

# EarthFax Engineering Group, LLC

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**EarthFax**

June 28, 2016

Mr. Daron Haddock  
Coal Program Manager  
Utah Division of Oil, Gas and Mining  
1594 West North Temple  
Suite 1210  
Salt Lake City, UT 84114-5801

Subject: BRC Wellington, Bowie Waste Rock Site, C/015/0035  
Coal Recovery Permit Application Revisions

Dear Daron:

Yesterday, I submitted electronic revisions via email to the *"Permit Application for Coal Recovery from the Existing Deer Creek Waste Rock Pile."* These revisions were submitted on behalf of BRC Wellington, LLC which was originally submitted to your agency in August 2015. The revisions were made to address deficiencies noted in your correspondence to Kyle Edwards of BRCW on May 26, 2016. This submittal included a copy of the signed C1 Form as well as a copy of the C2 Form as well as revisions to text, appendices, and maps as needed.

Please feel free to contact me (801-561-1555) or Kyle Edwards (435-613-1631) if you have any questions regarding this submittal. Thank you for your assistance in approving this application.

Sincerely,

Richard B. White, P.E.  
President  
EarthFax Engineering Group, LLC

Enclosure

cc: Kyle Edwards (BRC Wellington)  
Justin Thompson (Bowie Refined Coal)

**APPLICATION FOR COAL PERMIT PROCESSING**

C/015/0035  
Received 6/27/2016  
Task ID #4966

Permit Change  New Permit  Renewal  Exploration  Bond Release

**Permittee:** BRC Wellington, LLC

**Mine:** Wellington Dry Coal Cleaning Facility

**Permit Number:** C/015/0035

**Title:** Coal recovery from the existing Deer Creek waste rock pile (now known as the Bowie Waste Rock Site)

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

Revised permit application to recover coal from the existing Deer Creek waste rock pile

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

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

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

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

Steve M. Rickmeier  
Print Name

Carolyn Burton  
Sign Name, Position, Date

Subscribed and sworn to before me this 24<sup>th</sup> day of June, 2016

Carolyn Burton  
Notary Public

My commission Expires: Dec. 6, 2019  
Attest: State of Kentucky } ss:  
County of Jefferson



|                             |                                  |  |
|-----------------------------|----------------------------------|--|
| <b>For Office Use Only:</b> | <b>Assigned Tracking Number:</b> | <b>Received by Oil, Gas &amp; Mining</b> |
|-----------------------------|----------------------------------|--|



## **CHAPTER 1**

### **LEGAL, FINANCIAL, COMPLIANCE, AND RELATED INFORMATION**

#### **1.10 Minimum Requirements**

##### **1.1.1 Introduction**

This chapter provides information regarding ownership and control of the permit area. The compliance status of the operator at other locations is also provided herein. The waste rock pile covered by this application was first permitted for use on September 13, 1988 by the Utah Division of Oil, Gas and Mining (the “Division”). The original permit was issued to Utah Power and Light Company for disposal of waste rock generated at their Deer Creek Mine. The Deer Creek waste rock site (the “Deer Creek site” or the “site”) has since been purchased by Bowie Refined Coal LLC (“BRC”) for recovery of available coal. The site is located in Sections 5 and 6, Township 17 South, Range 8 East, SLBM, immediately north of State Route 31 approximately 6 miles northwest of Huntington, Utah.

This document has been arranged in the format of the R645-301 regulations. For example, Section 1.10 corresponds to R645-301-110, Section 1.1.1 corresponds to R645-301-111, Section 1.1.2.2 corresponds to R645-301-112.200, etc.

##### **1.1.2 Identification of Interests**

BRC Wellington LLC (hereafter referred to as “BRCW”) is a subsidiary of DB RC Investments II LLC and an affiliate of Bowie Refined Coal LLC and various subsidiaries of Deutsche Bank, as indicated in Figure 1-1. BRCW is the owner of a dry coal cleaning facility located in Carbon County, Utah. Bowie Refined Coal, LLC (“BRC”) is the operator of the facility. Furthermore, BRC is the owner and/or managing member of DB RC Investments I, LLC and DB

RC Investments II, LLC. The Deutsche Bank affiliates shown on Figure 1-1 (DB AG Cayman Islands Branch and DBAH Capital) are equity investors only with respect to the BRC companies.

### **1.1.2.1 Business Entity**

BRCW and BRC are both limited liability companies. The affiliated Deutsche Bank subsidiaries are also limited liability companies.

### **1.1.2.2 Applicant and Operator**

The applicant and operator for this permit application are:

APPLICANT: BRC Wellington, LLC  
6100 Dutchmans Lane, Suite 900  
Louisville, KY 40205  
Facility Phone: (435) 613-1631  
Headquarters Office Phone: (502)584-6022

Payment of abandoned mine land reclamation fees, if any, will be the responsibility of the managing member of BRCW. Inquiries regarding the payment of this fee should be directed to this individual at the mailing address and phone number indicated above. The person currently occupying this position is indicated in Section 1.1.2.3.

OPERATOR: Bowie Refined Coal, LLC  
6100 Dutchmans Lane, Suite 900  
Louisville, KY 40205  
Facility Phone: (435) 613-1631  
Headquarters Office Phone: (502)584-6022

### 1.1.2.3 Officers and Directors

The directors and officers DB RC Investments I LLC (FEIN 46-1601691), DB RC Investments II LLC (FEIN 46-1613542), and BRCW (FEIN 36-4743889) are:

| <u>Name</u>                 | <u>Title</u>            | <u>Date position was assumed</u> |
|-----------------------------|-------------------------|----------------------------------|
| Steve Rickmeier (90% owner) | Managing Member         | 09/20/2012                       |
| James F. Wolff (10% owner)  | Chief Financial Officer | 09/20/2012                       |

The addresses and phone numbers for the officers and directors of DB RC Investments I, LLC, DB RC Investments II, LLC, and BRC are the same as the applicant.

Written correspondence to BRCW or BRC regarding the operations should be addressed to:

Kyle Edwards, Resident Agent  
BRC Wellington LLC  
1865 West Ridge Road  
Wellington, UT 84542  
(435)613-1631

The directors and officers of BRC (FEIN 46-0911657) are:

| <u>Name</u>                 | <u>Title</u>            | <u>Date position was assumed</u> |
|-----------------------------|-------------------------|----------------------------------|
| Steve Rickmeier (90% owner) | Managing Member         | 09/20/2012                       |
| James F. Wolff (10% owner)  | Chief Financial Officer | 09/20/2012                       |

Mr. Rickmeier's ownership of BRC is divided between Rickmeier Advisors, Inc. (FEIN 36-4483193, owning 45% of BRC) and Rickmeier Partners LP (FEIN 35-2202674, owning 45% of BRC). Mr. Wolff's ownership of BRC is held by Wolff Consulting LLC, which is registered under his confidential social security number. These individuals hold the same positions and the same ownership percentages in each of the following companies:

Bowie Refined Management LLC  
BRC Chinook LLC  
BRC Pinnacle LLC  
BRC Rockcrusher LLC  
BRC Greenfuels LLC  
BRC Alabama No. 3 LLC  
BRC Alabama No. 4 LLC  
BRC Alabama No. 5 LLC  
BRC Alabama No. 7 LLC

These individuals also have partial ownership, through BRC, in DB RC Investments II, LLC, which then owns 100% of BRC Minuteman LLC and BRC Wellington LLC. The organizational structure of BRC is outlined in Figure 1-1.

#### 1.1.2.4 Coal Mining and Reclamation Operation Permit Applications

The following list represents all permits issued to BRC, along with applicable identification numbers of applications or permits:

| <u>Permit</u>  | <u>Issuing Authority</u>  | <u>Status</u>   |
|--|---|-----------------|
| UPDES Permit (No. UTR000685)                         | Utah Dept. Environmental Quality, Division of Water Quality                         | Approved        |
| Approval Order (DAQE# AN2952001-03)                  | Utah Dept. Environmental Quality, Division of Air Quality                           | Approved        |
| <u>DAQ NOI Approval (Deer Creek waste rock site)</u> | <u>Utah Dept. Environmental Quality, Division of Air Quality (see Appendix 4-4)</u> | <u>Approved</u> |
| Certificate of Insurance and Business Authorization  | Utah Industrial Development Commission  | Approved        |
| Mining and Reclamation Permit (C0070045)             | Utah Department of Natural Resources, Division of Oil, Gas and Mining               | Approved        |

These permits are related to operations conducted by BRC at the Wellington Dry-Coal Cleaning Facility in Wellington, Utah.

Permits held by subsidiary and/or affiliated companies of BRC are indicated in Table 1-1. In addition to the permit that BRC is seeking from the Utah Division of Oil, Gas and Mining for

operations at the Deer Creek site, BRC will also be obtaining a permit from the Utah Division of Air Quality. The sedimentation pond at the Deer Creek site is designed as a total-containment facility (see Section 7.4.2.2 of this application). Therefore, BRC will not be seeking a discharge permit from the Utah Division of Water Quality for operations at the site.

#### **1.1.2.5 Legal or Equitable Owner of the Surface and Mineral Properties to be Mined**

BRCW is the legal and equitable owner of the entire 49.05-acre surface parcel included within the permit area (see Appendix 1-1). BRCW's right to enter the property and conduct operations thereon is not the subject of current litigation. There will be no mining at this facility (only recovery of coal from an existing waste rock pile). Thus, the mineral properties will not be affected by the operation. A property ownership map of the permit and adjacent areas is presented as Plate 5-2. No area within the lands to be affected by the facility is under a real estate contract.

#### **1.1.2.6 Owners of Record of Property Contiguous to Proposed Permit Area**

The following owners of surface lands are contiguous to the permit boundary:

Utah Power and Light Company  
1407 West North Temple  
Salt Lake City, Utah 84116

U.S. Department of the Interior  
Bureau of Land Management  
900 North 700 East  
Price, Utah 84501

State of Utah  
Utah Division of Forestry, Fire and State Lands  
319 North Carbondale Road, Suite D  
Price, Utah 84501

The locations of these lands relative to the permit area are shown on Plate 5-2.

#### **1.1.2.7 MSHA Numbers**

The MSHA number for the operation is: 4202398

#### **1.1.2.8 Interest in Contiguous Lands**

The applicant neither owns nor controls, directly or indirectly, a legal equitable interest in any lands contiguous to the permit area.

#### **1.1.3 Violation Information**

Neither BRCW nor any major stockholder of BRCW having any interest, either legal or equitable, in the Deer Creek site have had a State or Federal mining permit suspended or revoked in the five years preceding the date of submission of this application, or have forfeited a performance bond or similar security deposited in lieu of bond revoked. A summary of Notices of Non-compliance associated with mining, air, or water permits issued to BRCW or related entities during the three year period preceding the submission of this application is provided in Table 1-2.

