
3. have an agricultural importance derived from the availability of surface or groundwater.

The ultimate goal is to prevent surface disturbance to areas that have agricultural importance or to determine that regional water availability is not affected.

The Division published a Technical Analysis document in March 2009 concluding that Upper Sink Valley, consists of high terrain alluvial fan deposits, with no flood plain or terrace complexes. The Division acknowledged that although some of the criteria for an AVF are present within Sink Valley, not all the characteristics listed in the definition were clearly present (i.e. stream-laid deposits holding streams with water availability sufficient for irrigation or subirrigation activities”.

The investigation then focused on a reconnaissance for alluvial valley floors in the adjacent areas of the Coal Hollow Permit area in order to determine possible hydrologic consequences to these adjacent areas from mining. Based on an investigation by Petersen, two locations were identified as probable alluvial valley floors: a valley in the Kanab Creek drainage located in Sections 25 and 35 of T. 39 S., R. 6 W., and the lower portion of Sink Valley located

in Section 6 of T. 40 S., R.5 W.

The Division conducted field reconnaissance in September 2009 to evaluate these areas, the valley within the Kanab Creek drainage was observed to have a continuous stream channel, geomorphic terraces, and improved rangeland where cattle was grazing. The area appeared to be subirrigated. Subirrigation is defined by the alluvial valley floor regulations as “the supply of water to plants from underneath or from a semi-saturated or saturated zone where water is available for use by vegetation” (30 CFR 701.5). This area was determined to have characteristics of an alluvial valley floor. According to the Petersen report, crop production in this area is limited to hay.

The second area evaluated was the Lower Sink Valley Wash. The stream channel in this area was deeply incised and other characteristics such as improved rangeland and geomorphic terraces were present. This area did not appear to be able to support irrigation or show any indications of subirrigation based on the vegetation observed. Vegetation consisted of sagebrush and some grass areas. There is no residential development or active water rights in this area. Based on these observances, the Division concluded that this area does not have the characteristics of an AVF. Plates 1 through 3 in Appendix A show the boundary of the probable AVF area in Sections 25 and 35, T. 40 S., R. 6 W.

The area of the Alton Amphitheater was studied extensively to determine the presence, location and extent of an AVF. The methods, results, and findings are provided in the report, “Alluvial Valley Floor Field Investigation in the North Private Lease” (Petersen, 2014). This report was prepared by professionals within their respective fields who investigated all relevant aspects of hydrology, geology, biology, and soil types to classify and delineate the AVF in the area. The Division thoroughly reviewed the report and field verified the report’s findings. In November 2014 the Division agreed with the assessment that an AVF exists north of the farm road, but is absent south of the road.

The historic practice of flood irrigation was the primary factor in determining the location and extent of the Alton Amphitheater AVF. The AVF is not subirrigated. Rooting depths on the flood plain terrace range from 0.7’ to 5.7’, while the water table sits 13’ or more below the ground surface. Therefore, any reduction in the water table due to mining operations will not impact the AVF and subsequent farming resource.

Properties of Water-bearing Stratigraphic Units in the Permit Area

Regional aquifer

The aquifer of regional significance is the Navajo Sandstone formation. The Navajo Sandstone is a resource for domestic, municipal and agricultural groundwater. The Navajo Sandstone is isolated by approximately 1,000 feet of overlying strata in the permit area and

consequently, will not be impacted by proposed mining activities. As a result, the Navajo Sandstone will not be considered a factor in evaluating aquifers that are pertinent to this CHIA. In preparing this CHIA, the Division has adhered to the definition of *aquifer* as found in the Coal Mining Rules (R645-100-200), and the term regional aquifer has been deliberately used or avoided, as appropriate, throughout this CHIA. Although there are local alluvial, perched, and fracture-related aquifers at Alton/Sink Valley, the quality, quantity, use, storage, flow and transport, and discharge of ground water do not indicate the presence of a regional aquifer or aquifer system.

Three principal stratigraphic units are found in the permit and surrounding areas that are considered part of this CHIA evaluation are the Dakota Formation, the Tropic Shale and Quaternary-age alluvium. The characteristics of each unit are described below:

Dakota Formation

The Dakota Formation is a shaley strata interbedded with fine to medium-grained sandstone and coal. The Smirl coal seam is contained within the Dakota Formation. In a report prepared by Petersen Hydrologic, LLC investigating the groundwater and surface water systems in the permit and adjacent area, Peterson suggests that recharge to the Dakota Formation by the overlying Tropic Shale is negligible due to the poor groundwater transmitting properties of the Tropic Shale. Petersen goes on to suggest that since the unit contains several vertically and horizontally discontinuous sandstone horizons, this impedes the flow of groundwater considerably. Only minor seeps with negligible discharge rates were found to originate in the Dakota Formation in and adjacent to the Coal Hollow Mine permit area.

Tropic Shale

The Tropic Shale outcrops as an observable ridge in the east-central portion of the permit area, which is likely a feature formed by the presence of the Sink Valley Fault. Other outcroppings of Tropic Shale are located in the most extreme southwest corner and also as two small knobs on the western side of the permit area. The lithologic characteristics of this unit are primarily uniform shale to silty shale with high clay content. No significant springs or seeps were identified as originating from this unit with the exception of one seep that discharges at a rate of less than 0.5 gallons per minute. The Tropic Shale is a poor transmitter of water and forms a basal confining layer for the overlying alluvial groundwater system. No appreciable amounts of groundwater flow from the Tropic Shale were observed during drilling activities for the baseline monitoring program.

The surficial outcrop of the Tropic Shale ridge along the Sink Valley fault in the South Private Lease is a hydrologic barrier to the up-gradient alluvial aquifer. This impermeable ridge directs groundwater flow to the south.

Alluvial Groundwater

The principal water-bearing stratum in the permit and adjacent area is the alluvial sediments. The groundwater recharge source of the alluvial aquifers is the upland areas of the Paunsaugunt Plateau. Alluvial groundwater discharges to the surface through springs, seeps, and along gaining sections of Kanab Creek.

In the South Private Lease the greatest concentration of alluvial groundwater discharge is found in the central Sink Valley area. This area was found to have the thickest section of alluvial sediments in Sink Valley where groundwater exists under artesian conditions. In January 2007, Petersen Hydrologic conducted a 28-hour pump and recovery test on monitoring well Y-61, which is located in the course alluvium at the base of Swapp Hollow Canyon, adjacent to the eastern boundary of the permit area. The objective of the pump test was to 1) evaluate hydraulic communication between the coarse alluvium of the pumping well Y-61 and the silty, clayey, and sandy alluvial sediments overlying areas planned for mining at the Coal Hollow Mine, and 2) to evaluate the aquifer characteristics of the coarse-grained, artesian portion of the Sink Valley Wash alluvial groundwater system. During the pump test, discharge was measured at four nearby springs and water levels measured in 20 observation wells. Information is in Section 9.3 of Appendix 7-1 of the Coal Hollow Mine MRP. Drawdown in the wells nearest Y-61 within the test period was up to 25 feet; the response to the pump test in other monitoring wells was negligible, with drawdowns of less than one foot. Drawing 7-14 in Chapter 7 illustrates the drawdown at C2-40, Y-102, and Y-59, three observation wells within 1,000 feet of Y-61; Figure 18 of Appendix 7-1 shows the smaller drawdown response at C2, C3, C4, and SS, observation wells along the eastern margin of the proposed mine; and contour lines on Figure 17 of Appendix 7-7 show the extent of the measurable drawdown in the observation wells. The results of the test indicated good groundwater communication between the pumping well and wells and springs within 1,400 feet of the pumping well. Observations at the springs and wells indicated that recovery continued after the 28 hour test. Petersen concluded that either the weak response from the monitoring wells indicates a low degree of hydraulic communication between the groundwater monitoring wells or the distance from these wells to the pumping well was too great for a potentiometric response to be measured. Overall, hydraulic conductivity rates for the coarse grained alluvial groundwater system were calculated to be relatively high at 6×10^{-2} cm/sec or 170 feet/day.

The alluvial aquifer in the vicinity of the Alton Amphitheater has been characterized with pumping tests and baseline monitoring of the well network. The hydraulic characteristics were determined using a constant-rate pumping test in the spring of 2016. The pumping test ran for a 56 hour period, while simultaneously measuring the cone of depression in 22 surrounding observation wells. The results were analyzed in Aqtesolv to determine the aquifer type and its properties. The best fit model characterized the aquifer as leaky or semi-confined. The hydraulic conductivity was determined to be 16.7 ft/day or 5.88×10^{-3} cm/sec. Drawdown during the pumping test was observed in a well up to 1150 ft away (Appendix 7-18, Figure 2). This is typical of leaky confined aquifers where drawdown can affect a large area. The aquifer is stratified with low permeability clays, silts,

and sands that overlay coarser gravels held in a silty matrix. The upper low permeability deposits likely responded to the pumping test as a saturated aquitard.

Groundwater Flow Characteristics

Once recharge enters the ground, the rate and direction of ground-water flow is governed mainly by gravity and geology. Since the source of the groundwater originates in the Paunsaugunt Plateau to the east, groundwater migrates toward the permit area from the massive alluvial fan sediments that are considered the primary transport mechanism of supplying groundwater to the springs, seeps and valleys in and around the permit area.

Ground water tends to flow more readily through shallower systems where weathering and fracturing produce hydraulic conductivities that are generally larger than in deeper systems. Much of the ground-water flow continues both laterally and downward through these shallower, local systems until it intercepts the surface and is discharged at a spring or seep, enters a stream as baseflow, is transpired by vegetation, or simply evaporates to the atmosphere. Because of the lithic characteristics of the Tropic Shale and Dakota Formation's groundwater is primarily confined to the alluvium and not expected to infiltrate into deeper underlying strata (i.e. Navajo Sandstone).

Tritium and radiogenic carbon values are typically used to date the groundwater residence time within an aquifer system. This information is useful in determining the age of groundwater and how often a groundwater system recharges. Tritium in the atmosphere is the result of atomic weapons testing that has occurred over the past 100 years. Tritium present in groundwater indicates that groundwater has made contact with the atmosphere and suggests its is of relatively recent age. Radiocarbon measurements of groundwater indicate how long groundwater has become isolated from soil-zone gasses and near-surface groundwater.

Tritium testing of groundwater and surface water from springs, wells, and streams in the Coal Hollow Mine permit/adjacent area was found to primarily be of modern ages. The Petersen report concluded that travel time of groundwater in Sink Valley was less than 50 years. All alluvial groundwater in Sink Valley indicates that recharge rates have occurred in modern times. The only exception to this was groundwater found in the Dakota Formation, which was determined to be isolated from the surface for at least the past 50 years and a groundwater residence time of approximately 1,000 years. The results of this testing indicate that the shallow groundwater system is relatively dynamic from the Paunsaugunt Plateau recharge area to discharge points located in Sink Valley.