#### **1.1.4 Right-of-Entry Information**

The Deer Creek site is located on lands that are entirely owned by BRCW (see Appendix 1-1). Hence, no other right of entry is required.

### **1.1.5 Status of Unsuitability Claims**

The permit area is not located within an area that has been designated as unsuitable for mining and reclamation operations, nor is it within an area under study for designation in an administrative proceeding under R645-103-300, R645-103-400, or 30 CFR Part 769.

### **1.1.6 Permit Term**

Operations for recovery of coal from the Deer Creek site will begin as soon as required permits are issued for these operations. Termination of operations will be determined by economic and working conditions. The timing of this termination is, therefore, unknown. It is anticipated that the Applicant will operate at the site for a period of less than 5 years. The anticipated total acreage to be affected during operations is less than the 49.05-acre surface parcel included within the permit area.

### **1.1.7 Insurance and Proof of Publication**

A certificate of Insurance issued to BRC is provided in Appendix 1-2. The following announcement was published in the Emery County Progress, a newspaper of general circulation in the Huntington area, from October 6 through October 27, 2015 following notification that the Division had determined that this permit application was complete. Proof of publication of this announcement is provided in Appendix 1-3.

#### **NOTICE OF PERMIT APPLICATION** **BRC WELLINGTON LLC**

Notice is hereby given that BRC Wellington LLC, 6100 Dutchmans Lane, Suite 900, Louisville, Kentucky 40205 has submitted an application to the Utah Division of Oil, Gas and Mining (the "Division") to recover coal from the Deer Creek waste rock site located approximately 6 miles northwest of Huntington, Utah. The permit area for this facility is located in Sections 5 and 6, Township 18 S., Range 8 E., SLBM and contains approximately 49.05 acres.

The Division has determined that this application is administratively complete. A copy of the permit application is available for public inspection at the following locations:

Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, UT 84114-5801

Written comments, objections, or a request for an informal conference regarding the above application should be directed to the Division at the above address within the next 30 days.

### **1.1.8 Filing Fee**

The permit filing fee was paid upon submittal of the application.

## **1.20 Permit Application Format and Contents**

The permit application contains clear, concise, current information, in the format of the DOGM regulations.

## **1.30 Reporting of Technical Data**

All technical data submitted in the permit application is accompanied by the names of persons or organizations that collected and analyzed the data. The technical data also contains the dates of collection and analysis of the data, and descriptions of the method used to collect and analyze data, as indicated in subsequent sections of this application. Professionals qualified in the subject planned or directed the technical analyses. These professionals included the following:

- Richard B. White, P.E. – President/Civil and Environmental Engineer, EarthFax Engineering Group, LLC (engineering, soils, hydrology, bonding, alluvial valley floors)
- Patrick Collins, Ph.D. - President, Mt. Nebo Scientific, Inc. (vegetation)
- Val Payne - Wildlife Biologist, Utah Power and Light Company (wildlife)

#### **1.40 Maps and Plans**

The maps submitted in this permit application comply with the format required by the regulations. The permit area was developed prior to the initial submittal of this permit application in February 2015.

The permit area boundary shown on the maps submitted in this permit application is an approximate representation of that boundary. A more complete description of that boundary is provided in Appendix 1-1 as follows:

Beginning at the Northwest corner of Section 6, Township 17 South, Range 8 East, SLB&M, and running thence S 89°52'00" W, 1272.00 feet along Section line; thence S 72°54'35" E, 314.08 feet; thence S 63°06'41" E, 224.51 feet; thence S 48°18'17" E, 268.40 feet; thence S 20°06'29" W, 1066.85 feet; thence S 39°24'03" W, 846.37 feet, more or less to the Northerly right-of-way of SR-31; thence N 89°39'06" E, 139.42 feet along said right-of-way; thence N 43°39'42" E, 1520.19 feet; thence N 31°02'18" E, 412.96 feet; thence N 22°58'45" E, 1322.55 feet to the North line of Section 5, Township 17 South, Range 8 East, SLB&M; thence N 89°44'10" W, 744.58 feet along Section line to the point of beginning.

#### **1.50 Completeness**

The Applicant believes the information in this application to be complete and correct.

**TABLE 1-1**

Related-Entity Permits

| Entity and State                                       | Permit   | Issuing Authority                         | Status |
|--|--|---|--------|
| BRC Alabama No. 7, LLC<br>(Alabama)<br>FEIN 32-0392802 | Operator on Mine Permits P3247 (MSHA ID 01-03364 issued 5/24/2007), P3256 (MSHA ID 01-03365 issued 5/24/2007), P3257 (MSHA ID 01-03278 issued 5/1/2006), and P3260 (MSHA ID 01-03362 issued 4/20/2007) | Alabama Surface Mining Commission         | Issued |
| BRC Chinook, LLC (Indiana)<br>FEIN 37-1703437          | Permittee on Mine Permit P-00004 (MSHA ID 12-02397 issued 3/23/2007)   | Indiana Dept of Natural Resources         | Issued |
| BRC Chinook, LLC (Indiana)<br>FEIN 37-1703437          | NPDES Permit No. ING040176 (MSHA ID 12-02397 issued 3/23/2007)   | Indiana Dept of Environmental Management  | Issued |
| BRC Chinook, LLC (Indiana)<br>FEIN 37-01703437         | SSOA 167-27370-00055 [Air Permit] (MSHA ID 12-02397 issued 3/23/2007)  | Indiana Dept of Environmental Management  | Issued |
| Minuteman (Kentucky)<br>FEIN 36-4743728                | Permittee on Mine Permit 889-8005 (MSHA ID 15-19205 issued 3/21/2008)  | Kentucky Division of Mine Permits         | Issued |
| Minuteman (Kentucky)<br>FEIN 36-4743728                | KPDES Permit No. 0107158 (MSHA ID 15-19205 issued 3/21/2008)   | Kentucky Division of Water                | Issued |
| Minuteman (Kentucky)<br>FEIN 36-4743728                | Air Permits S-07-145 (MSHA ID 15-19205 issued 3/21/2008) and S-08-039 (MSHA ID 15-19071 issued 12/6/2007)  | Kentucky Division of Air Quality          | Issued |
| Minuteman (Kentucky)<br>FEIN 36-4743728                | UIC Permit KYV0047 (MSHA ID 15-19205 issued 3/21/2008)   | USEPA Region 4                            | Issued |
| Minuteman (Kentucky)<br>FEIN 36-4743728                | UIC Permit KYV0053 (MSHA ID 15-19205 issued 3/21/2008)   | USEPA Region 4                            | Issued |
| BRC Pinnacle, LLC (West Virginia)<br>FEIN 61-1696678   | Operator on Mine Permit No. 0402292 (MSHA ID 46-09146 issued 2/18/2008)  | WV Dept of Env. Protection                | Issued |
| BRC Pinnacle, LLC (West Virginia)<br>FEIN 61-1696678   | Air Permit G10-C104 (MSHA ID 09146 issued 2/18/2008)   | WV Department of Environmental Protection | Issued |
| BRC Alabama No. 5, LLC<br>(Alabama)<br>FEIN 61-1696887 | Operator on Mine Permit P3199 (MSHA ID 01-00563 issued 7/1/2008)   | Alabama Surface Mining Commission         | Issued |
| BRC Wellington (Utah)<br>FEIN 36-4743889)              | Permittee on Mine Permit C/007/0045 (MSHA ID 42-02398 issued 2/10/2005)  | Utah Division of Oil, Gas and Mining      | Issued |
| BRC Wellington (Utah)<br>FEIN 36-4743889)              | Approval Order DAQE# AN2952001-03  | Utah Division of Air Quality              | Issued |
| BRC Wellington (Utah)<br>FEIN 36-4743889)              | UPDES Permit No. UTR000685   | Utah Division of Water Quality            | Issued |

**TABLE 1-2**

Affiliated Notices of Violation

| <b>Entity</b>           | <b>Location</b>   | <b>Permit Number</b> | <b>Description of Violation</b>  | <b>Current Status</b>   | <b>Actions to Abate</b>  |
|-------------------------|---|----------------------|--|---|--|
| BRC Chinook, LLC        | 3589 North Country Road<br>500 West Brazil, IN<br>47834 | P-00004              | Non Compliance N40818-P-004<br><br>Submit Rec Plan & equipment necessary to backfill/grade prior to fall seeding deadlines.  | Ongoing reclamation work being performed.                                     | Submitted reclamation plan and have equipment on site backfilling and grading as of 10/22/2014   |
| BRC Alabama No. 3, LLC  | 3318 Highway 3041<br>Corbin, KY<br>40702                | 861-8015             | Non Compliance 23-2827<br><br>Failed to submit water monitoring reports for Q4 2013. Non Correctable as deadline has passed.   | Water monitoring reports are being prepared and submitted in a timely manner. | Submitted Notification that required sampling for Q4 2013 had not been performed. Quarterly water monitoring reports are being filed.  |
| BRC Alabama No. 3, LLC  | 3318 Highway 3041<br>Corbin, KY<br>40702                | 861-8015             | Non Compliance 23-2835<br><br>Failure to maintain fresh water pond. Water seeping from pond.   | Impoundment in is compliance with no seepage as of 12/29/2014                 | Repaired pond in order to prevent unapproved discharge from structure.   |
| Bowie Refined Coal, LLC | 898 Coal Wash Road<br>Irvine, KY<br>40336               | 833-9006             | Non Compliance 63-2989<br><br>1. Failure to notify State in a timely manner that warning elevations in piezometers were exceeded.<br><br>2. Failure to construct and operate impoundments in accordance with approved designs. | Completed remedial measures as of 7/23/2014.                                  | Maintaining pool at the approved elevation.<br><br>Construct all impoundments in accordance with approved permit design or diligently pursue the issuance of Minor Revision #4 in a timely manner. |

| <b>Entity</b>           | <b>Location</b>                           | <b>Permit Number</b> | <b>Description of Violation</b>   | <b>Current Status</b>   | <b>Actions to Abate</b>  |
|-------------------------|---|----------------------|---|---|--|
| Bowie Refined Coal, LLC | 898 Coal Wash Road<br>Irvine, KY<br>40336 | 833-9006             | Non Compliance 63-2951<br><br>Sediment level in Effluent Control Pond reached an unacceptable level for impoundment to function properly.   | Deadline of 3/6/2015 to Complete remedial measures to restore capacity.   | Removing material from Effluent Control Pond until acceptable capacity is restored.  |
| Bowie Refined Coal, LLC | 898 Coal Wash Road<br>Irvine, KY<br>40336 | 833-9006             | Non Compliance 63-2394<br><br>1. Failure to maintain accurate 7 day records of crest elevation levels piezometers on coal waste dams.<br><br>2. Failure to maintain operating pool level. Records show levels exceeded approved elevation levels. | Deadline of 3/17/15 to Complete remedial measures. Currently verifying elevations of impoundments. Update the 7-day report with current geometry of structure, and with piezometer warning levels approved in the permit. | Verify elevation of pond crest, correct the discrepancy on 7-day inspection records, if different, return crest to approved elevation levels.<br><br>The decant was extended to Stage 2 elevation so Stage 1 operating pool limit is no longer applicable. |

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

**APPENDIX 1-1**

Property Asset Purchase and Sale Agreement

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

**APPENDIX 1-2**

Certificate of Insurance

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

**APPENDIX 1-3**

Proof of Publication

## **CHAPTER 3 BIOLOGY**

### **3.10 Introduction**

This chapter provides a general description of the biological resources found in the vicinity of the Deer Creek waste rock site (the “Deer Creek site” or the “site”), and describes measures that will be taken to protect biological resources within and adjacent to the permit area.