There are numerous seeps and springs within the CIA. Discharge volumes are summarized in Table 1 below. Petersen Hydrologic LLC identified 38 seeps and springs in and adjacent to the permit area in their 2008 baseline survey. Most of the springs and seeps in and adjacent to the permit area have been identified within the alluvial groundwater systems in Sink

Valley. Springs SP-3 and SP-5 are located in upland areas southeast of the permit area. These springs are considered to be part of the groundwater recharge source area within the Paunsaugunt Plateau and will not be affected by mining activities. Two springs that discharge in the lower Sink Valley Wash area, SP-4 and SP-34. The discharge from these springs is thought to be from either alluvium or faulting in the valley. The discharge from these springs is negligible with less than 1 gallon per minute being reported. Neither of these springs have any water rights associated with them. Spring SP-37 is utilized for stock water and wildlife and is located at the eastern edge of Sink Valley. This spring discharges at less than 1 gallon per minute. Three springs are used for seasonal domestic water supply for the three residential properties in the adjacent area. SP-8 (Swapp Ranch House), SP-33 (Johnson cabin) and SP-35 (Sorensen Ranch House) each have variable discharge rates. The highest yielding spring is the spring located at the Swapp Ranch House with an average gpm of 14.31. Multiple springs to the west of and along the northeast/southwest trending boundary of the permit area are used for stockwater and support wildlife. Many of these springs may be dislocated when mining development commences.

Bank seepage occurs along Lower Robinson Creek in Section 19, T. 39 S., R. 5 W. The Petersen report concluded that is from the alluvial groundwater where the potentiometric surface of the groundwater intersects the stream channel. Based on data from the springs that have been monitored, spring discharge is distributed roughly as follows:

<u>Lithologic Unit</u>	<u>Number of Springs Included in Survey</u>	<u>Number of Springs Monitored</u>	<u>Total Average Monitored Discharge</u>
Alluvium	35	27	1.54 gpm
Sorenson Spring (Alluv.)	-	-	0.02 gpm
Johnson Spring (Alluv.)	-	-	6.20 gpm
Dames Spring (Alluv.)	-	-	14.31 gpm
Tropic Shale Formation	0	0	n/a
Dakota Formation	3	3	0.36 gpm

Groundwater in the Alton Amphitheater is held in the alluvial valley fill sediments. The direction of groundwater flow is from north to south and generally parallels Kanab Creek. The alluvial sediments are heterogenous layers of clays, silts, and gravels within the permit area. Low permeability clays and silts make up much of alluvial deposit and are readily prevalent along the perimeter of the deposit near the Tropic Shale contact and the upper 20 to 30 feet of the deposit. Coarse gravels within a silty matrix are mostly in the center of the alluvial valley and extend vertically from the base of the contact to within 20 to 30 feet of the surface.

Groundwater exits the southern permit boundary primarily contained in a narrow and shallow gravel alluvial deposit resting on top of the Dakota sandstone.

The groundwater outflow through the alluvial sediments is calculated near the southern area of the Alton Amphitheater or southern permit boundary. The monitoring well network just south of the county road crossing of Kanab Creek was utilized for this study. A pumping test on well CLEM-4 determined the hydraulic conductivity at this location to be 8.515×10^{-4} cm/sec. The gradient is the average change in head between the two up-gradient wells and the two down-gradient wells. The cross-sectional area is the width and depth of the geologic bottle neck of the alluvial sediments at the location of the well network. Using these data it is determined the total groundwater discharge at the southern end of the permit area is 4.6 gpm. In early May 2017 when this study was conducted, Kanab Creek was flowing at a rate of about 330 gpm. Therefore, the total calculated outflow at the southern boundary of the NPL permit area was 335 gpm.

Faults and fractures

Faults and fractures can act as effective conduits for ground water flow but can also be barriers to flow, especially to flow across the fault plane. The location of the Tropic Shale ridge that is located in the central portion of the permit area and is likely associated with the Sink Valley Fault provides a hydrologic barrier to groundwater flow originating from the eastern upland area. A readily observable pattern is shown on infrared aerial photography maps that concentrations of water represented in the varying forms of vegetation. These patterns show up as pink areas on the infrared maps. The Tropic Shale ridge clearly is showing that the alluvial groundwater is intercepted by the shale ridge and deflected toward the south. Infrared aerial and aerial photography maps of the Coal Hollow permit and adjacent area are included as Plates 2 and 3 in Appendix A. Only one spring originating in the Dakota Formation fault/fracture system about 1 mile south of the permit area is known to exist and this spring discharges negligible amounts of groundwater.

Hydraulic Conductivity and Permeability

In sedimentary rocks, there is a wide range of textures or fabrics that determine the hydraulic characteristics of the unfractured medium. These textures or fabrics are related to the mineralogy or composition of the sediments, the range of sizes of the sedimentary particles (sorting), the spatial distribution of different sediment-sizes (grading), the shape and spatial orientation or arrangement of the sediment particles after compaction (packing), cementation, and properties acquired or altered as and after the sediments were lithified. Lateral and vertical variations in these characteristics can create internal low-permeability zones or barriers, so that a unit that to the eye appears to be uniform and to have aquifer characteristics can actually be incapable of storing or transporting water in any significant amount.

The initial field investigation conducted in and adjacent to the permit area was designed to:

- 1) Better define the vertical and lateral extent of permeable, coarse-grained sediments in the alluvial groundwater system;
- 2) Characterize the water bearing and water transmitting properties of alluvial sediments and;
- 3) to evaluated the degree of hydraulic communication between the coarse-grained portion of the alluvial system in Sink Valley and the clayey alluvial sediments in the proposed mining areas.

The tasks performed as part of the initial field investigation included: A total of 30 monitoring wells were drilled in and adjacent to the permit area. A 28-hour pump test was conducted at well Y-61 located within the coarse alluvial sediments east of the permit area in the northwest portion of Section 29, T. 39 S., R. 5 W. Finally, slug testing was performed on 20 monitoring wells to determine approximate hydraulic conductivity values within the various formations.

Groundwater inflow values were determined based on the results of slug tests and calculated using Darcy's Law:

$$Q = KIA$$

Where Q = groundwater discharge rate
 K = hydraulic conductivity
 I = hydraulic gradient
 A = cross-sectional area

These data from the slug tests indicate that hydraulic conductivity in monitoring wells in the Lower Robinson Creek area and in the Dakota Formation above the coal seam was negligible, with transmissivity of groundwater being less than one gallon per minute. Significant transmissivity rates in the tests performed in wells in the Sink Valley area are summarized in the table below.

Well ID	Formation	Conductivity Value (Maximum) cm/second
Y-61	Coarse alluvium (artesian system)	6.0×10^{-2}
C7-20'	Shallow Sink Valley clayey alluvium	8.3×10^{-4}
C2-28'	Mid to Lower Sink Valley sandy, silty, clayey alluvium	5.3×10^{-3}
SS-75'	Lower Sink Valley coal burned area	$>10^{-2}$
Y-98	Upper Robinson Ck drainage	3.2×10^{-2}
Y-38	Smirl Coal Seam	6.3×10^{-5}

Groundwater inflow rates into mine openings were estimated based on these data. The report concludes that groundwater inflow rates into the northwest corner of Section 29, 39 S., R. 5 W., which is considered the artesian alluvial groundwater system (C2 area), inflow rates are estimated at less than 10 gallons per minute. The report emphasized that these numbers were general estimates and if mine openings were to intersect a substantial thickness of coarse-grained material, that inflow rates could be much greater. The greatest hydraulic conductivity value was found in the burned out coal zone at the southern end of the permit area and encountered at a depth of 75 feet in borehole SS. The conductivity value presented was $>10^{-2}$ and listed as high with data indicating mine inflow rates of 220 gpm over 100 linear feet. Rates of alluvial groundwater flow intercepted by the Coal Hollow project are expected to be variable due to the heterogeneity of the deposits. ACD estimates that groundwater on the order of a few tens of gallons per minute to several hundred gpm could be expected to be encountered.

Section 728.333 and Appendix 7-9 address specific protocols that the mine plans to implement in order to manage large, unexpected inflows of groundwater into the mine pits. Large cross-sectional areas of water-bearing strata will not be exposed to the mine pits because allowing the pits to flood would be prohibitive to coal extraction activities. Data show hydraulic conductivity values are highest in the area of a section of burned out coal located in the southern corner of the permit area. This area was documented at a depth of 75 feet in borehole SS. This area could experience high levels of groundwater inflow if it is encountered. According to page 7-28 of the MRP, the mine intends to avoid this highly permeable area by delineating the competent coal seam from the burned out section in order to design mining opening that will avoid exposing the burned (highly permeable) coal section.

Water Quality

The alluvial sediments in the Coal Hollow Mine permit area primarily consist of low permeable clays, silts, and sands derived mainly derived from the Tropic Shale that do not appear to readily transmit water. Deeper, coarser alluvia, especially on the east side of Sink Valley Wash are derived from Cretaceous and Tertiary strata exposed along the canyons of the Paunsaugunt Plateau east of Sink Valley Wash. Because appreciable amounts of groundwater originating from the Tropic Shale are not anticipated to flow out of the mine pit areas, minimal to no impacts to important water quality parameters in receiving surface and groundwater resources are expected to occur. Similar to the Tropic Shale, the coal-bearing Dakota Formation is not anticipated to have any adverse affects to water quality parameters. The Dakota was found to contain low-permeable shales and interbedded sandstone lenses which data has shown to be a poor transmitter of groundwater.

Since the alluvial sediments have been demonstrated to be the primary unit of importance in the permit and adjacent area for the transport of groundwater, water quality parameters could be adversely affected when mine workings intercept flow. One of the most important water

quality parameters is Total Dissolved Solids (TDS), which is a measure of the amount of dissolved sediment in the ground and surface water systems.

Under the Standards of Quality for Waters of the State of Utah (UAC R-317-2.13), waters in Kanab Creek and its tributaries - from irrigation diversion at the confluence with Reservoir Canyon to headwaters - are classified as, 2B, 3A and 4.

- 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing;
- 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain;
- 4 - Protected for agricultural uses including irrigation of crops and stock watering

Water originating from Water Canyon and Swapp Hollow is good quality from the Paunsaugunt Plateau on the eastern flank of Sink Valley. As surface water travels down the canyons and makes contact with the silty, clayey, sandy sediments from the alluvium and Tropic Shale formation, surface water quality generally degrades and higher levels of TDS are detected.

Depending on the duration of contact, water quality degrades downstream to where TDS levels reaching 3,000 mg/L are not uncommon.

Total Dissolved Solids (TDS) in Surface Water Systems

In the Paunsaugunt Plateau, water quality is good in headwater areas and produces some of the freshest water in the region, where rocks contain only small amounts of readily soluble material. TDS concentrations are typically less than 300 mg/L and dominant ions are calcium, magnesium and bicarbonate. TDS concentrations increase at lower elevations, where stream waters flow along more saline sediments such as the alluvium and the Tropic Shale. Overall, surface water quality in the Kolob-Alton coal field region is considered fresh to moderately saline with TDS values ranging from 250 – up to 10,000 mg/L (Price, 1980). Surface water TDS values in Sink Valley typically range from 250 – 1,000 based on heavy flow to low flow conditions that vary by the season. TDS levels are naturally highest in Kanab Creek and Sink Valley drainages, mainly due to the general degradation of water quality as it travels and continues to make contact with sediment. TDS concentrations in the surface water drainages range from 500 – 3,000 mg/L.