#### **3.1.1 Vegetative, Fish and Wildlife Resources**

Vegetative, fish, and wildlife resources in the vicinity of the Deer Creek site are discussed in Section 3.20. Additional information regarding vegetative resources is provided in Appendices 3-1 and 3-2.

#### **3.1.2 Potential Impacts to Vegetative, Fish and Wildlife Resources**

Potential impacts to vegetative, fish and wildlife resources and the associated mitigation plans are presented in Sections 3.30 and 3.40 of this application.

#### **3.1.3 Description of Reclamation Plan**

The plan to reclaim vegetative, fish and wildlife resources to a condition suitable for the post-operations land use is presented in Section 3.40.

### 3.20 Environmental Description

#### 3.2.1 Vegetation Information

##### 3.2.1.1 Plant Communities Within the Proposed Permit and Adjacent Areas

A vegetation survey of the permit area was performed by Mt. Nebo Scientific in 1987 prior to site disturbance. The results of this survey are provided in Appendix 3-1. As indicated, vegetation in the permit area is characterized primarily as a Gardner Saltbush/Mat Saltbush plant community, with Pinyon/Juniper communities within the larger community. Dominant species in these smaller plant communities consist of pinyon and juniper trees, black sagebrush, and shadscale. The general pre-disturbance distribution of vegetation in the permit area is shown on Plate 3-1.

From data presented in Appendix 3-1, the vegetative species within the Gardner Saltbush/Mat Saltbush community in the permit area consist of the following:

#### **Shrubs:**

- Black sagebrush (*Artemisia nova*)
- Castle Valley saltbrush (*Atriplex gardneri* var. *cuneate*)
- Shadscale (*Atriplex confertifolia*)
- Mat saltbush (*Atriplex corrugata*)
- Rubber rabbitbrush (*Chrysothamnus nauseosus*)
- Low rabbitbrush (*Chrysothamnus viscidiflorus*)
- Mormon tea (*Ephedra viridis*)
- Corymb buckwheat (*Eriogonum corymbosum*)
- Utah juniper (*Juniperus osteosperma*)
- Greasewood (*Sarcobatus vermiculatus*)
- Cottonthorn horsebrush (*Tetradymia spinosa*)

#### **Forbs**

- Cryptantha (*Cryptantha flava*)
- Spring parsley (*Cymopterus purpureus*)

- Gordon's buckwheat (*Eriogonum gordonii*)
- James wild buckwheat (*Eriogonum jamesii*)
- Buckwheat (*Eriogonum sp.*)
- Goldenweed (*Haplopappus ep.*)
- Parthenium (*Parthenium sp.*)
- Phacelia (*Phacelia crenulata*)
- Phacelia (*Phacela sp.*)

**Grasses:**

- Salina wildrye (*Elymus salinus*)
- Indian ricegrass (*Orizopsis hymenoides*)
- Squirreltail (*Sitanion hystrix*)

**3.2.1.2 Land Productivity Prior to Mining**

A reference area with representative slope, soil, exposure, species composition, and other environmental factors was chosen in 1987 as a standard for future reclamation of the site. The mean percent cover in the reference area was calculated as follows at the time of the 1987 survey:

- Living cover = 38.93%
- Litter = 8.40%
- Rock = 7.50%
- Bare ground = 45.33%

Information presented in Section 2.2.2.4 of this application indicates that, under favorable conditions, the soils in the permit area can produce only 63 pounds of rangeland vegetation per acre annually. These production values drop to 44 lb/acre/yr under normal and 19 lb/acre/yr under unfavorable conditions (see Appendix 2-1).

Appendix 3-2 presents the results of an evaluation conducted by Mt. Nebo Scientific wherein the mean percent cover of the reference area (as measured in 1987) was compared with the mean percent cover of the reclaimed fill along the site access road (as measured in 1995). As

indicated, the mean percent live vegetative cover for the reference area and the access road fill were 38.93% and 38.33%, respectively. Total ground cover (which includes live vegetation, litter, and rock) was 54.67% on the reference area and 74.17% on the fill slopes. This, it is reasonable to assume that land productivity following reclamation will be similar to pre-disturbance conditions in the permit area.

### **3.2.2 Fish and Wildlife Information**

Undisturbed lands in the area generally support wildlife habitat. The generally poor soil and sparse vegetation of the area limit the degree to which wildlife frequent the area. Given the lack of perennial and intermittent surface water, there is no fish habitat within the permit area.

#### **3.2.2.1 Level of Detail**

The scope and level of detail for identification of fish and wildlife resources are considered sufficient to design a protection and enhancement plan consistent with the requirements of R645-301-333.

#### **3.2.2.2 Site-specific Resource Information**

A site-specific evaluation of wildlife within the permit and adjacent areas was conducted of the permit area in 1988 prior to disturbance of the site. The results of this survey, which was conducted by Val Payne of Utah Power and Light Company in consultation with Larry Dalton of the Utah Division of Wildlife Resources, are provided on Plate 3-2. As indicated, portions of the permit area serve as critical winter habitat for mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*). Specific wildlife use areas associated with the site include migration routes, open areas, and bedding areas as indicated on Plate 3-2.

A review of information maintained by the Utah Conservation Data Center<sup>1</sup> indicates that no threatened or endangered species, nor habitat for such species, are present within the permit area. However, this site indicates that the following species of concern may be present within the USGS quadrangle in which the Deer Creek site is located (i.e., the Hiawatha 7.5 minute quadrangle):

- Ferruginous Hawk (*Buteo regalis*): According to the Utah Conservation Data Center, this species of concern was last observed in the Hiawatha quadrangle on December 13, 2008. It is identified as a Utah species of concern, with a global status rank of G4 (indicating that it is a species that is widespread, abundant, and apparently secure, though it may be quite rare in parts of its range, especially at the periphery) and a State status rank of S3B (indicating that it is a species that is either very rare and local throughout its range or found locally [even abundantly at some of its locations] within a restricted range, or vulnerable to extinction or extirpation because of other factors, particularly during breeding season).
- Colorado River Cutthroat Trout (*Oncorhynchus calrkii pleuriticus*): According to the Utah Conservation Data Center, this species was last observed in the Hiawatha quadrangle on October 19, 2005. This species is receiving special management under a Conservation Agreement in order to preclude the need for Federal listing. It has a global status rank of G4T3 (indicating that some infraspecific taxa of the species may warrant a global numeric ranking of 3 rather than 4) and a State status rank of S3.
- Western Toad (*Bufo boreas*): According to the Utah Conservation Data Center, this species of concern was last observed in the Hiawatha quadrangle on July 25, 1964. It is identified as a Utah species of concern, with a global status rank of G4 and a State status rank of S3.

Although the Ferruginous Hawk may be present in the general area of the Deer Creek site, its preferred nesting sites (cliffs, buttes, and creek banks) do exist within the area where coal recovery operations will be conducted. Furthermore, dust will be suppressed during operations, thereby minimizing the potential for impacts from this source. Therefore, no significant impacts are anticipated to Ferruginous Hawks in the area from the planned site activities.

No perennial streams occur within the permit area. Furthermore, site activities will be conducted in a manner that minimizes contributions of sediment and other pollutants to the closest perennial source of water (Huntington Creek). Therefore, coal recovery operations at the site should not adversely impact Colorado River Cutthroat Trout in the region.

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<sup>1</sup> <http://dwrcdc.nr.utah.gov/ucdc/>, accessed 21 Jan 2015.

The Western Toad habitat consists primarily of slow-moving streams, wetlands, and other perennial sources of water. Since these sources are absent within the permit area and protected from contributions of sediment and other pollutants outside of the permit area, coal recovery operations at the site should not adversely impact Western Toads in the region.

Additional information regarding the potential for important biological resources to be present in the permit area was obtained from the “IPaC Information for Planning and Construction” web site maintained by the U.S. Fish and Wildlife Service. The IPaC Trust Resource Report and associated Section 7 letter obtained from this web site are provided in Appendix 3-4. The Resource Report and the Section 7 letter indicate that the following threatened or endangered species may occur in the region of the permit area:

- Birds:
  - Mexican Spotted Owl (*Strix occidentalis lucida*)
  - Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
  - Yellow-billed Cuckoo (*Coccyzus americanus*)
- Fishes:
  - Bonytail Chub (*Gila elegans*)
  - Colorado Pikeminnow (*Ptychocheilus lucius*)
  - Humpback Chub (*Gila cypha*)
  - Razorback Sucker (*Xyrauchen texanus*)
- Flowering Plants:
  - Barneby Reed-mustard (*Schoenocrambe barnebei*)
  - Jones Cycladenia (*Clycladenia humilis var. jonesii*)

The report and letter further state that no critical habitats occur within the permit area for these threatened or endangered species. None of these species are known to exist in the permit area.

According to information provided in the Deer Creek Mine mining and reclamation plan, the nearest known raptor nests are approximately 1.3 miles northeast of the site. Golden eagles have been observed in flight above the general area where the site is located. Furthermore, as

indicated above, the absence of perennial and intermittent water indicates that no fish habitat exists within the permit area.

Under the U.S. Fish and Wildlife Service Windy Gap Process, projects within the Upper Colorado River Basin may be assessed a one-time conservation fee, depending on annual water usage, to study and protect endangered fish species. The conservation fee is generally assessed only if the annual water consumption exceeds 100 acre-feet. The applicant acknowledges that the assessment of the conservation fee must be decided by the U.S. Fish and Wildlife Service, with this assessment potentially being independent of the 100 acre-foot value.

Calculations provided in Appendix 3-5 estimate that less than 2 acre-feet of water will be used for dust-suppression and moisture conditioning purposes during the course of this project. This water may be obtained from the sedimentation pond (if available and practical) but more likely will be obtained from nearby municipal or industrial sources. As indicated in Section 7.2.4.2 of Chapter 7, the average annual flow of Huntington Creek near the permit area is 109.0 cubic feet per second (78,900 acre-feet per year). Assuming that all of the project water is obtained from Huntington Creek and/or from the sedimentation pond (i.e., water that theoretically could have reached Huntington Creek), the total estimated project water usage (1.92 acre-feet) represents just 0.002% of this annual flow.

Stream gaging records are developed by correlating the depth (or “stage”) of streamflow with the measured streamflow at a gaging station. Rantz et al. (1982) indicate that current-meter methods (the standard approach used to measure streamflow) are accurate to within approximately 2.2 percent if properly used. Additional error is introduced in the stage measurements. Thus, the potential decrease in streamflow in Huntington Creek due to project water usage is at least 1000 times less than the accuracy of the methods used to measure streamflow, indicating that the amount of project water usage is insignificant compared to the flow of Huntington Creek. This impact will be even less if the project water is obtained from a supplier that uses groundwater as its source.

Given the minimal amount of water to be used on the project, it is concluded that impacts to fish habitat will also be insignificant and not practically measurable.

As indicated above, project water will likely be obtained (purchased) from nearby municipal or industrial water sources. Rights for the use of this water will be the responsibility of the seller. In the case of water obtained from the sedimentation pond, water rights are normally not filed for ephemeral sources due to their unreliability. If used, this water will be applied at or adjacent to the ground from which it flowed.

### **3.2.2.3 Fish and Wildlife Service Review**

If requested, the applicant authorizes the release of information pertaining to Section 3.2.2 and 3.3.3 to the U.S. Fish and Wildlife Service Regional and Field office for their review.

### **3.2.3 Maps and Aerial Photographs**

The results of vegetation and wildlife surveys in the permit area are provided on Plates 3-1 and 3-2, respectively. The location of the reference area for determining revegetation success is shown on Plate 3-1. This map also shows the general pre-disturbance boundaries of plant communities and vegetation sample areas. No monitoring stations have been established to gather ongoing data for fish and wildlife or any special habitat features.

## **3.30 Operation Plan**

### **3.3.1 Measures Taken to Disturb the Smallest Practicable Area**

No disturbance will occur beyond the permit area boundary. New disturbances (if they occur) will be kept to the smallest practicable area. All currently-disturbed areas may be used for active operations. Thus, interim revegetation of the site is not feasible.

### **3.3.2 Description of Anticipated Impacts of Subsidence**

No underground mining operation will occur within the permit area. Thus, the planned actions will not result in subsidence of renewable resource lands.

### **3.3.3 Plan to Minimize Disturbances and Adverse Impacts**

The fence surrounding the permit area was designed to be compatible with wildlife migration. This fence will be maintained during operations. No disturbance will occur outside of that fenced area. Furthermore, runoff control measures will be maintained to preclude off-site surface-water impacts. Other protective measures within the disturbed area boundary will include adhering to clean industrial hygiene procedures, properly disposing of all waste (papers, cans, bottles, etc.), and instructing employees not to hunt or harass wildlife in the permit and adjacent areas. Thus, measures will be implemented to minimize adverse impacts to fish and wildlife and related environmental resources.

## **3.40 Reclamation Plan**

Information regarding final revegetation of disturbed ground within the permit area is provided below. The extent of site restoration following operations is discussed more fully in Section 5.40 of this permit application.

### **3.4.1 Revegetation**

Disturbed areas will be revegetated, following completion of site activities, in a manner that complies with the biological protection standards of the State of Utah Coal Mining Rules as promulgated in R645.

### 3.4.1.1 Schedule and Timetable

Revegetation of disturbed areas will begin after the topsoil has been redistributed. To the extent feasible, seeding will occur in the late fall, just prior to the onset of snow fall. If this schedule is not feasible, grasses and forbs will be planted in the late spring (May or early June), while shrubs will be planted in the late summer through early fall (late August through early October). A detailed schedule for implementation of the revegetation plan is discussed in Section 5.4.2.1 of this permit application.

### 3.4.1.2 Descriptions

**Species and Amounts of Seed.** All revegetated areas will be planted with the seed mix specified in Table 3-1. This seed mix was developed in consultation between Lisa Reinhart of the Utah Division of Oil, Gas and Mining and Makeda Trujillo Hanson of the Utah Division of Wildlife Resources (see Appendix 3-3). At the recommendation of Ms. Reinhart, the non-native forb substitutes recommended by Ms. Hanson were not included in Table 3-1.

**Method Used for Planting and Seeding.** Revegetation will be performed using broadcast, hydroseed, or drill seed methods. If drill seeding is used, the application rates of the grasses and forbs in Table 3-1 will be reduced by 50 percent.

**Mulching Techniques.** Mulch will be applied to seeded areas in accordance with Section 2.4.4.2 of this application.

**Irrigation, Pest, and Disease Control.** No persistent pesticides will be used in the permit area unless previously approved by DOGM.

**Measures Proposed for Revegetation Success.** Revegetation success will be monitored in accordance with the requirements of R645-301-356. These measures are discussed in Section 3.5.6 of this permit application.

### **3.4.1.3 Greenhouse Studies, Field Trials or Other Equivalent Studies**

If DOGM requires additional testing for the purpose of demonstrating that reclamation as required by the State Program can be accomplished according to information given in this document, the applicant will comply.

## **3.4.2 Fish and Wildlife**

### **3.4.2.1 Enhancement Measures**

Wildlife habitat will be enhanced during reclamation through the use of runoff controls to prevent excessive erosion and through the use of a seed mix that includes plants that are indigenous to the area and that serve as valuable wildlife forage.

### **3.4.2.2 Plants Used for Wildlife Habitat**

The reclamation plan has been specifically developed to support post-operation land use by wildlife. In particular, the plant species presented in Table 3-1 include those that will provide adequate nutritional value for big game as well as cover for small game (see Appendix 3-3). Plant species that are native to the area (and thereby appropriately adapted to local soils, climate, etc.) were selected to ensure long-term survival following the release of performance bonds.

### **3.4.2.3 Cropland**

Cropland is not a post-operation land use.

#### **3.4.2.4 Residential, Public Service and Industrial Land Use**

Neither residential, public service, nor industrial post-operation land uses are anticipated for the permit area.

### **3.50 Performance Standards**

#### **3.5.1 General Requirements**

The Applicant commits to conduct all operations in accordance with Sections R645-301-330 through R645-301-340 of the regulations.

#### **3.5.2 Contemporaneous Reclamation**

Given the relatively short duration of anticipated coal recovery operations at the Deer Creek site, contemporaneous reclamation is not considered practical.

#### **3.5.3 Revegetation: General Requirements**

The revegetation plan presented herein complies with the requirement that a vegetative cover be established on all reclaimed areas. The vegetative cover will be established in accordance with the approved permit and reclamation plan.

##### **3.5.3.1 Vegetative Cover**

The seed mix presented in Table 3-1 is intended to provide vegetative cover that will be diverse, effective, and permanent. The seed mix is comprised of species native to the area recommended by the Utah Division of Wildlife Resources for enhancement of wildlife habitat.

The seed mix was selected with to be compatible with the climate, potential seedbed quality, and drought tolerance.

**Native Species.** The vegetative mixture is primarily comprised of species native to the area. The seeds will be purchased from suppliers who will certify their purity, germination, hard seed, and percentages of maximum weed seed contents.

**Extent of Cover.** The seed mix presented in Table 3-1 has been designed to result in vegetative cover that will be at least equal in extent to the natural vegetation as measured in an adjacent reference area at the time of revegetation.

**Stabilizing.** The area to be revegetated will be mulched during reclamation. This mulching, together with the vegetative cover mixture and surface roughening of the redistributed topsoil, will provide erosional stability at least equivalent to that of adjacent undisturbed areas.

### 3.5.3.2 Reestablished Plant Species

**Compatible.** The plant species proposed for revegetation have been selected to be compatible with the intended post-operation land use of wildlife habitat.

**Seasonal Characteristics.** Because the reclamation seed mix is dominated by native species, the revegetation plant species will have the same growing season as the native vegetation.

**Self-generation.** The revegetation seed mix consists of species capable of self-generation and plant succession.

**Compatibility.** The seed mix proposed for revegetation contains plants native to the area and compatible with the plant and animal species of the permit area.

**Federal and Utah Laws or Regulations.** The seed mixture purchased to revegetate the mine area will contain neither poisonous nor noxious plant species. The mix will also be compatible with introduced species laws and regulations.

### **3.5.3.3 Vegetative Exception**

The applicant does not require vegetative exception at this time.

### **3.5.3.4 Cropland**

The permit area contains no land designated as cropland for post-operation land use.

### **3.5.4 Revegetation: Timing**

Reclaimed areas will be revegetated during the first favorable period for planting, as discussed in Section 3.4.1.1.

### **3.5.5 Revegetation: Mulching and Other Soil Stabilizing Practices**

Areas to be revegetated will be mulched as described in Section 3.4.1.2. The redistributed topsoil will also be left in a roughened state prior to revegetation, as described in Section 5.4.2 of this application. If excessive erosion occurs following revegetation and prior to bond release, those affected areas will be repaired using a method approved by DOGM.

### **3.5.6 Revegetation: Standards for Success**

#### **3.5.6.1 Success of Revegetation**

The success of revegetation will be judged on the effectiveness of the vegetation for post-operation land use and the standards outlined in Section 3.5.3. Success of the revegetation effort in the permit area will be determined by use of and in comparison to data obtained from the reference area shown on Plate 3-1.

Final comparisons will involve random sampling of both the reference area and the revegetated site. All sampling will be done in the late summer to insure maximum plant growth. Estimates of ground cover and density of woody plant species will be made for the revegetated areas and the reference areas using the following methods:

- Quantitative and qualitative data will be collected on the reclaimed areas. Information to be recorded during field surveys will include not only vegetation data but also observations concerning recent precipitation, slope, exposure, wildlife use, and other appropriate notes
- Bi-directional random placement of sampling plots will be used to provide unbiased accuracy of the data compiled.
- Cover estimates will be made using ocular methods with meter square quadrats.
- Density of woody plant species will be estimated using the point quarter distance method (Cottam and Curtis, 1956). In this method, random points will be placed on the sample sites and measured into four quarters. The distances to the nearest woody plant species will then be recorded in each quarter. The average point-to-individual distance will be calculated as the square root of the mean area per individual.
- Sampling adequacy for cover and woody species density will be sufficient to insure that the required statistical confidence is achieved. This will be evaluated using formulas from Snedocor and Cochran (1980), ensuring that 80% of the samples are within 10% of the true mean for the shrub communities of the area. Student's t-tests will be employed to compare the proposed disturbance and reference areas of all sites for cover and woody plant species density.
- Jaccard's Community Coefficients will be used to make species composition comparisons.