TDS in Groundwater Systems

Overall, groundwater quality in the Kolob-Alton coal field region is considered fresh to slightly saline with TDS values ranging typically from <1,000 to 3,000 mg/L (Price, 1981). The freshest groundwater originates in the high plateau areas as well as at the headwaters of Kanab

Creek. In these areas, TDS values are typically less than 500 mg/L. More saline water is found in the Tropic Shale with TDS concentrations in groundwater typically ranging anywhere from 500 to 10,000 mg/L. TDS groundwater values within Sink Valley have been reported to range from 500-3,000 mg/L.

Aquatic Species

Streams in and adjacent to the Coal Hollow Mine flow in response to rainfall and snowmelt. Although there are episodes with high flow volumes, the channels are typically dry for several months out of each year and flow is too inconsistent to provide any aquatic habitats for fish. Amphibians and macroinvertebrates may survive in reaches of Kanab Creek west of the Coal Hollow Mine, but Lower Robinson Creek and Sink Hollow Wash do not support aquatic habitats.

Limited aquatic resources are found within the Kanab Creek drainage. Aquatic species, reptiles and mollusks, have been documented in the Kanab Creek drainage to include both native and nonnative fish species.

Fish Species	Native (Y) or Non-Native (N)	General Habitat
Speckled dace	Y	Wide variety of water conditions and habitats, marshy wetlands to large streams
Mountain Sucker	Y	Riffles in clear, cold creeks and rivers in mountains
Rainbow Trout	N	Wide range of habitat including large, deep lakes, rivers and small streams.

Relatively few wetlands have been documented in the Kanab Creek/Virgin River Drainage Basin. Small seep or pothole-type wetlands act as water reserves and provide baseflows that can support aquatic communities during low-water periods. Potholes, small ponds and marshy areas provide subsurface flow that supplements direct water sources like springs and run-off. These wet areas also provide important habitat for invertebrate and amphibian populations. Waterfowl habitat areas are limited to a few “potholes and marshes” created by seepage from farm ponds.

The Kanab Creek drainage does not support significant habitat for sport fisheries. Flows are considered too small to provide adequate habitat for fish. Limited aquatic habitat is possible in the upper stream reaches, which would include the Alton/Sink Valley area.

Surface Water Baseline Conditions

Surface runoff from the permit and adjacent area are directed to three principal drainage basins in the region. In the lower half of the South Private Lease permit area surface runoff is directed to the Sink Valley Wash Drainage. The remainder of runoff in the South Private lease flows to the Lower Robinson Creek subdrainage. The North Private lease falls within the Upper Kanab Creek Drainage basin. The Sink Valley Wash is a tributary to Kanab Creek where the confluence of the two water bodies is located approximately 6 miles south of the permit area. Runoff in the Alton-Kolob region is generated from precipitation that falls directly on the area and snowmelt. The contributing area of Dry and Water Canyons and Swapp Hollow is approximately 5,080 acres. The area of Sink Valley is about 730 acres. Price (1982) gave mean averages in the Sink Valley area from 1 to 8 inches per year (Price 1982), but data from the Alton, Utah weather station indicate average annual precipitation of 16.38 inches per year (Appendix 7-6). ACD has maintained a weather station at the Coal Hollow permit area since 2006, and data from this station are in Appendix 7-6 of the Coal Hollow Mine MRP.

Dry Canyon

This drainage delineates the north and northeastern-most boundary of the CIA and represents the headwaters of Lower Robinson Creek. The surface and groundwater that originates in Dry Canyon follows a southwesterly gradient. Any runoff from heavy precipitation events from this canyon is directed west toward Lower Robinson Creek. The alluvial sediments originating from this canyon and Water Canyon form the geomorphic features of the alluvial fan structure found along the eastern flank of Sink Valley. Because this canyon is upgradient of proposed mining operations, surface and groundwater originating from this canyon will not be affected by any mine operations. For surface water baseline sampling purposes, the sampling point from this canyon is referred to as RID-1 – Robinson Creek.

Water Canyon

The surface and groundwater that originates in Water Canyon follows a southwesterly gradient. Surface runoff from Water Canyon is shown on topographic maps as intermittent. However, surface water monitoring has not detected flow since the baseline water monitoring program began in 2005. Runoff from Water Canyon is directed toward Robinson Creek. Because this canyon is upgradient of proposed mining operations, surface and groundwater originating from this canyon will not be affected by any mine operations. For surface water baseline sampling purposes, the sampling point from this canyon is referred to as SW-7 – Swapp Hollow (Adjacent).

Swapp Hollow

This drainage delineates the eastern-most boundary of the CIA. Surface water originating from Swapp Hollow Canyon may have at one time drained into a channel that existed in Sink

Valley, which is now buried beneath the alluvial fan. Currently, there is no continuous stream channel in Sink Valley. However, landform features of dried up channels can be seen in 2009 aerial photographs.

The surface water monitoring point midway up the canyon consistently reports flow. The data from the baseline monitoring period beginning in 2005 have reported flows ranging from 2.0 gpm through 290 gpm. Because this canyon is upgradient of proposed mining operations, surface and groundwater originating from this canyon will not be affected by any mine operations. For surface water baseline sampling purposes, the sampling point from this canyon is referred to as SW-8 – Swapp Hollow.

Sink Valley

Remnants of an old stream channel appear in Sink Valley. The Division has observed that this channel, shown on the USGS Alton Topographic Quad and evident on the ground, is a feature superimposed on the alluvial fan: it has not created a floodplain; it originates near the head of the fan in Section 21 Canyon, where sheetwash collects into rills and channels, and is augmented by flow from Swapp Hollow and several smaller drainages

The channel appears discontinuous when viewing current aerial photographs. The only surface water monitoring point in Sink Valley (SW-6) is located adjacent to the southeast corner of the permit boundary near a spring. Surface flow from this point has only been detected twice since the beginning of the baseline monitoring period in 2005 during the spring season. Although appreciable amounts of groundwater are found in zones of coarse alluvium within Sink Valley, surface water expression is infrequent. Surface water runoff near monitoring point SW-6 (adjacent to the southeast boundary of the permit area) does have potential to increase upon the inception of mining activities due to the diversion of water being directed southward (i.e. downgradient) from the mine pits.

Lower Sink Valley Wash

Lower Sink Valley begins in the northeast corner of Section 6, T. 40 S., R. 5 W where the county road crosses the drainage and the channel looking south becomes significantly incised. There are only two surface water monitoring points in Lower Sink Valley Wash: SW-9 and SW-10. Similar to surface water conditions in Sink Valley, surface water has only been measured twice - in March 2006 and March 2008 - since the beginning of the baseline monitoring period in 2005, although data from the 1980s in the Division's database show episodic flow as great as 763 gpm. No development and no active water rights exist in this area. These surface water monitoring points do have potential to be impacted by upgradient mining activities in the form of increased runoff. However, the closest monitoring point in Lower Sink Valley Wash is 1.5 miles downstream of the permit area boundary. The effects of mining, if any, this far downstream are not yet known, but will require close monitoring.

Kanab Creek

Kanab Creek is a tributary of the Colorado River that originates at the base of the Paunsaugunt Plateau at Reservoir Canyon east of Alton, Utah and flows 29.7 miles south through the town of Kanab, Utah to the Utah-Arizona state line. Perennial headwaters reach a maximum of 8,300 feet elevation, while Kanab Creek exits the state at 4,700 feet. There are no lakes or reservoirs in the drainage catalogued by the Utah Division of Wildlife Resources (Hadley, 2007).

On a regional scale, Kanab Creek flows to the south and is a part of the Colorado River Basin and ultimately discharges to the Colorado River. The Colorado River Basin drains approximately 246,000 square miles, including parts of seven western U.S. states (Wyoming, Colorado, Utah, New Mexico, Nevada, Arizona, California) and Mexico. Three-fourths of the Colorado basin is federal land comprised of national forests, national parks, and Indian reservations (Water Encyclopedia). Surface water in Kanab Creek is primarily used for stock watering and crop irrigation in irrigable areas.

Robinson Creek

In the Robinson Creek drainage, water in the form of precipitation or snow melt originates in the upper reaches of the stream from Water Canyon and other canyons east of the permit area on the Paunsaugunt Plateau. Robinson Creek exhibits geomorphic features of a highly incised natural channel that is often dry but likely receives water from torrential rainstorms.

The data show that stream flow significantly drops off as it continues downstream to where Lower Robinson Creek drains to Kanab Creek. The Kanab Creek drainage shows consistent spring and fall seasonal flow along all the sampling points on the creek. During spring runoff season, stream flow does steadily decrease as it travels downstream.

Water Canyon and Swapp Hollow Canyon are represented by surface water sampling points SW-7 and SW-8, respectively. Interestingly, no stream flow data has been detected in Water Canyon during the baseline monitoring period. Conversely, data from Swapp Hollow Canyon do show consistent stream flow data throughout the year. Surface water points SW-6, SW-9, and SW-10 represent sampling locations along Sink Valley and Sink Valley Wash. Baseline stream flow data show that flow is detected only during spring runoff season. These three points will be the surface water points that have potential to see effects to surface water runoff from mining activities, especially if groundwater flow is to be redirected away from the mining pits.

Baseline surface water monitoring at the Coal Hollow mine site began in June 2005 and has been collected on a quarterly basis ever since. Surface water collection points are shown on

Drawing 7-2 of the Coal Hollow Mine MRP. The principal drainage systems in the permit and adjacent area are: Lower Robinson Creek, Kanab Creek, Water Canyon, Swapp Hollow, and Sink Valley. Table 3 below indicates the minimum and maximum flows recorded since 2005 along with mean flow data where available. As can be seen on Table 3, the principal drainages are grouped together with the upstream to downstream locations grouped left to right.