### **3.5.6.2 Standards for Success**

Standards of success will be applied in accordance with the approved post-operation wildlife habitat land use. Revegetation efforts will be considered successful if the total ground cover in the reclaimed areas is at least 90% of the total ground cover in the reference area, with 90% statistical confidence at the time of the comparison. The species diversity of the revegetated areas will be considered successful if there is a 50% or greater similarity in the life forms present between the reference area and the reclaimed plant community.

### **3.5.6.3 Siltation Structure Maintenance**

Siltation structures will be maintained until removal is authorized by the Division and the disturbed areas have been stabilized and revegetated. For additional details on siltation structures, see Section 5.4.2.

### **3.5.6.4 Removal of Siltation Structures**

Upon removal of siltation structures at the site, the land on which the siltation structure was located will be revegetated in accordance with this plan.

### **3.5.7 Revegetation: Extended Responsibility Period**

BRC Wellington (“BRCW”) will be responsible for revegetation success during the extended responsibility period. The period of extended responsibility will begin after the last year of augmented seeding, fertilization, irrigation, or other revegetation work, excluding husbandry as approved by the Division. Vegetation parameters will equal or exceed the approved success standard during the last two years of the responsibility period. The success standards are outlined in Sections 3.5.6.1 and 3.5.6.2 of this application.

If required to enhance revegetation efforts, BRCW may implement husbandry practices on reclaimed area, but only if approved beforehand by the Division. These husbandry practices, if needed, would consist of normal conservation practices within the region of the operation. These practices may include disease, pest, and vermin control; pruning; reseeding; and transplanting. BRCW acknowledges that any such work must be conducted in accordance with R645-301-357.300 and may affect the timing of bond release as stipulated in that rule.

### **3.5.8 Protection of Fish, Wildlife, and Related Environmental Values**

This plan is designed to minimize disturbances and adverse impacts on fish, wildlife and their related environments. BRCW will periodically educate their employees about wildlife needs and their importance. The mitigation requirements of Section 3.3.3 of this application will also be discussed with existing employees during periodic staff meetings and with new employees during initial orientation. Given the lack of permanent surface water in the permit and adjacent areas, there are no fisheries within the permit area.

#### **3.5.8.1 Existence of Endangered or Threatened Species**

There are no known endangered or threatened species within the permit area. Therefore, facility operations will not result in the destruction or adverse modification of critical habitats. If State- or Federally-listed endangered or threatened species are discovered in the permit area in the future, the presence of these species will be reported to the Division upon their discovery. Operations thereafter, including site reclamation, will proceed in accordance with appropriate Division stipulations to protect those species.

### **3.5.8.2 Bald and Golden Eagles**

No suitable bald or golden eagle habitat exists in the permit and adjacent areas. The nearest known raptor nests are approximately 1.3 miles northeast of the site. Golden eagles are occasionally observed in flight above the general area but none are known to inhabit the permit or adjacent areas.

If bald or golden eagle habitat is discovered in the permit or adjacent area in the future, BRCW will promptly report such habitat to the Division and will proceed with operations thereafter in accordance with appropriate Division stipulations to avoid impacts to that habitat. BRCW will also make employees aware of the species and their prey base during periodic staff meetings in accordance with Section 3.5.8 of this plan.

### **3.5.8.3 Taking of Endangered or Threatened Species**

The applicant understands that there is no permission implied by these regulations for taking of endangered or threatened species, their nests, or eggs.

### **3.5.8.4 Replacement of Wetland and Riparian Vegetation**

No wetland or riparian habitat exists in the permit area, nor has any such habitat been disturbed by this operation. The closest riparian habitat is located along Huntington Creek approximately 0.4 mile southwest of the waste rock pile and about 200 feet southwest of the southwest edge of the permit area. All operations associated with this application will be conducted in a manner that avoids disturbances to wetlands and riparian vegetation along Huntington Creek.

### 3.5.8.5 Manmade Wildlife Protection Measures

**Electric Power Lines.** No electric power lines exist within the permit area.

**Potential Barriers.** Fences that surround the permit area have been design to allow crossing by big game.

**Pond Protection.** No site ponds contain hazardous concentrations of toxic-forming materials.

### REFERENCES CITED

- Cottam, G. and J.T. Curtis. 1956. The Use of Distance Measures in Phytosociological Sampling. Ecology. Volume 37, No. 3, pp. 451-460.
- Rantz, S.E. et al. 1982. Measurement and Computation of Streamflow: Volume 1. Measurement of State and Discharge. U.S. Geological Survey Water-Supply Paper 2175. Washington, D.C.
- Snedecor, G. W. and W.G. Cochran, W. G. 1980. Statistical Methods. Iowa State University Press. Ames, Iowa.

**TABLE 3-1**

Revegetation Seed Mixture

| Scientific Name          | Common Name             | Application Rate<br>(pls lb/acre) |
|--------------------------|-------------------------|-----------------------------------|
| <b>Shrubs</b>            |                         |                                   |
|                          |                         |                                   |
| Artemisia tridentata     | Wyoming big sagebrush   | 1.0                               |
| Atriplex canescens       | Fourwing saltbush       | 1.0                               |
| Ceratoides lanata        | Winterfat               | 0.5                               |
| <b>Forbs</b>             |                         |                                   |
| Acillea millefolium      | Western yarrow          | 0.01                              |
| Cleome serrulata Pursh   | Rocky Mountain Beeplant | 1.0                               |
| Helianthus annuus        | Annual sunflower        | 1.0                               |
| Linum lewisii            | Lewis flax              | 1.0                               |
| Penstemon palmeri        | Palmer's penstemon      | 0.5                               |
| Sphaeraicea coccinea     | Scarlet globemallow     | 0.5                               |
| <b>Grasses</b>           |                         |                                   |
| Agropyron dasystachyum   | Thickspike wheatgrass   | 1.0                               |
| Hilaria jamesii          | Galleta                 | 0.5                               |
| Leymus salinus           | Salina wildrye          | 0.5                               |
| Oryzopsis hymenoides     | Indian ricegrass        | 1.0                               |
| Poa sandbergii           | Sandberg bluegrass      | 1.0                               |
| <b>TOTAL (pls lb/ac)</b> |                         | <b>10.01</b>                      |

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
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### **APPENDIX 3-1**

Vegetation Survey of the Permit Area

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
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## **APPENDIX 3-2**

Survey of Revegetation Success on  
Access Road Cut and Fill Slopes

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
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### **APPENDIX 3-3**

Correspondence from the Utah Division of Wildlife Resources  
Regarding the Revegetation Seed Mix

BRC Wellington LLC  
Deer Creek Waste Rock Site

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**APPENDIX 3-4**

IPaC Resource Report and  
Section 7 Letter

BRC Wellington LLC  
Deer Creek Waste Rock Site

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~~February-June~~ 2016

## **APPENDIX 3-5**

Estimated Project Water Usage

## CHAPTER 5 ENGINEERING

### 5.10 Introduction

This chapter provides a discussion of general engineering aspects, an operation plan, a reclamation plan, design criteria, and performance standards related to the Deer Creek waste rock site (the “Deer Creek site” or the “site”) as proposed by BRC Wellington LLC (“BRCW”). The existing and proposed facilities have been or will be designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plans.

It should be noted that this application is for recovery of coal from an existing waste rock pile and not for operation of a surface or underground coal mine. Thus, several of the sections in this chapter that refer to mining operations are not applicable and have been noted as such.

#### 5.1.1 General Requirements

This permit application includes descriptions of the proposed operations for recovery of coal from waste rock at the Deer Creek site together with the appropriate maps, plans, and cross sections. Methods and calculations utilized to achieve compliance with the design criteria are also presented.

#### 5.1.2 Certification

Where required by the regulations, cross sections and maps in this permit application have been prepared by or under the direction of, and certified by, qualified registered professional engineers or land surveyors. As appropriate, these persons were assisted by experts in the fields of hydrology, geology, biology, etc.

### 5.1.2.1 Cross Sections and Maps

**Previously Mined Areas.** There are no previously mined areas near the facility.

**Surface Facilities.** A general site map is shown on Plate 5-1. This map includes the locations of topsoil and coal material stockpiles, runoff control structures, and sedimentation pond. Except for the sedimentation pond, no other water treatment facilities exist at the site. Other surface facility maps provided in this application are similarly certified.

The following facilities or activities do not exist or occur within the permit area:

- Excess spoil,
- Durable rock fills, and
- Disposal of non-coal (non-waste rock) waste

**Surface Configurations.** The topography noted on Plate 5-1 is based on a survey of the site performed in September 2014.

**Hydrology.** Certified maps and cross sections associated with the hydrology of the Deer Creek site are provided in Chapter 7.

**Geology.** A certified map and cross sections associated with the geology of the site is provided as Figure 6-1 of this application.

### 5.1.2.2 Plans and Engineering Designs

All plans and engineering designs presented in this permit application were prepared by or under the direction of and certified by a qualified registered professional engineer.

**Excess Spoil.** No excess spoil will be generated from the permit area.

**Durable Rock Fills.** No durable rock fills will exist in the permit area.

**Coal Mine Waste.** The waste rock pile at the Deer Creek site was designed by a professional engineer with experience in the design of similar structures (see the Mining and Reclamation Plan for the Deer Creek Mine, DOGM identification number C0150018). The operations proposed in this application involve the recovery of coal from that site. No additional coal mine waste will be stored in the permit area, beyond that which existed at the time this application was submitted. Reject from the coal recovery operations will be temporarily stored as indicated in Section 5.2.2 and finally placed as indicated in Sections 5.2.8.3 and 5.3.6. Final compaction and reclamation of the reject material will occur as outlined in Section 5.4.2.2.

**Impoundments.** One impoundment is present at the site, located immediately west of the waste rock pile (see Plate 5-1). This impoundment (a sedimentation pond) was designed and certified by a professional engineer using current, prudent, engineering practices. The details of this design are presented in Chapter 7 of this application.

**Primary Roads.** The site access road is considered a primary road as defined in R645-301-527.120. This road has been certified by a professional engineer as meeting the requirements of R645-301-534.200 and R645-301-742.420 (see Appendix 5-1).

**Variance from Approximate Original Contour.** The placement of waste rock at the site since the late 1980s has resulted in a change to the original contour of the site. BRCW plans to recover a substantial amount of the coal from the waste rock pile. However, non-coal rock and unrecoverable coal will remain at the site. It is the understanding of BRCW that a variance from the Approximate Original Contour requirements of the regulations is not required for waste rock sites due to the nature of such sites. Therefore, no variance request is submitted with this application.

### **5.1.3 Compliance with MSHA Regulations and MSHA Approvals**

#### **5.1.3.1 Coal Processing Waste Dams and Embankments**

No coal processing waste dams or embankments exist within the permit area.

#### **5.1.3.2 Impoundments and Sedimentation Ponds**

No impoundments or sedimentation ponds in the permit area meet the size criteria of 30 CFR 77.216(a).

#### **5.1.3.3 Underground Development Waste, Coal Processing Waste, and Excess Spoil**

No underground development waste, coal processing waste, or excess spoil will be disposed of in underground mine workings the permit area.

#### **5.1.3.4 Refuse Piles**

The Deer Creek waste rock pile was designed and constructed in accordance with the requirements of the Mine Safety and Health administration as promulgated in 30 CFR 77.214 and 77.215.

#### **5.1.3.5 Underground Openings to the Surface**

There are no underground openings within the permit area.

### **5.1.3.6 Discharges to Underground Mines**

No discharges occur from the surface to underground mine workings in the permit area.

### **5.1.3.7 Surface Coal Mining and Reclamation Activities**

The regulatory definition of “surface coal mining and reclamation activities” includes the “recovery of coal from a deposit that is not in its original geologic location” (see R645-100-200). None of the planned coal recovery operations within the permit area will occur within 500 feet of an active underground mine.

### **5.1.3.8 Coal Mine Waste Fires**

If any coal-related fires occur within the permit area, these will be reported immediately to MSHA and DOGM. Immediate remedial action will be taken as deemed necessary by BRCW to protect public health and safety as well as the environment. Following initial remedial efforts, a long-term plan will be formulated in discussion with MSHA and DOGM to extinguish any existing fires and prevent future fires.

## **5.1.4 Inspections**

### **5.1.4.1 Excess Spoil**

Excess spoil does not exist in the permit area.

### **5.1.4.2 Refuse Piles**

The Deer Creek waste rock pile has been inspected at least quarterly by Energy West since construction of the pile began. Quarterly inspections of the pile will continue during coal recovery

operations and through the period of final grading and revegetation. A report of each inspection will be prepared by a qualified individual and provided to the Division after each inspection.

### **5.1.4.3 Impoundments**

The sedimentation pond at the Deer Creek has been inspected at least quarterly by Energy West since construction of the pond. Quarterly inspections of the pond will continue during coal recovery operations and through the period of final grading and revegetation. A report of each inspection will be prepared by a qualified individual and provided to the Division after each inspection. This report will indicate whether or not the impoundment has been maintained as designed and in accordance with the approved plan and the R645 rules. The report will also include a discussion of any apparent instability, structural weakness or other hazardous conditions, approximate depth of impounded waters, existing storage capacity, existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability, as noted during the inspection. A copy of the inspection report will be maintained at the BRCW office in Wellington, Utah.

No impoundments that are subject to 30 CFR 77.216 currently exist or are planned within the permit area. If impoundments subject to 30 CFR 77.216 are constructed in the future, these impoundments will be inspected in accordance with 30 CFR 77.216-3.

## **5.1.5 Reporting and Emergency Procedures**

### **5.1.5.1 Slides**

The potential for slides to occur in the permit area is extremely minimal. However, if a slide occurs within the permit area that may have a potential adverse effect on the public, property, health, safety, or the environment, BRCW will notify the Division by the fastest available means

following discovery of the slide and will comply with any remedial measures required by the Division.

#### **5.1.5.2 Impoundment Hazards**

If any examination or inspection of the sedimentation pond discloses that a potential hazard associated with that impoundment may have an adverse effect on the public, property, health, safety, or the environment, the person who examined the impoundment will promptly inform the Division of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the Division will be notified immediately.

#### **5.1.5.3 Temporary Cessation of Operations**

Prior to a temporary cessation of operations within the permit area that will last for a period of 30 days or more or as soon as it is known that a temporary cessation will extend beyond 30 days, BRCW will submit to the Division a notice of intention to cease or abandon operations. This notice will include the following:

- A statement of the exact number of surface acres in the permit area prior to cessation of operations,
- A discussion of the extent and kind of reclamation activities which will have been accomplished prior to cessation of operations, and
- An identification of the regrading, revegetation, environmental monitoring, and water treatment activities that will continue during the temporary cessation.

During the temporary cessation, BRCW will support and maintain all surface access and will also secure all facilities. The gate at the entry to the site and the fence surrounding the site will be maintained. The gate will be closed and locked to prevent unauthorized access to the site.

## 5.20 Operation Plan

### 5.2.1 General

#### 5.2.1.1 Cross Sections and Maps

**Previously Mined Areas.** There are no active, inactive, or abandoned underground workings, including openings to the surface, within the permit and adjacent areas. No previously surface-mined areas exist within the permit area.

**Existing Surface and Subsurface Facilities and Features.** Plate 5-1 depicts the following information:

- Each public road located in or within 100 feet of the permit area,
- The location of soil stockpiles,
- The location of existing waste rock piles,
- The location of roads and drainage ditches, and
- The location of the sedimentation pond within the permit area.

Information regarding the dimension of the sedimentation pond is provided on Plate 7-1. Typical dimensions of drainage ditches UD-1 through UD-4 are noted on Plate 7-2. Typical dimensions of drainage ditches UD-5 through UD-7 are provided on Plate 5-1. Buildings located within 1,000 feet of the permit area are noted on Figure 5-1, including an identification of the current use of the buildings. No major electric transmission lines, pipelines, agricultural drainage tile fields, or similar surface and subsurface man-made features exist within, passing through, or passing over the permit area. No areas of spoil, non-coal waste disposal, permanent water impoundments, water treatment facilities, air pollution control facilities, coal processing waste dams, or coal processing embankments exist within the permit area. The only coal development waste located within the permit area is the waste rock pile noted on Plate 5-1.

**Landowner, Right-of-Entry, and Public Interest.** Plate 5-2 shows the boundaries of lands and the names of present owners of record of those lands, both surface and subsurface, included in or contiguous to the permit area. BRCW is the owner of all lands within the permit area, as indicated on the legal description provided on the warranty deeds in Appendix 1-1, and therefore has the legal right to enter the property and recover coal from the existing waste rock pile. The permit area consists of approximately 49.05 fee acres. No Federal or State land exists within the permit area. As the owner of the property, BRCW has a legal right to operate on all of the lands within the permit area.

No coal recovery operations will be conducted within 100 feet of a public road. The only activity associated with this plan to be conducted within 100 feet of a public road (State Route 31) will be where the site access road joins that right-of-way.

**Mining Sequence and Planned Subsidence.** No underground mining will occur at this site. Therefore, no subsidence is anticipated. All land proposed to be affected by operations and reclamation at the waste rock site is shown on Plate 5-1. This Plate also provides an estimate of the total quantity of waste rock at the site that will be processed. It is anticipated that all coal recovery operations will be completed within one year of beginning. Therefore, Plate 5-1 also shows the extent of annual operations associated with this permit application. Reclamation of the site will begin as soon as practical following coal recovery operations. An estimate of the reclamation timetable is provided in Table 5-1. It is not currently anticipated that additional permits will be sought from the Division for this operation. All coal recovery and reclamation operations will occur within the disturbed area boundary shown on Plate 5-1 unless approved otherwise beforehand by the Division.

**Land Surface Configuration.** The surface contour data presented in Plate 5-1 were developed by an aerial survey conducted on September 26, 2014 by Aero-graphics. The 2-foot contour interval of this map is sufficient to clearly show surface topography and slope within the permit and adjacent areas.

**Surface Facilities.** Plate 5-1 shows the locations of the following surface facilities:

- Sedimentation pond,
- Roads, and
- Soil stockpile areas.

It is currently anticipated that coal recovery and loading operations will occur within the footprint of the existing waste rock piles noted on Plate 5-1. No buildings, utility corridors, or similar facilities exist or will be used within the permit area. No coal processing waste banks, dams, or embankments exist in the permit area. Similarly, no spoil or coal preparation waste sites exist in the permit area. The permit area shown on Plate 5-1 is the same as the land area for which a performance bond or other guarantee has been posted.

General refuse that is generated on site will be regularly removed from the site. This waste will consist predominantly of daily miscellaneous garbage (e.g., food wrappers, drink bottles, etc.) that will be responsibility of the individuals that generate the waste. A waste container will be provided for larger items of garbage that may be generated at the site. This waste will be disposed of (before the container is full) at an off-site location that permitted to accept such waste.

**Transportation Facilities.** Energy West constructed an access road to the waste rock pile at the beginning of site operations. This road, which will be used and maintained by BRCW during coal recovery and reclamation activities, is shown on Plate 5-1. Typical cross sections for the access road are also shown on Plate 5-1. A temporary roadway accessing the top of the waste rock pile is also shown on Plate 5-1. No permanent conveyors do or will exist in the permit area.

The general location of the site access road was disturbed by activities associated with the Utah Power and Light Research Farm prior to construction of the waste rock site. The access road was upgraded in the late 1980s, following issuance of the waste-rock facility permit, to a typical road width of 24 feet. The road subgrade was prepared by scarifying the ground to a depth of 6

inches and compacting the soil to 90% of standard Proctor density. The road subgrade consists of approximately 10 inches of bottom ash supplied from the Huntington Power Plant. This material was moisture-conditioned and compacted to 95% of standard Proctor density.

The untreated road base consists of 1-inch minus crushed gravel, with approximately 9% fines. The material was moisture conditioned and compacted to 95% of standard Proctor density. The final surface lift of the access road consists of a 3-inch thick layer of compacted, rotomilled asphalt.

The gradient of the access road averages approximately 3.3%, ranging from about 1.7% to 4.2%. The road surface slopes at a grade of about 1% toward roadside drainage channels. Road cut and fill slopes were typically constructed at angles of 1.5H:1V. Cuts into rock were constructed at slopes of approximately 0.5H:1V. A locking gate has been installed on the access road near its intersection with State Route 31 to control access to the site.

The locations of culverts and drainage ditches associated with the permit-area roads are shown on Plate 5-1. These drainage structures are discussed in Section 7.5.2.2 of this application.

#### **5.2.1.2 Signs and Markers**

**Permit Identification Signs.** A permit identification sign will be placed so that it is visible from the location where the site access road joins State Route 31. The sign will be of a design that can be easily seen and read, will be made of durable material, and will conform to local laws and regulations. The sign will contain the following information:

- The name, business address, and telephone number of the permittee and
- The permanent program permit number as obtained from the Division.

The sign will be retained and maintained until after the release of all bonds for the permit area.