TABLE 3
 SEASONAL SURFACE WATER FLOW DATA

RID-1 Robinson Creek				SW-4 Robinson Creek				SW-101 Robinson Creek				SW-5 Robinson Creek			
Flow in gpm				Flow in gpm				Flow in gpm				Flow in gpm			
Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.
March	-	13	-	March	-	-	-	March	21	777	399	March	-	-	-
April	-	-	-	April	-	-	-	April	-	-	-	April	-	-	-
May	3.5	48.6	24	May	-	539	-	May	-	734	-	May	5	410	207
June	-	-	-	June	-	-	-	June	-	-	-	June	-	-	-
July	-	2.8	1.4	July	-	-	-	July	-	-	-	July	-	-	-
August	-	-	-	August	-	-	-	August	-	-	-	August	-	-	-
September	7	60	33	September	-	-	-	September	-	-	-	September	-	5	-
October	-	-	-	October	-	-	-	October	-	-	-	October	-	-	-
November	0	64.7	24	November	-	-	-	November	-	-	-	November	-	-	-
December	-	-	-	December	-	-	-	December	-	-	-	December	-	-	-

SW-1 Kanab Creek				SW-3 Kanab Creek				Lamb Canal - Kanab Creek				SW-2 Kanab Creek			
Flow in gpm				Flow in gpm				Flow in gpm				Flow in gpm			
Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.
March	0	2770	1471	March	191	4170	2351	March	-	372	-	March	-	21	-
April	-	-	-	April	-	-	-	April	-	-	-	April	-	-	-
May	158	1830	994	May	37	1850	530	May	14.6	1560	450	May	3.4	934	264
June	-	-	-	June	-	-	-	June	-	-	-	June	-	-	-
July	-	-	-	July	-	37	-	July	0	0	0	July	-	8	-
August	-	-	-	August	-	-	-	August	-	-	-	August	-	-	-
September	68	161	115	September	85	119	104	September	0	300	106	September	5.4	36	24.53
October	-	-	-	October	-	-	-	October	-	-	-	October	-	-	-
November	300	893	632	November	320	1970	900	November	0	0	0	November	-	430	-
December	-	-	-	December	-	-	-	December	-	-	-	December	-	-	-

SW-7 Swapp Hollow Adjacent				SW-8 Swapp Hollow				SW-6 Sink Valley Wash				SW-9 Sink Valley Wash				SW-10 Unnamed Tributary to Sink Valley			
Flow in gpm				Flow in gpm				Flow in gpm				Flow in gpm				Flow in gpm			
Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.
March	-	-	-	March	-	34	-	March	58	1370	714	March	11	182	96.5	March	15	247	131
April	-	-	-	April	-	-	-	April	-	-	-	April	-	-	-	April	-	-	-
May	-	-	-	May	11	290	87	May	-	-	-	May	-	-	-	May	-	-	-
June	-	-	-	June	-	-	-	June	-	-	-	June	-	-	-	June	-	-	-
July	-	-	-	July	-	2.05	-	July	-	-	-	July	-	-	-	July	-	-	-
August	-	-	-	August	-	-	-	August	-	-	-	August	-	-	-	August	-	-	-
September	-	-	-	September	10	69	43	September	-	-	-	September	-	-	-	September	-	-	-
October	-	-	-	October	-	-	-	October	-	-	-	October	-	-	-	October	-	-	-
November	-	-	-	November	13	71	39	November	-	-	-	November	-	-	-	November	-	-	-
December	-	-	-	December	-	-	-	December	-	-	-	December	-	-	-	December	-	-	-

Baseline TDS data in Surface Water

Another water quality parameter that has significant effects to the quality of surface water is TDS concentration. TDS is an indicator of how much sediment load a water body is carrying: the lower the TDS concentration in surface water, the fresher the water. As previously mentioned, data published by the U.S. Geological Survey (Price 1980) indicated that TDS data

in the drainage basins of Kanab Creek and Sink Valley typically range from 500 – 3,000 mg/L. Table 4 shows concentrations of TDS in each of the drainages relevant to the permit and adjacent area. The drainages are grouped together in rows with the upgradient to downgradient sampling locations shown from left to right. TDS levels originating from the upland areas of the Robinson Creek drainage show TDS levels under 300 mg/L, as what was reported by USGS data back in the 1980s.

TABLE 4
Total Dissolved Solids in Surface Water

RID-1 Robinson Creek				SW-4 Robinson Creek				SW-101 Robinson Creek				SW-5 Robinson Creek			
TDS in mg/L				TDS in mg/L				TDS in mg/L				TDS in mg/L			
Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.
March	-	254	-	March	-	-	-	March	644	3012	1828	March	-	-	-
April	-	-	-	April	-	-	-	April	-	-	-	April	-	-	-
May	186	265	225	May	-	283	-	May	-	309	-	May	469	1205	837
June	-	-	-	June	-	-	-	June	-	-	-	June	-	-	-
July	-	203	-	July	-	-	-	July	-	-	-	July	-	-	-
August	-	-	-	August	-	-	-	August	-	-	-	August	-	-	-
September	-	245	-	September	-	-	-	September	-	-	-	September	-	1081	-
October	-	-	-	October	-	-	-	October	-	-	-	October	-	-	-
November	250	273	262	November	-	-	-	November	-	-	-	November	-	-	-
December	-	-	-	December	-	-	-	December	-	-	-	December	-	-	-

SW-1 Kanab Creek				SW-3 Kanab Creek				SW-2 Kanab Creek			
TDS in mg/L				TDS in mg/L				TDS in mg/L			
Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.
March	530	1238	884	March	418	1167	713	March	-	1511	-
April	-	-	-	April	-	-	-	April	-	-	-
May	578	815	697	May	644	1372	1146	May	853	1672	1300
June	-	-	-	June	-	1358	-	June	-	1771	-
July	-	-	-	July	-	-	-	July	-	-	-
August	1095	1293	1227	August	85	119	104	August	1434	1725	1595
September	-	-	-	September	-	-	-	September	-	-	-
October	-	-	-	October	-	-	-	October	-	-	-
November	442	1085	660	November	1206	1281	1248	November	-	1513	-
December	-	-	-	December	-	-	-	December	-	-	-

SW-8 Swapp Hollow				SW-6 Sink Valley Wash				SW-9 Sink Valley Wash				SW-10 Unnamed Tributary to Sink			
TDS in mg/L				TDS in mg/L				TDS in mg/L				TDS in mg/L			
Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.	Month	Min	Max	Avg.
March	-	324	-	March	1028	3575	2301.5	March	360	1270	815	March	-	236	-
April	-	-	-	April	-	-	-	April	-	-	-	April	-	-	-
May	305	366	344	May	-	-	-	May	-	-	-	May	-	-	-
June	-	-	-	June	-	-	-	June	-	-	-	June	-	-	-
July	238	274	256	July	-	-	-	July	-	-	-	July	-	-	-
August	-	-	-	August	-	-	-	August	-	-	-	August	-	-	-
September	298	353	327	September	-	-	-	September	-	-	-	September	-	-	-
October	-	-	-	October	-	-	-	October	-	-	-	October	-	-	-
November	321	377	345	November	-	-	-	November	-	-	-	November	-	-	-
December	-	-	-	December	-	-	-	December	-	-	-	December	-	-	-

Downstream data from Lower Robinson Creek do show increased levels of TDS in the drainage within the permit boundary and at the confluence of Lower Robinson Creek and Kanab

Creek. Limited data show concentrations of TDS reaching slightly above 3,000 mg/L in Robinson Creek. It is anticipated that with the construction of Coal Hollow Mine surface facilities near Lower Robinson Creek, there would be a potential for increased contributions of sediment to Lower Robinson Creek and therefore sediment control practices in accordance with the Utah Coal Rules would need to be closely monitored in this area.

TDS concentrations in Kanab Creek from monitoring points SW-1 and SW-3 averaged approximately 1,200 mg/L. Concentrations of TDS increased slightly in downstream sample SW-2, with limited data showing a maximum concentration of 1,771 mg/L. SW-2 is downgradient of the confluence of Lower Robinson Creek and has the potential to see increases to sediment loads from mining activities.

TDS concentrations in the Swapp Hollow drainage show concentrations consistent with a fresh water classification.

Perched Water-Bearing Zones

There appears to be a perched aquifer adjacent to the Coal Hollow Mine. Petersen Hydrologic reported that perched groundwater conditions exist locally in the alluvial groundwater system in the Lower Robinson Creek subdrainage (Section 11.1, Appendix 7-1). As spring and stream flow moves down the canyons it infiltrates into the matrix at the head of the alluvial fan. In its downward movement it comes in contact with finer lentils materials then moves horizontal until it comes to the surface. This feature is seen in the wet areas (A and B) and spring discharges described by the Coal Hollow Mine MRP.

Anderson (1991) indicated two aquifers on his cross section. The pump test at Y-61 produced drawdown in wells screened in the same deeper, coarser materials that Y-61 was pumping from, but flows in springs at the surface were also reduced. The alluvial groundwater system is probably not homogeneous and anisotropic, but rather is a series of more permeable and less permeable materials with varying degrees of interconnectivity.

These systems may not always be perched in the strict sense, because they may be underlain or even enveloped by saturated low-permeability rock, but large contrasts in hydraulic conductivity effectively isolate them.

IV. IDENTIFY HYDROLOGIC CONCERNS

GROUND WATER

Groundwater systems in the permit and adjacent area have been identified within four formations: Navajo Sandstone, Dakota Formation, Tropic Shale and the Quaternary Alluvial Sediments. The Navajo Sandstone has been ruled out as having any impacts to the hydrologic balance of the permit and adjacent area since it does not outcrop in the area, is separated from the Smirl Coal Seam by several hundred feet of low permeability strata, and will not be encountered during surface mining activities. The Dakota and Tropic formations are considered poor transmitters of groundwater in the permit/adjacent area and are not considered a significant source of groundwater that could affect the hydrologic balance. The alluvial groundwater system supports springs, seeps and provides the groundwater source for several wells within the permit/adjacent area and is considered the formation of primary importance to the hydrologic balance.

Page 7-25 of the Coal Hollow MRP identifies three potential mechanisms of producing hydrologic consequences of surface mining activities in the Coal Hollow Permit Area. They are:

1. Where water-bearing strata in the proposed mining areas are mined through, groundwater systems within these strata will obviously be directly intercepted,
2. Where groundwater flow paths through mine openings are interrupted, groundwater flow in down-gradient areas could be diminished, and
3. Where mine openings intercept permeable strata, groundwater resources in up-gradient areas could potentially be diminished if appreciable quantities of groundwater were to be drained from up-gradient areas.

Seventeen springs and seeps are being monitored within and adjacent to the Coal Hollow permit and adjacent area. Average flows from baseline monitoring of springs within and adjacent to the permit area are presented in the table below.

SPRING ID	LOCATION	FLOW (in gpm)
BLM-1	Kanab Creek	3.4
SP-4	Lower Sink Valley Wash – Dakota Fm Fracture	0.7
SP-6	Alluvium - seep in Sink Valley	0
SP-8	Alluvial spring at Dames Ranch	16
SP-14	Alluvium - Sink Valley	3.9
SP-16	(Teal Spring) - Alluvium -	0.9

	Sink Valley	
SP-19	(Sorenson Pond)- Alluvium - Sink Valley	0.23
SP-22	Alluvium - Sink Valley	0.27
SP-23	Alluvium - Sink Valley	0.8
SP-33	Alluvium - Johnson Property Spring	14
SP-40	Sorensen Spring	0.51

Springs on the east side of the South Private Lease in Sink Valley such as the Sorensen Spring (SP-40) and Sorensen Pond (SP-19) along with several others on the east side of the permit boundary in Section 29 are upgradient of the mine and will not likely be affected by mining activities. Springs that will be affected by mining activities when the mine pits are constructed will be the springs within the permit area along the northeast to southwest permit boundary: these include SP-14, SP-22, and SP-23. Currently, these springs are used for stockwatering. The mine plan in the MRP states that groundwater flow that feeds these springs will be intercepted by an engineered barrier to be installed further to the west of these springs. The photo below show one of these springs within the permit boundary. The view is to the south with the fence line noted in the background.

Most of the springs show an average annual flow of less than one gallon per minute. Springs with significant flow include the springs located near the residential properties that are used for domestic purposes. These springs include SP-8 near the Dames property and SP-33 near the Johnson property. Neither of these springs is likely to show any effects from mining activities since their groundwater recharge source is to the east and consequently upgradient of mining activities.

Ground Water Intercepted by Mining

Groundwater resources in the relatively impermeable Tropic Shale are considered meager and therefore unlikely that appreciable amounts of groundwater would be intercepted within this formation. Similarly, groundwater resources within the Dakota Formation are also considered meager. The coal seam within the Dakota Formation will be extracted but the underlying strata will not be disturbed. Consequently, adverse impacts to direct interception of groundwater with these two formations are not considered to be significant.

Alluvial groundwater systems in the permit area will be directly intercepted by mining activities. The areas of permeable strata that are to be excavated for mining activities have the potential to drain groundwater resources in the upgradient areas. Hydraulic conductivity data available from the artesian alluvial groundwater system found in the coarsest alluvium (well C2 area) indicate a “worst case” scenario discharge rate from mine inflows is estimated to be less

than 10 gallons per minute. The permeability of backfill materials that will be placed into the mine pits during operations also needs to be considered in a groundwater permeability analysis. The potential for the migration of appreciable quantities of groundwater through fill material is considered low because the material will be clay rich in nature and the material has low permeability characteristics (Coal Hollow Mine MRP Appendix 7-10 and Appendix 7-20). In the event that appreciable amounts of groundwater inflows into the mine pits do occur, ACD has proposed to install a low-permeability barrier adjacent to the undisturbed alluvial sediments along highwalls with high inflow rates. The objective of this barrier is to prevent significant inflows of groundwater into the mine pits and minimize long term impacts to subirrigation, soil moisture, and adjacent water tables and potentially affect the hydrologic balance.

If mining operations do encounter groundwater in the mine workings, the water will be discharged to surface drainages through UPDES outfalls. Mine water will ultimately be discharged to the Sink Valley Wash drainage and Kanab Creek drainage.

Diminution of Down-Gradient Ground Water Resources

When areas to be mined intercept groundwater flow paths, there is the potential that diminution of down-gradient groundwater resources could occur. As previously mentioned, groundwater resources in the Tropic Shale and Dakota Formation formations transmit meager amounts of groundwater and do not provide measureable baseflow to streams down-gradient of mining areas.

Alluvial groundwater systems in Sink Valley and Alton Amphitheater show the highest rates of hydraulic conductivity where the coarsest alluvial deposits are mapped. In contrast, the total flux of groundwater migration through finer, clayey and silty sediments considerably less.

Draining of Up-Gradient Groundwater Resources

Based on information from water monitoring wells, including slug tests and a pumping and recovery test of Y-61, and analysis of the geology and hydrology of the proposed permit and adjacent area, the Coal Hollow Mine is designed to minimize potential diminution of flow from the alluvial springs in the Coal Hollow Mine permit and adjacent area.

The pump at Y-61 was stopped at the end of the 28-hour pumping test, and spring discharge rates and water levels in alluvial monitoring wells recovered to approximate pre-test levels. Figure 18 in Appendix 7-1 of the MRP shows the drawdown and recovery response of four wells (C2-40, C3-40, C4-30, and SS-30) and three springs (SP-20, SP-8, and SP-14). The observation springs were 750 to 1,400 and the wells 1,800 to 4,400 feet from the pumping well. Drawing 7-14 illustrates the drawdown at C2-40 and two other wells, Y-102 and Y-59, which were within 1,000 of Y-61; drawdowns at more distant wells are too small to show at the scale on that drawing.

The relationship of the alluvial ground-water table to wells and springs in and adjacent to the NW1/4 of Section 29 is crucial in understanding the PHC of the mining operation. Figure 18 in Appendix 7-1 indicates that during the pump test on Y-61, water levels actually increased at C2-40 and SS-30 and flow increased at SP-8 after 4 hours of pumping.

If inflows to the mine pits become excessive as mining progresses, ACD commits to use techniques such as bentonite- or clay-filled cutoff walls to minimize inflows (Appendix 7-20, Coal Hollow Mine MRP). Temporary reductions in flow from alluvial aquifers may occur but are likely to be short-lived as the pits will remain open for only 60 to 120 days.

Water replacement is discussed in Section 727. Long-term diminution of flow will be replaced with water from a well. The town of Alton has entered into an agreement to transfer a point of diversion for water rights to 50 acre-feet of water, which ACD plans to use to satisfy the water replacement requirements: a copy of the agreement with the town of Alton is in Appendix 7-8 of the Coal Hollow Mine MRP. The production well is constructed on lands currently leased by Alton Coal Development, LLC.

Based on information from water monitoring wells, including slug tests and a pumping and recovery test of Y-61, and analysis of the geology and hydrology of the Coal Hollow Mine permit and adjacent area, ACD has concluded that the proposed mine plan is designed to minimize potential diminution of flow from the alluvial springs in the permit and adjacent area.

The MRP for ACD's Coal Hollow Mine notes that after the pump at Y-61 was stopped at the end of the 28-hour pumping test, spring discharge rates and water levels in alluvial monitoring wells recovered to approximate pre-test levels. Figure 18 in Appendix 7-1 shows the drawdown and recovery response of four wells (C2-40, C3-40, C4-30, and SS-30) and three springs (SP-20, SP-8, and SP-14). The observation springs were 750 to 1,400 and the wells 1,800 to 4,400 feet from the pumping well. Drawing 7-14 in Chapter 7 illustrates the drawdown at C2-40, Y-102, and Y-59, three observation wells within 1,000 of Y-61; Figure 18 of Appendix 7-1 shows the smaller drawdown response at C2, C3, C4, and SS, observation wells along the eastern margin of the proposed mine; and contour lines on Figure 17 of Appendix 7-7 show the extent of the measurable drawdown in the observation wells.

The relationship of the alluvial ground-water table to wells and springs in and adjacent to the NW1/4 of Section 29 is crucial in understanding the PHC of the proposed mining operation. Figure 18 in Appendix 7-1 indicates that during the pump test on Y-61, water levels actually increased at C2-40 and SS-30 and flow increased at SP-8 after 4 hours of pumping.

SURFACE WATER

Increased discharge, especially runoff from disturbed areas, could alter flow volumes, water quality, and runoff and flood patterns in creeks. Mining in the Alton area is not expected to increase discharge of surface or ground water beyond current levels. Creeks and drainage areas discussed are shown on Figure 19, Appendix 7-1 of the Coal Hollow Mine MRP.

AQUATIC HABITAT

Macroinvertebrates are excellent indicators of stream quality and can be used to evaluate suitability of a stream to support fish and other aquatic life. However, streams in and adjacent to the Coal Hollow Mine flow in response to rainfall and snowmelt. Although there are episodes with high flow volumes, the channels are typically dry for several months out of each year. Amphibians and macroinvertebrates may survive in reaches of Kanab Creek east of the Coal Hollow Mine, but flow in Lower Robinson Creek and Sink Hollow Wash is too inconsistent to support aquatic habitats.

Water withdrawals within the upper Colorado River Basin impact habitats of four endangered fish species in the Colorado River and its tributaries: the Colorado squawfish, razorback sucker, bonytail chub, and humpback chub. Water withdrawals from the Colorado River Basin above Lake Powell are restricted, and water withdrawals in excess of the limit could trigger consultation requirements with the U.S. Fish and Wildlife Service (USFWS). The Coal Hollow Mine and other possible future mines covered by this Alton/Sink Valley CIA do not flow to the Upper Colorado River Basin and are not subject to these restrictions.

V. IDENTIFY RELEVANT STANDARDS AGAINST WHICH PREDICTED IMPACTS CAN BE COMPARED

The UPDES permit for the Coal Hollow mine provides some standards for water quality in the area. Utah water quality standards exist for numerous parameters other than those discussed below, but at this time there is neither evidence to indicate nor reason to believe that those parameters are of concern in the Alton/Sink Valley CIA. However, additional parameters recommended for routine monitoring in UDOGM directive Tech-004 are included in the water-monitoring plans of the Coal Hollow operation.

Flow: There is no standard for flow in the Utah water quality standards. Flow is very sporadic in Lower Sink Valley. The only measured flow in Lower Sink Valley during the pre-mining baseline monitoring period was during the springtime runoff season. Similarly, surface water measurements in Robinson Creek during the baseline period showed only occasional flow.

The UPDES General Permit for Coal Mining contains no limit on flow. Discharge is to be measured monthly, and the duration of intermittent discharge is to be reported along with flow. Characteristics such as stream morphology, vertebrate and invertebrate populations, and water chemistry can be affected by changes in flow and therefore can provide an indirect standard for flow.

R645-301-731.530 and -731.800 require prompt replacement of State-appropriated water that is contaminated, diminished, or interrupted. Baseline hydrologic and geologic information is to be used to determine the impact of mining activities upon ground- and surface-water supplies.

Oil and Grease: There is no State water quality standard for oil and grease, but the limit in the UPDES General Permit for Coal Mining is 10 mg/L. Any observation of visual sheen requires a sample be taken immediately.

A 10 mg/L oil and grease limit does not protect fish and benthic organisms from soluble oils such as those used in longwall hydraulic systems, and UDWR has recommended soluble oils be limited to 1 mg/L (Darrell H. Nish, Acting Director UDWR, letter dated April 17, 1989 to Dianne R. Nielsen, Director UDOGM). Hydraulic longwall systems will not be present in the Coal Hollow Mine.

pH: Allowable pH ranges are 6.5 to 9.0 under State water quality standards for all Classes, and also under the UPDES General Permit for Coal Mining.

Total Dissolved Solids (TDS) concentrations: TDS is commonly used to indicate general water quality with respect to inorganic constituents. Kanab Creek and its

tributaries are categorized as Class 2B, 3A and 4 waterbodies. There is no state water quality standard for TDS for Classes 1, 2, and 3, but 1,200 mg/L is the limit for agricultural use (Class 4).

Total Suspended Solids (TSS) and Settleable Solids: There is no State water quality standard for solids in the water, but an increase in turbidity is limited to 10 NTU for Class 2A, 2B, 3A, and 3B waters. The UPDES General Permit for Coal Mining has the following allowable limits on TSS: 30-day average, 25 mg/L; 7-day average, 35 mg/L; daily maximum, 70 mg/L. TSS is to be determined by a monthly grab sample.

Under the current UPDES General Permit for Coal Mining, all samples collected during storm water discharge events are to be analyzed for settleable solids. Samples collected from increased discharge, overflow, or bypass that is the result of precipitation that does not exceed the 10-year, 24-hour precipitation event may comply with a settleable solids standard of 0.5 ml/L daily maximum rather than the TSS standard, although TSS and the other UPDES parameters are still to be determined. If the increased discharge, overflow, or bypass is the result of precipitation that exceeds the 10-year, 24-hour precipitation event, then neither the TSS nor settleable solids standard applies.

Iron and Manganese: UPDES General Permit for Coal Mining limit on daily maximum for total iron is 1.0 mg/L as determined by a monthly grab sample. State water quality standards (UDWQ 2009) allow a maximum of 1,000 µg/L (1 mg/L) dissolved iron in Class 3A, 3B, 3C, and 3D waters, with no standard for Class 1, 2, and 4 waters.

Monitoring of total manganese is required by SMCRA and the Utah Coal Mining rules, but there is no UPDES or Utah water quality standard for either total or dissolved manganese.

Macroinvertebrates: Macroinvertebrates are excellent indicators of stream quality and can be used to evaluate suitability of a stream to support fish and other aquatic life. However, streams in and adjacent to the Coal Hollow Mine flow in response to rainfall and snowmelt. Although there are episodes with high flow volumes, the channels are typically dry for several months out of each year. Amphibians and macroinvertebrates may survive in reaches of Kanab Creek east of the Coal Hollow Mine, but flow in Lower Robinson Creek and Sink Hollow Wash is too inconsistent to support aquatic habitats.