**Perimeter Markers.** The perimeter of the facility (disturbed area boundary) is marked with a fence.

**Buffer Zone Markers.** Since the facility is not located near a perennial or intermittent stream channel, there are no stream buffer zone markers at the site.

**Topsoil Markers.** Markers have been placed on each soil stockpile indicating that they contain topsoil.

### **5.2.2 Coal Recovery**

The operations anticipated under this application will be for the recovery of coal from an existing waste rock pile, thereby converting a waste material into a valuable product. An inspection report filed by Energy West for the fourth quarter of 2014 indicates that the waste rock site has a capacity of 468,215 yd<sup>3</sup>. This report further states that the north half of the site is filled to 87% of capacity and the south half is filled to 44% of capacity. Assuming that the capacities of the north and south halves of the site were equal, approximately 306,700 yd<sup>3</sup> of waste rock exist on the site at the time of this application. Placement of a substantial additional quantity of waste rock at the site is not anticipated by Energy West.

Coal recovery from the Deer Creek waste rock pile will be performed by crushing, screening, and other methods as appropriate. Primary equipment to be used in coal recovery operations will include loaders, excavators, a crusher, and haul trucks. The goal of the recovery operations will be to maximize the economic recovery of coal, thereby minimizing (to the extent economically feasible) the quantity of this valuable resource that remains on site at the time of reclamation. It is anticipated that the operations proposed herein will recover approximately 60% of the existing material from the existing waste rock pile, leaving 40% of the volume as reject to be disposed of on site

Activities associated with coal recovery will be kept within the footprint of the existing waste rock pile unless approved otherwise beforehand by the Division. Waste rock will initially be excavated from the south side of the pile, with the recovered coal and the waste rock reject temporarily stored on unprocessed waste rock. The control of runoff and sediment will be maintained during this operation as discussed in Section 7.4.6.2. The recovered coal will be transported by truck to the BRCW dry-coal cleaning facility located on in Wellington, Utah for further processing. The reject material will be placed in the area from which the waste rock was excavated once sufficient space becomes available.

It is currently anticipated that all waste rock will be processed through the entire thickness of the pile. Exceptions may occur in areas where the bottom layer of material contains minimal recoverable coal or in areas where a base of coarser material is needed to permit equipment traffic in the area. As more waste rock is processed, temporary storage of recovered coal and final storage of reject will occur in areas currently occupied by waste rock.

Areas outside of the existing waste rock footprint will be disturbed only if it becomes impractical to conduct all operations within the existing footprint. BRCW will not move operations outside of the existing waste rock footprint without first modifying this permit application and obtaining approval for that modification from the Division. If it becomes necessary to move outside of the existing footprint, topsoil and subsoil will be removed from areas of planned disturbance. This soil will be segregated into topsoil and subsoil stockpiles at the edge of the planned disturbance. The soil stockpiles will be surrounded by silt fences, straw wattles, or soil berms to preclude off-pile transport of sediment. If runoff from the future disturbed area will not report to the sedimentation pond, that portion of the disturbed area will also be surrounded by a silt fence, straw wattles, or berms, except for breaks for vehicle access. The ground at any such breaks will be graded to prevent off-site transport of sediment.

### **5.2.3 Mining Methods**

No underground or surface mining of naturally in-place coal will occur at the Deer Creek site. However, coal will be recovered from the existing waste rock pile using the methods discussed in Section 5.2.2. It is anticipated that coal recovery operations at the site will be completed within one 12-month period. Hence, assuming recovery of 184,020 cubic yards of coal (60% of the total volume of 306,700 cubic yards of waste rock, as indicated above), the annual and total production of coal from the site will be approximately 129,200 tons (based on a unit weight of 52 pounds per cubic foot for broken coal).

### **5.2.4 Blasting and Explosives**

Blasting and explosives will not be stored or used at the site.

### **5.2.5 Subsidence**

There will be no underground mining or subsidence at this facility. Hence, no pre-subsidence survey will be conducted, no areas require protection from subsidence, no subsidence control plan will be developed, no subsidence control measures will be implemented, no subsidence damage repair will be performed, and no public notice of underground mining activities will be required.

### **5.2.6 Mine Facilities**

Although no underground or surface coal mining will occur at the Deer Creek site, mobile equipment will be used to recover coal from the waste rock pile. The equipment and associated processes that are planned for use at the site are detailed in the following sections.

### **5.2.6.1 Mine Structures and Facilities**

Waste rock has been placed at the Deer Creek site since the late 1980s. No permanent structures (e.g., buildings, utilities, processing equipment, etc.) were present at the site prior to the submittal of this application. No permanent structures will be installed as part of the operations planned herein. Crushing and screening equipment will be temporarily located on site to process the waste rock and recover coal. Loaders and other mobile equipment will be used as needed to move material from the waste rock pile to the processing area and from the processing area to the transport trucks. No footings or other foundations will be constructed for this equipment. All equipment will be actively maintained in good functional condition.

It is anticipated that the crushing and screening equipment will be mobilized to the site as soon as feasible after issuance of regulatory permits. This equipment will be operated in accordance with manufacturer's recommendations and permits issued by the Utah Division of Oil, Gas and Mining and the Utah Division of Air Quality. All of the equipment will be used specifically to recover coal from the waste rock and is considered adequate to meet the requirements of R645-301. No coal recovery operations will occur within 100 feet of the right-of-way of any public road, except for the transport of coal from the site where the access road joins that right-of-way. No public roads will be relocated under the operations planned herein. All crushing, screening, and other equipment required for this operation will be removed following operations in accordance with the reclamation plan discussed in Section 5.40.

### **5.2.6.2 Utility Installation and Support Facilities**

**Utility Installations.** No electric lines, telephone transmission lines, water lines, sewer lines, water wells, oil wells, or other utilities currently pass over, under, or through the permit area. Operations at the site will use temporary utilities only (i.e., generators, water transported to the site via tankers, etc.). All operations will be conducted to prevent damage, destruction, or disruption of

utility services in the general area. Since there is no planned subsidence on site, no utilities are located within permit area subsidence zones.

**Support Facilities.** Support facilities at the Deer Creek site will consist only of mobile equipment. No permanent equipment or utilities will be constructed at the site. All equipment will be operated in accordance with the permit issued for this operation. Support facilities will be located, maintained, and used in a manner that:

- Prevents or controls erosion and siltation, water pollution, and damage to public or private property,
- To the extent possible, using the best technology currently available, minimizes damage to fish, wildlife, and related environmental values, and
- Minimizes additional contributions of suspended solids to stream flow or runoff outside the permit area.

All support facilities will be removed following operations in accordance with the reclamation plan discussed in Section 5.40.

**Water Pollution Control Facilities.** Water pollution control facilities at the Deer Creek site consist of one sedimentation pond (with its appurtenant structures), silt fences, and straw wattles. Sanitary waste at the site will be handled via portable toilets. The sedimentation pond will be reclaimed and the portable toilet will be removed following the completion of coal recovery operations at the site. Site reclamation is discussed in Section 5.40.

The sedimentation pond and appurtenant structures have been constructed as discussed in Chapter 7 and will be used and maintained as discussed in Section 5.3.3.7 of this application.

## **5.2.7 Transportation Facilities**

### **5.2.7.1 Road Classification**

The access road that leads to the facility from State Route 31 will be used to transport coal and is classified as a primary road. Interior roads at the site are considered ancillary.

### **5.2.7.2 Description of Transportation Facilities**

No surface conveyors (other than those that may be used to transfer and temporarily stockpile materials for or after processing) or rail systems have been or will be constructed, used, or maintained within the permit area.

**Road Specifications.** Cross sections are provided on Plate 5-1 for the access road that will be used and maintained by BRCW. Information regarding road drainage is presented in Chapter 7. Additional information regarding the site access road is provided in Section 5.2.1.1.

The access road will be maintained and repaired as needed prior to reclamation. Maintenance work will be performed to ensure that the road and the associated drainage structures (ditches and culverts) meet the design standards and to ensure the safety and proper functioning of trucks and equipment. Road maintenance may include repairs to potholes and other defects that affect the normal operability of the road. Drainage system maintenance may include cleaning of ditches and culverts as needed to maintain design capacities. Roads within the permit area that are damaged by a catastrophic event, such as a flood or earthquake, will be repaired as soon as practical after the damage has occurred.

**Drainageway Alterations.** No alterations or relocations of natural drainageways are required within the permit area to accommodate the needs of transportation systems.

## **5.2.8 Handling and Disposal of Coal, Excess Spoil, and Coal Mine Waste**

### **5.2.8.1 Coal Handling and Transportation**

Coal will be recovered from the waste rock pile using crushing and screening equipment and other equipment as needed to maximize coal recovery within economic constraints. Additional information regarding planned coal recovery operations at the site is provided in Section 5.2.6 of this application. Crushing and screening operations will be conducted within the footprint of the existing waste rock pile using a mobile crusher. The crusher will be moved within the pile footprint as needed to maintain efficient operations. Recovered coal will be temporarily stored adjacent to the crusher location, within the footprint of the existing waste rock pile, until this coal is loaded and hauled off site. The recovered coal will be transported by truck to the BRCW dry-coal cleaning facility for further processing.

### **5.2.8.2 Overburden**

No overburden will be removed, handled, stored, or transported within the permit area.

### **5.2.8.3 Spoil, Coal Processing Waste, Non-Coal Waste, and Mine Development Waste**

**Excess Spoil.** No spoil will be generated at the Deer Creek site.

**Coal Processing Waste.** Following recovery of coal from the waste rock, all reject material will be placed back on areas currently occupied by the waste rock. It is anticipated that the operations proposed herein will recover approximately 60% of the existing material, leaving 40% of the volume as reject to be returned to the waste rock pile. With a current volume of approximately 306,700 yd<sup>3</sup> in the waste rock pile (see Section 5.2.2), it is anticipated that about 184,000 yd<sup>3</sup> of material will be removed from the site, leaving 127,700 yd<sup>3</sup> of reject for on-site

disposal. Under the reclamation plan presented herein, the footprint of the reject pile will cover approximately the same area as the current waste rock pile, thereby reducing the height of the pile below that which currently exists. Additional information regarding placement, compaction, and final reclamation of the reject is provided in Sections 5.3.6 and 5.4.2.2.

**Non-Coal Mine Waste.** No non-coal waste will be disposed of within the permit area. No non-coal waste that is defined as hazardous in 40 CFR 261 will be generated at the site. If such waste is generated in the future, it will be handled in accordance with the requirements of Subtitle C of the Resource Conservation and Recovery Act and any implementing regulation.

**Underground Development Waste.** No new underground development waste will be generated at the site. Reject from the recovery operations will be placed back within the footprint of the existing waste rock pile, as described above. Additional information regarding the placement of this refuse is provided in Section 5.3.6 of this application.