MATERIAL DAMAGE

Material damage to the hydrologic balance would possibly manifest itself as an economic

loss to the current and potential water users, would result in quantifiable reduction of the capability of an area to support fish and wildlife communities, or would cause other quantifiable adverse change to the hydrologic balance outside the permit area. The basis for determining material damage may differ from site-to-site within the CIA according to specific site conditions. Surface-water and ground-water concerns have been identified for CHIA evaluation.

The direct effect of mining on the hydrology of the area is mainly focused on managing the limited amount of water that is available for present uses. This means that the quantity, quality and distribution of the water must be maintained at minimum present levels. The specific objectives of this CHIA used to evaluate material damage are:

1. Determine any changes in the quality of water that reaches the off-permit stream systems
2. Evaluate the sediment load to the stream system during and after mining and reclamation

Parameters for surface-water quantity and quality

The potential material-damage concerns this CHIA focuses on are changes of surface flow rates and chemical composition that would physically affect the off-permit stream channel systems as they presently function. Based on the data from the area, there is a minimal presence of aquatic habitat in this area. Wildlife habitat most likely to be affected by the proposed Coal Hollow Mine has been determined to be sage grouse. There is livestock grazing and an AVF in Kanab Creek west of the permit area. In accordance with R645.302.323, *“the proposed operations would not materially damage the quantity and quality of water in surface and underground water systems that supply those alluvial valley floors or portions of alluvial valley floors which are outside the permit area of an existing or proposed coal mining and reclamation operation”*.

Therefore, water-quality and quantity criteria are intended to identify changes in the present discharge regime that might be indicators of economic loss to the water users and grazing-right owners, of significant alteration to the channel size or gradient, or of loss of capacity to support existing fish and wildlife communities within the CIA. In order to assess the potential for material-damage to these elements of the hydrologic system, the following indicator parameters were selected for evaluation at each evaluation site: low-flow discharge rate and TDS.

Low-Flow Discharge Rate

In the Wasatch Plateau, Waddell and others (1981) found that correlating three years of low-flow records (September) at stream sites against corresponding records from long-term monitoring sites would allow the development of a relationship that could be used to estimate future low-flow volumes at the stream sites within a standard deviation of approximately 20 %.

Ten years of measurements reduced the standard deviation to 16 - 17 % and 15 years of data reduced it to about 15 %. This relationship indicates that a change in low-flow rates of less than 15 to 20 % probably would not be detectable. A 20 % decrease in the low-flow rate will provide a threshold indicator that decreased flows are persisting and that an evaluation for material damage is needed. However, because flow in many streams is intermittent, material damage due to loss of flow is very unlikely, and the intermittent nature of the flow will also make any such loss almost impossible to detect. Any such apparent change in discharge would need to be correlated against precipitation and a drought index such as the PHDI.

Aside from torrential precipitation events, currently Lower Robinson Creek sees minimal surface water flows in its stream channel. With the advent of surface mining, this area may see an increase in surface water via sheet flow along the surface as mining of the disturbed areas may produce some flows following a southwesterly gradient into Lower Robinson Creek. Monitoring of surface water flow levels at Lower Robinson Creek both at the mine site and downstream sample locations will provide a means to evaluate effects of the surface water flows resulting from disturbed areas on the receiving streams. Additionally, water from disturbed areas will be monitored at the discharge from the sedimentation ponds.

Total Dissolved Solids (TDS)

The concentration of dissolved solids is commonly used to indicate general water quality with respect to inorganic constituents. Wildlife and livestock use is the designated post-mining land use for the CIA, so established dissolved solids tolerance levels for wildlife and livestock have been adopted as the thresholds beyond which material damage may occur. The state standard for TDS for irrigation of crops and stockwatering (Class 4) is 1,200 mg/L. However, baseline conditions in the Coal Hollow permit and adjacent area have shown in both scientific literature from the USGS field investigations and in the baseline surface water data collected, that TDS concentrations can exceed levels over 3,000 mg/L in the stream channels - especially when surface water makes contact with silty, clayey or sandy sediments. As a result, material damage criteria for excessive TDS concentrations that persistently exceed 3,000 mg/L in springs, UPDES discharges, or receiving streams, it will be an indication that evaluation for potential material damage is needed.

Parameters for Ground Water Quantity and Quality

The potential material-damage concerns of this CHIA are intended to limit changes in the quantity and chemical composition of water from ground-water sources to magnitudes that:

- Will not cause economic loss to existing or potential agricultural and livestock enterprises;
- Will not degrade domestic supplies;
- Would not cause structural damage to aquifers; and
- Will maintain adequate capacity for wildlife and the limited aquatic communities that

exist in the area.

To assess the potential for material damage to these elements of the ground-water hydrologic system, the following indicator parameters were selected for evaluation: seasonal flow from springs and TDS concentration in spring and mine-discharge water.

Ground-water concerns will be monitored at numerous springs, wells, and UPDES discharge points. Locations are identified on Drawing 7-10 of the Coal Hollow Mine MRP. If inflow to a mine is significant or persistent, UDOGM can require monitoring of mine inflow.

Seasonal flow from springs

Maintain potentiometric heads that sustain average spring discharge rates, on a seasonal basis, equal or greater than 80 % of the mean seasonal baseline discharge, or in other words baseline minus 20 % probable measurement error. The 20 % measurement error is based on analogy with the accuracy of measuring low-flow surface discharge rates. A 20 % decrease in flows, determined on a seasonal basis, will indicate that decreased flows are probably persisting and that an evaluation for material damage is needed.

TDS concentration

The concentration of total dissolved solids is commonly used to indicate general water quality with respect to inorganic constituents. The quality of water from underground sources reflects the chemical composition of the rocks the water passes through. Ground-water quality may be degraded by intrusion of poorer quality water from wells or mines, by leakage from adjoining formations, or by recharge through disturbed materials. Wildlife and livestock use ground water discharging from seeps and springs, and those are the designated postmining users most likely to be impacted. Baseline conditions in the Coal Hollow permit and adjacent area have shown in both scientific literature from USGS field investigations and in the baseline groundwater data collected that TDS concentrations from the upland areas range from 100-500 mg/L while baseline groundwater TDS concentrations in Sink Valley typically range from 500-3,000 mg/L. There are no state-established groundwater quality standards for TDS. If TDS concentrations persistently exceed 3,000 mg/L it will be an indication that evaluation for material damage is needed.

VI. ESTIMATE PROBABLE FUTURE IMPACTS OF MINING ACTIVITY WITH RESPECT TO THE PARAMETERS IDENTIFIED IN V.

GROUND WATER

Dewatering related to mining has the greatest potential for impacting ground-water resources in the CIA.

Dewatering

Large-scale dewatering of the alluvial groundwater system, such that appreciable compaction of the aquifer skeleton could occur, is not anticipated (Section 724.500). Increased rates of dewatering may in the future result in depletion of ground-water storage in some beds above the coal seams. Upon cessation of mining, evaporation and water discharge, if there has been any, will be discontinued. Ground-water conditions similar to those that existed before mining will probably be established.

Estimates of groundwater inflow rates suggest that large, unmanageable amounts of alluvial groundwater will likely not be encountered; however, special mining protocols found in Appendix 7-9 of the MRP will be used when mining east of well C2 (Pits 13, 14, and 15) in order to minimize the potential for interception of large groundwater inflows.

When the pits are backfilled, it is likely that the average hydraulic conductivity of the placed run-of-mine backfill material will be low because of the pervasiveness of low-permeability, clay-rich materials in the overburden and the anisotropic nature of the placed fill material. Consequently, the potential for the migration of appreciable quantities of groundwater through the fill is considered low. In addition, to minimize the potential for long-term impacts to the alluvial groundwater system that could occur from long-term draining of alluvial groundwater into the pit backfill area, a low-permeability barrier may be emplaced adjacent to the undisturbed alluvial sediments.

SURFACE WATER

Changes in flow volume and total dissolved sediments in water quality have the greatest potential for impacting water resources in the CIA. Sites that were used for baseline monitoring of the Coal Hollow Mine are on Drawing 7-2 of the MRP. Sites to be monitored during mine operation are on Drawing 7-10.

Water Quality

Uncontrolled runoff from the disturbed lands and spoil pile could increase sediment

concentrations and alter the distribution and concentration of dissolved solids in the receiving streams. Sediment control measures such as sedimentation ponds are to be used to protect receiving streams from impacts from the mine's disturbed areas.

Kanab Creek, Lower Robinson Creek, and Sink Valley Wash are monitored above and below the proposed Coal Hollow Mine, and monitoring will continue through mining and reclamation. Discharges from sedimentation ponds will be monitored under the Coal Hollow Mine's UPDES permit. There is no plan to discharge water directly from the Coal Hollow Mine, but should the need arise, ACD has made a commitment to obtain a UPDES permit (MRP Section 724.200).

Based on analyses for the acid- and toxic-forming potential of the overburden and Smirl Coal Seam at the Coal Hollow Mine permit area (Appendices 6-1 and 6-2)x 6-2), it is apparent that acid-forming and toxic-forming materials that could result in the contamination of surface-water or groundwater supplies in the Coal Hollow Mine permit and adjacent area are generally not present. Both groundwaters and earth materials are moderately alkaline.

CIA Sediment Control

Four sedimentation ponds and associated diversion ditches will be the primary sediment control method at the Coal Hollow Mine. Miscellaneous controls such as silt fence, straw bales, and berms are also proposed during construction and for specific areas, such as where impoundments or diversions are not suitable to the surrounding terrain.

Water Quantity

Discharges from sedimentation ponds will be monitored under Coal Hollow Mine's UPDES permit. There is no plan to discharge water directly from the mine, but should the need arise, ACD has made a commitment to obtain a UPDES permit (MRP Section 724.200).

Estimates of groundwater inflow rates suggest that large, unmanageable amounts of alluvial groundwater will likely not be encountered; however, special mining protocols found in Appendix 7-20 of the MRP will be used when mining adjacent to alluvial sediments in order to minimize the potential for interception of large groundwater inflows.

When the pits are backfilled, it is likely that the average hydraulic conductivity of the placed run-of-mine backfill material will be low because of the pervasiveness of low-permeability, clay-rich materials in the mine overburden and the anisotropic nature of the placed fill material. Consequently, the potential for the migration of appreciable quantities of groundwater through the fill is considered low.

The clays, claystones, silts, siltstones, and shales that dominate the overburden have low hydraulic conductivity and consequently groundwater seepage through backfill in reclaimed mine pits and excess spoils storage areas will not be large.

VII. ASSESS PROBABLE MATERIAL DAMAGE

FIVE-YEAR PERMIT TERM

Coal Hollow Mine

Planned operational monitoring will document any measurable changes in the surface- and ground-water systems. Surface disturbances and UPDES permitted discharges are not expected to degrade surface- or ground-water quality. There is no AVF in the Coal Hollow Mine permit area or adjacent area to be impacted. Sediment control measures should continue to effectively prevent diminution of water quality in the receiving drainages.

The operations plan for the Coal Hollow Mine indicates that the operator should be able to control water inflow.

BLM LBA area

The Division will need to do further evaluation of areas along Kanab Creek for the presence of AVFs and potential impacts from mining before a mining permit can be issued for the future LBA area. The Division will also update the CHIA based on the findings of that determination.

FUTURE MINING

If it is demonstrated that mining has caused or will cause a diminution, contamination, or interruption of an appropriated water right or a material impact either within or outside of the permit area, ACD will be required by the Division to address means of minimizing the impact and replacing any appropriated water rights. Evaluation of Coal Hollow Mine PHC and the preparation of this CHIA do not indicate that there is any evidence that such impacts will result from the proposed mining in the Alton/Sink Valley CIA, and as a consequence, there is no reason to require operators to propose alternatives for disposing of the displaced water or other possible actions as part of the PAP.

Increased rates of dewatering may in the future result in depletion of ground-water storage in some beds above the coal seams. Upon cessation of mining, mine water discharge, if there has been any, will be discontinued. Ground-water conditions similar to those that existed before mining will probably be established as the mine workings flood.

Drainage from surface disturbance due to coal mining and reclamation operations will be managed through appropriate sediment controls. Excess spoil areas will be adequately covered with topsoil and all disturbed areas will be stabilized and revegetated to prevent surface water contamination.

VIII. STATEMENT OF FINDINGS

Based on the information presented in this CHIA, the Utah Division of Oil, Gas and Mining finds that the proposed coal mining and reclamation operations in of the Coal Hollow Mine have been designed to prevent material damage to the hydrologic balance outside the permit area. The Division has found no probability of material damage to the hydrologic balance from all anticipated mining operations in the CIA.

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VIII. REFERENCES

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Water Encyclopedia URL: <http://www.waterencyclopedia.com/>

ABBREVIATIONS

AML	Abandoned Mine Lands
AVF	Alluvial Valley Floor
BLM	Bureau of Land Management
CIA	Cumulative Impact Area
CHIA	Cumulative Hydrologic Impact Area
CVSSD	Castle Valley Special Service District
DWR	Utah Division of Wildlife Resources
EA	Environmental Assessment
NEWUSSD	North Kane Water Users Special Service District
MRP	Mining and Reclamation Plan
MSHA	Mine Safety and Health Administration
PAP	Permit Application Package
PHC	Probable Hydrologic Consequences
PHDI	Palmer Hydrologic Drought Index
SMCRA	Surface Mining Control and Reclamation Act of 1977
UDOGM	Utah Division of Oil, Gas and Mining
UDWR	Utah Division of Water Resources
UDWQ	Utah Division of Water Quality
UPDES	Utah Pollution Discharge Elimination System
UP&L	Utah Power and Light
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

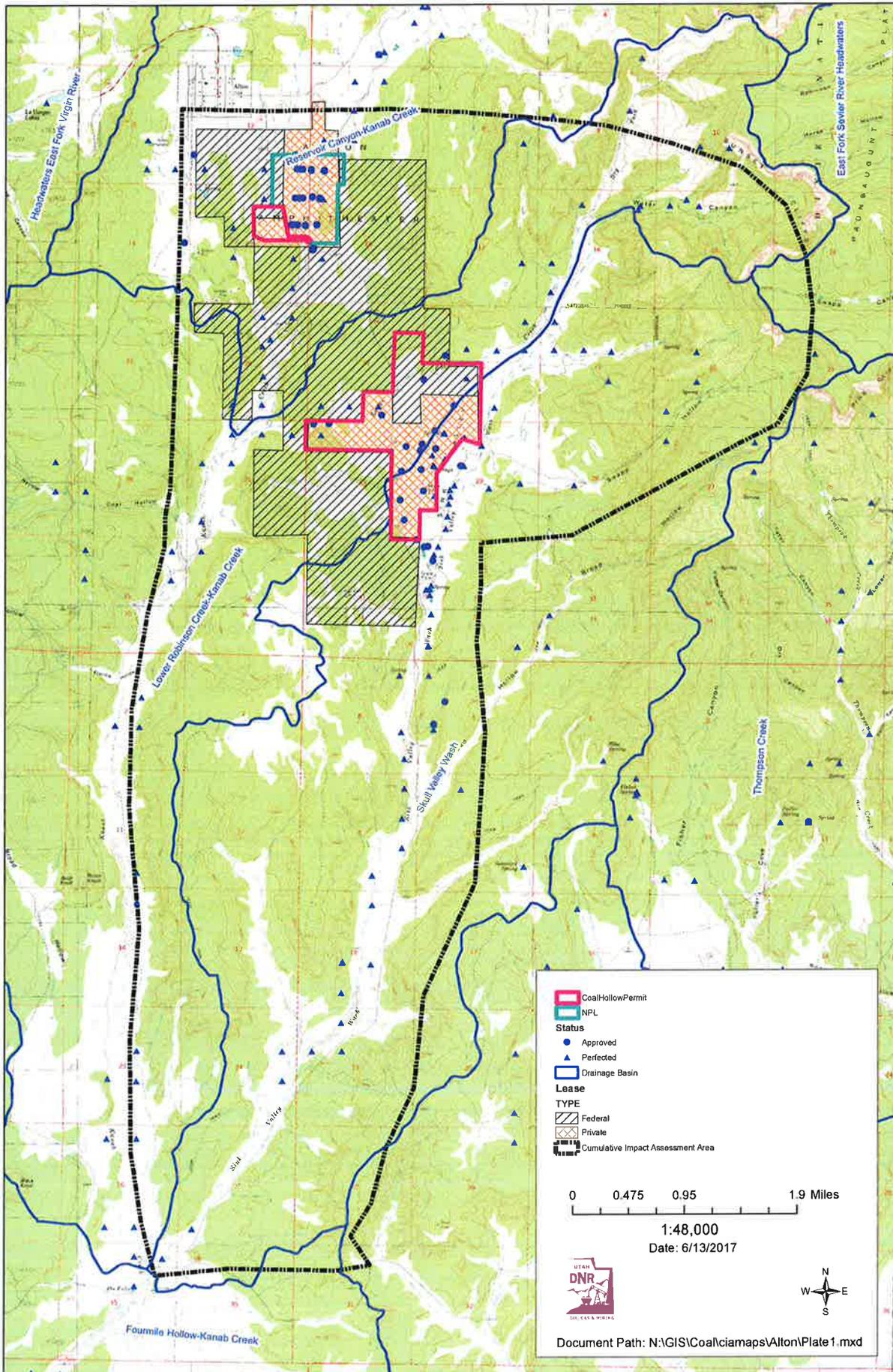
APPENDIX A

PLATES

- Plate 1** CIA Boundary and Coal Hollow Permit Area with Federal Leases
- Plate 2** Infrared Aerial Photography Map
- Plate 3** Aerial Photography Map

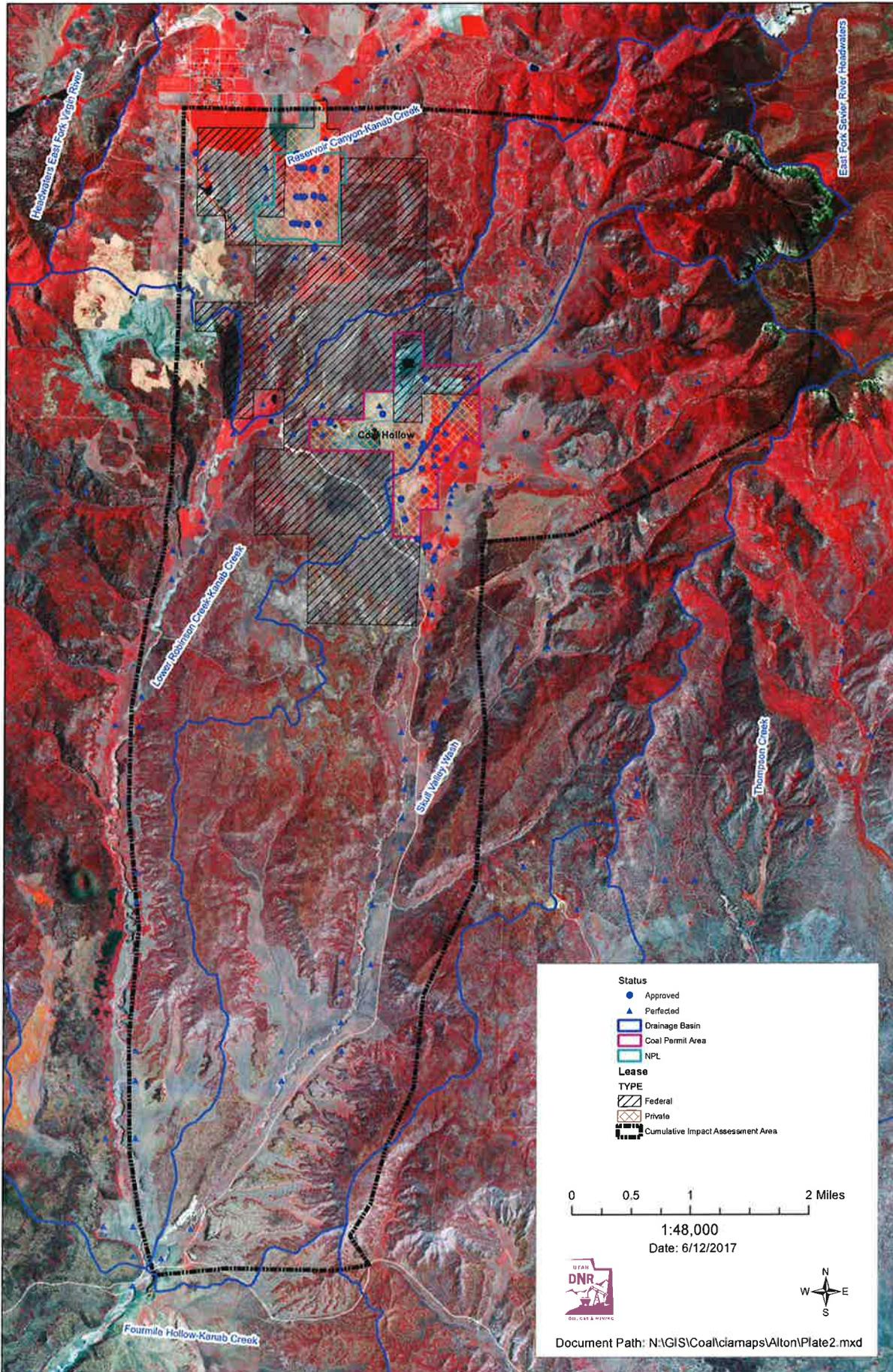
Alton Coal Hollow Permit Area

Plate 1 CIA Boundary and Coal Hollow Permit Area with Federal Leases



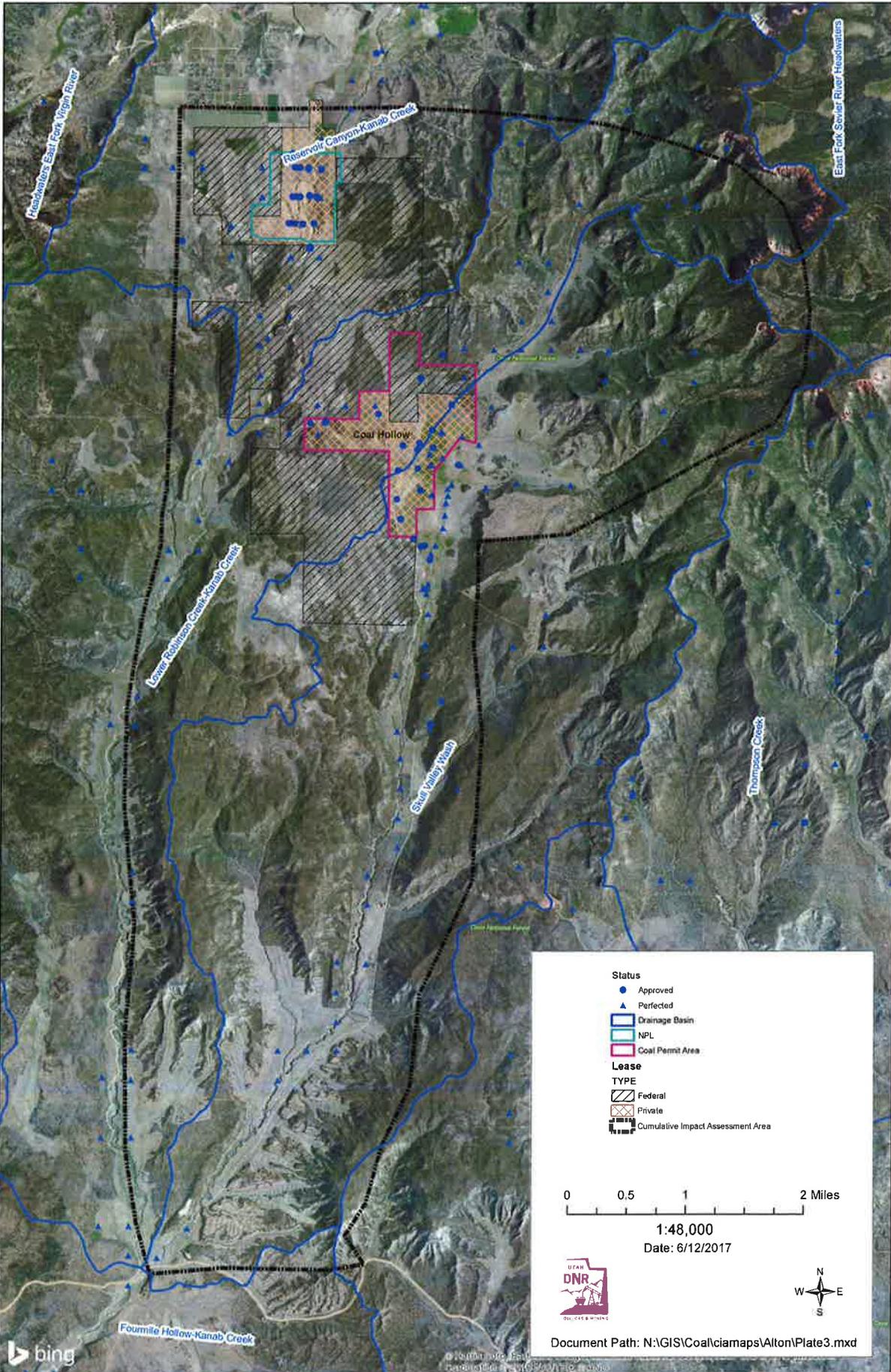
Alton Coal Hollow Permit Area

Plate 2 CIA Boundary and Coal Hollow Permit Area Infrared Photography Map



Alton Coal Hollow Permit Area

Plate 3 Coal Hollow CIA Boundary Aerial Photography Map



SEP 09 2015

Affidavit of Publication

STATE OF UTAH)
) (SS.
COUNTY OF KANE)

I, Dennis A. Brunner, being duly sworn, depose and say that I am General Manager/Publisher of the SOUTHERN UTAH NEWS, a weekly newspaper of general circulation published every Wednesday at Kanab, Utah, for Kane County, Utah and Coconino County, Arizona, and a designated agent of the Utah Press Association and the notice attached hereto,

was published in said newspaper for:

FOUR

consecutive weeks, the first publication on:

07/30/2015

and the last on:

08/13/2015

that said notice was published in the regular and entire issue of every number of the paper during the period and times of publication, and

that the same was published in the newspaper proper and not in a supplement and that said notice was published on www.utahlegals.com on the same day as the first newspaper publication and the notice remained on www.utahlegals.com for one week after the final publication date.

Subscribed and sworn to before me

Notary Public

Residing in Kanab, Utah.

My commission expires:

8-21-16



Legs

Alton Coal Development, LLC has filed a complete application with the Utah Department of Natural Resources, Division of Oil, Gas & Mining for revision of the Mining and Reclamation Plan, Coal Hollow Mine, C025/0005, Alton Coal Development, LLC operates the Coal Hollow Mine, which is located on private land near the town of Alton, Utah. The revision will add approximately 295.633 acres of new private coal leases to the Coal Hollow Mine permit area.

Surface mining (traditional and highwall) will take place in coal reserves leased by Alton Coal Development, LLC. A legal description of the proposed areas for additional mining and reclamation activities are described as follows:

The following described lands located in Kane County, Utah within Sec. 12 & 13, T39S, R6W and within Sec. 7 & 18, T39S, R5W:

Beginning at S 59° 16' 29" W a distance of 1,920.87' from Section Corner 7-18-12-13, T39S, R5 W6W, thence N 89° 29' 27" W a distance of 823.81'; thence S 00° 00' 38" E a distance of 1313.93'; thence S 65° 46' 52" E a distance of 479.40'; thence S 89° 44' 30" E a distance of 1861.86'; thence S 54° 58' 33" E a distance of 226.53'; thence S 89° 45' 07" E a distance of 1235.50'; thence N 00° 41' 09" E a distance of 1322.97'; thence N 00° 41' 09" E a distance of 1922.97'; thence S 89° 30' 20" E a distance of 241.42'; thence N 00° 51' 49" E a distance of 1323.52'; thence N 89° 22' 39" W a distance of 249.30'; thence N 89° 56' 02" W a distance of 12923.34'; thence S 00° 24' 59" W a distance of 2326.09'; which is the point of beginning, having an area of

12,877.780.47 square feet, or 295.633 acres

County Road 136 currently intersects the Coal Hollow Mine North Private Lease Area. Approximately 0.6 miles of this road will be temporarily relocated to allow for mining operations. This relocated section begins approximately 0.8 miles south of the Town of Alton and will reconnect with the original road approximately 1.4 miles south of the Town. This relocation will occur in year one of the mining operation and is expected to be reestablished to approximate original location in a time frame ranging from year three to year five of the mining operation. The proposed relocation of the County road is within the North East Quarter, Section 13, Township 39 South, Range 6 West, SLB8M, Kane County, Utah.

The address of the applicant is: Alton Coal Development, LLC 463 North 100 West, Suite 1 Cedar City, Utah 84720

After filing, copies of this permit revision will be available for inspection at the Kane County Court House, and at the Utah Division of Oil, Gas & Mining website under Coal Permit files.

Written comments or requests regarding this permit revision must be made within thirty (30) days of the last publication of this notice, and may be addressed to the Utah Division of Oil, Gas & Mining, 1564 West North Temple, Suite 1210, Salt Lake City, Utah 84114-5801.

Published in the *Southern Utah News* on July 23, 30, August 6 and 13, 2015.

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GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

June 21, 2017

To: Internal File

From: Daron R. Haddock, Coal Program Manager 

Subject: 510 (c) Recommendation for Alton Coal Development, LLC, Coal Hollow Mine, C/025/0005, Task ID #5369

As of writing of this memo, there are no NOV's or CO's which are not corrected or in the process of being corrected for the Coal Hollow Mine. There are no finalized civil penalties, which are outstanding and overdue in the name of Alton Coal Development, LLC. Alton Coal Development, LLC does not have a demonstrated pattern of willful violations, nor have they been subject to any bond forfeitures for any operation in the state of Utah.

Attached is a recommendation from the OSM Applicant Violator System for the Coal Hollow Mine that states there are no outstanding violations.

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U.S. Department of the Interior Office of Surface Mining
Applicant/Violator System

suzanne.steab (WT) | [Logout](#)

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[HOME](#) > ENTITY EVALUATE

Evaluation on Permit Number: C0250005 SEQ:3

0 Violations

[Print Report](#)

Permit Evaluation

Permit Number	C0250005 SEQ:3
Permitee Name	247248 Alton Coal Development LLC
Date of Request	6/21/2017 10:06:56 AM
Requestor	suzanne.steab

CAUTION: The Applicant/Violator System (AVS) is an informational database. Permit eligibility determinations are made by the regulatory authority with jurisdiction over the permit application not by the AVS. Results which display outstanding violations may not include critical information about settlements or other conditions that affect permit eligibility. Consult the AVS Office at 800-643-9748 for verification of information prior to making decisions on these results.

There were no violations retrieved by the system

Evaluation OFT

Entities: 8

- 250908 Sleepy Hollow Mineral Investors LLC - ()
- 064574 Thomas T Ungurean - (Manager)
- 107810 Charles C Ungurean - (Manager)
- 250907 SH Coal Investment LLC - (Subsidiary Company)
- 064574 Thomas T Ungurean - (Corporate Officer)
- 107810 Charles C Ungurean - (Corporate Officer)
- 247248 Alton Coal Development LLC - (Subsidiary Company)
- 036531 Robert C Nead Jr - (Manager)
- 247290 James J Wayland - (Manager)
- 251418 Larry W. Johnson - (Manager)

Narrative

Request Narrative



GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Julie Fisher
Executive Director
Department of
Heritage & Arts



Brad Westwood
Director

C/025/005 Incoming

CC: Lisa

#5369

May 16, 2017

Daron R. Haddock
Coal Program Manager
Division of Oil, Gas and Mining
P.O. Box 145801
Salt Lake City, Utah 84114-5801

RE: North Private Lease Area of the Coal Hollow Mine C/025/0005, Kane County, Utah
U-16-HO-0136

For future correspondence, please reference Case No. 17-0846

Dear Mr. Haddock:

The Utah State Historic Preservation Office concurs that no further testing is necessary, given the initial results.

If you have questions, please contact me at 801-245-7263 or cmerritt@utah.gov.

Sincerely,

Chris Merritt, Ph.D.

Deputy State Historic Preservation Officer
Archaeology



United States Department of Agriculture

C/O 25/005 Incoming ✓

#5369

March 21, 2017

Regarding: North Private Lease Prime Farmland Reclamation

Priscilla Burton, MS, CPSSc
Environmental Scientist III
Utah Division of Oil, Gas & Mining
Price Field Office
319 North Carbonville Road #C
Price, Utah 84501-2351

Dear Ms. Burton,

This is in response to your request for review of the reclamation plan for areas of Prime Farmland in the North Private Lease Expansion. The documents provided to our office on March 9, 2017 were reviewed. The NRCS concurs with the Prime Farmland soils handling and reclamation plan as described in Chapter 9 of the permit application. This concurrence meets the requirements of the Utah Administrative Code: R645-302-317 - Prime Farmland Performance Standards.

Michael Domeier
State Soil Scientist
Utah NRCS