**Minimization of Acid, Toxic, and Fire Hazards.** Data presented in Section 6.2.3 and Appendix 6-1 of this application indicate that the waste rock from which coal will be recovered is neither acid- nor toxic-forming. Thus, no acid- or toxic-forming materials will be placed on the site following recovery of coal from the existing waste rock.

Coal that is recovered from the waste rock pile will be only temporarily stored at the site. Hence, there is no significant potential for this coal to spontaneously combust. Any coal fires that do occur will be handled as outlined in Section 5.1.3.8. No waste materials that constitute a fire hazard (i.e. grease, lubricants, paints, and flammable liquids) will be accumulated at the site.

#### **5.2.8.4 Dams, Embankments, and Impoundments**

No dams, embankments, or impoundments will be used for the handling or disposal of coal, overburden, excess spoil, or coal mine waste in the permit area.

### **5.2.9 Management of Mine Openings**

There are no mine openings at the Deer Creek site.

## **5.30 Operational Design Criteria and Plans**

### **5.3.1 General**

This application contains a general plan for the sedimentation pond located in the permit area. No other water impoundments or coal processing waste banks, dams, or embankments exist in the permit area. Since subsidence will not occur at the site, and no underground mining has occurred beneath the site, no damage will occur to surface operations due to subsidence.

### **5.3.2 Sediment Control**

Sediment-control measures for the Deer Creek site are described in Section 7.3.2 of this application. Sediment-control structures at the site consist of a sedimentation pond located adjacent to the west side of the waste rock pile, silt fences and straw wattles installed in areas that do not flow to the sedimentation pond, and drainage ditches and culverts that convey disturbed-area runoff to the sedimentation pond and undisturbed-area runoff away from disturbed areas. Runoff-control structures have been designed to convey runoff in a non-erosive manner.

Runoff is retained behind the silt fences and straw wattles that have been installed in areas that do not flow to the sedimentation pond, thereby precluding discharge of this water to undisturbed areas. Additional information regarding sediment-control measures at the site is provided in Section 7.3.2.

In addition to the use of a sedimentation pond, silt fences, straw wattles, and properly designed runoff-control facilities, sediment yields in the permit area will be further minimized by:

- Disturbing the smallest practicable area during operations,
- Contemporaneously reclaiming areas suitable for such reclamation,
- Roughening of the surface soil during topsoil redistribution, and
- Construction of a stable site entrance (Figure 5-2) at the northern extent of the asphalt roadway, thereby minimizing the potential for off-site transport of sediment via vehicle tires.

### **5.3.3 Impoundments**

#### **5.3.3.1 Slope Stability**

The sedimentation pond located immediately west of the waste rock pile was constructed by excavating approximately 6 feet of soil, thereby creating a below-grade impoundment. The resulting depression has the required storage capacity with the design elevation of water primarily below the natural grade line. Appendix 5-3 contains a stability analysis of the pond embankment. According to these analyses, the minimum calculated factors of safety for the outslope and inslope of the pond are 2.89 and 2.02, respectively. These values exceed the minimum safety factor of 1.3 required for pond embankment by R645-301-533.100.

#### **5.3.3.2 Foundation Considerations**

The sedimentation pond was constructed below grade in stable, natural soil. Cross sections of the sedimentation pond are presented in Chapter 7 of this document.

### **5.3.3.3 Slope Protection**

The outslopes and inslopes of the sedimentation pond are periodically inspected for signs of surface erosion. The inlets and outlets of the pond are armored with rip rap.

### **5.3.3.4 Embankment Faces**

The soil stockpiles that surround the sedimentation pond have been revegetated to protect against erosion. Riprap has also been placed to protect pond slopes and embankments near the discharge structures.

### **5.3.3.5 Highwalls**

No highwalls are located within the permitted boundary.

### **5.3.3.6 MSHA Criteria**

The site sedimentation pond does not meet the size criteria of 30 CFR 216(a).

### **5.3.3.7 Pond Operation and Maintenance Plans**

The sedimentation pond was designed in accordance with R645-301-740. Details of this design are presented in Chapter 7.

The sedimentation pond is designed as a total containment structure, with an emergency spillway to discharge water in the event that a storm generates sufficient runoff to exceed the design capacity. Since the pond was designed to contain the runoff resulting from two 100-year, 24-hour storm events, the probability of exceeding the storage capacity of the pond is extremely

small. Water held in the pond evaporates or infiltrates into the ground. Water may also be pumped from the pond for use in dust suppression at the site.

Inspections of the sedimentation pond will be conducted on a quarterly basis (see Section 5.1.4.3). Maintenance that is required to keep the pond in good working condition will be performed on an as-needed basis.

Sediment will be removed from the pond when it accumulates to 60 percent of the design sediment storage volume. If coal collects in the pond, this coal will be recovered as part of normal site operations. Non-coal sediment will be placed with the reject from the coal recovery operations.

### **5.3.4 Roads**

#### **5.3.4.1 Location, Design, Construction, Reconstruction, Use, Maintenance, and Reclamation**

**Control of Damage to Public or Private Property.** All roads used by BRCW were designed in accordance with applicable County and facility-use requirements. By designing according to these standards, the potential for damage to public or private property has been minimized.

**Road Surfacing.** The site access road is surfaced with rotomilled asphalt that was compacted during placement (see Section 5.2.1.1). No acid- or toxic-forming materials have been or will be used in the road surfaces.

**Slope Stability.** The site access road was constructed in the late 1980s and has been used for site operations for over 25 years. No road slope stability issues have been observed during this time frame. An analysis of the stability of the road embankment is provided in Appendix 5-3. As

indicated therein, the minimum calculated safety factor against failure of the road embankment is 1.46 under both existing and reclaimed scenarios. This exceeds the minimum safety factor of 1.3 required for roads by R645-301-534.130.

#### **5.3.4.2 Environmental Protection and Safety**

Safety and environmental protection were primary concerns during the design and construction of the access road. The grade, width, and surface materials used for the road was selected to be appropriate for the planned duration and use of the road.

#### **5.3.4.3 Primary Roads**

The site access road was designed, constructed, and will be maintained to meet the requirements of Utah Administrative Rules R645-301-358, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-542.600, R645-301-542.600, and R645-301-762. Furthermore, the road has the following characteristics:

- It is located on a stable surface,
- It was constructed with a sufficiently durable surface for the traffic volume and vehicle speeds on the road,
- It is maintained as needed, and
- Culverts have been designed, constructed, and are maintained to withstand the loads imparted by the vehicle traffic on the road.

#### **5.3.5 Spoil**

No spoil is generated in the permit area.

### **5.3.6 Coal Mine Waste**

Coal will be recovered from the existing waste rock pile to the extent feasible. Material that is not economically recoverable (“reject”) will be placed in a controlled manner back within the footprint of the existing waste rock pile. Information regarding placement of the reject material is provided below.

#### **5.3.6.1 Design**

A geotechnical evaluation of the waste rock and the foundation beneath the pile was conducted in 1988 prior to construction of the pile. The results of this evaluation are provided in Appendix 5-2. As part of that investigation, two holes were drilled in the vicinity of the waste rock pile, one to a depth of 80 feet and the other to a depth of 82 feet. These holes encountered low plasticity clay to sandy-gravelly clay (i.e., weathered shale) to a depth of 15 to 16 feet at the site. This material was described as cohesive and in a medium-stiff condition. The in-place density of the soil was 108 to 117 lb/ft<sup>3</sup>. The unweathered shale at depth was defined as competent. Thus, the foundation upon which the waste rock rests is considered stable.

Stability analyses presented in Appendix 5-2 indicate that the minimum static safety factor against mass failure of the pile is 1.50 for a pile outslope of 1.75H:1V and 1.62 for a pile outslope of 2H:1V. These safety factors were calculated assuming conservative values for soil strength, based on the results of field and laboratory analyses of soils at the site, as outlined in Appendix 5-2. These safety factors meet or exceed the minimum requirements of R645-536.110.

#### **5.3.6.2 Waste Emplacement**

Reject from coal recovery operations will be placed with outslopes of approximately 2H:1V, thereby enhancing the stability of the waste pile. The reject will be placed in horizontal lifts that do not exceed 2 feet in thickness. The geotechnical evaluation provided in Appendix 5-2

indicates that placement of the reject in this manner will be structurally stable, with a minimum factor of safety against failure of 1.5 if the ground immediately below the reject is saturated and a higher safety factor if the underlying ground is not saturated (as is expected). The material will be dumped from loaders or haul trucks. Loaders or dozers will be used to rework and initially compact the dumped material. Additional compaction of each lift will be accomplished by routing the loaded equipment over the prior lift surface.

#### **5.3.6.3 Excess Spoil Fills**

No excess spoil fills exist in the permit area.

#### **5.3.6.4 Impounding Structures Constructed of Coal Mine Waste**

No impounding structures have been or will be constructed of coal mine waste in the permit area.

#### **5.3.6.5 Disposal of Coal Mine Waste in Special Areas**

No coal mine waste has been or will be disposed of in special areas in the permit area.

#### **5.3.6.6 Underground Development Waste**

A description of pre-disturbance soil resources at the waste-rock disposal site is provided in Chapter 2 of this application. Methods used to stockpile topsoil at the site are also discussed in Chapter 2.

As indicated in Section 6.2.3 of this application, the material in the waste rock pile is neither acid- nor toxic-forming. Furthermore, as discussed in Sections 5.3.6.1 and 5.3.6.2 above,

the reject pile will be stable following placement. Therefore, reject material is considered suitable for reclamation.

#### **5.3.6.7 Coal Processing Waste**

No coal processing waste generated within the permit area will be returned to abandoned underground workings.

#### **5.3.6.8 Coal Processing Waste Banks, Dams, and Embankments**

No coal processing waste banks, dams, or embankments exist within the permit area.

#### **5.3.6.9 Refuse Piles**

A description of the anticipated reject pile is provided elsewhere in this application. Specifically:

- A description of the pre-disturbance soils is provided in Chapter 2.
- A discussion of the suitability of the reject for reclamation is provided in Section 5.3.6.6.
- Certification of all designs and plans is provided in the chapters where those designs and plans are first presented.
- A description of proposed inspection activities is provided in Section 5.1.4.2.
- A description of the design, stability, operation, and reclamation of the final reject disposal site is provided in various subparts of Section 5.3.6.
- A discussion of runoff- and sediment-control plans associated with the site is provided in Chapter 7.

All designs and plans presented in this application were prepared in compliance with applicable MSHA regulations.

### **5.3.7 Regraded Slopes**

Reclamation of this site will not involve significant regrading of slopes.

## **5.40 Reclamation Plan**

### **5.4.1 General**

Prior to disturbance of the area by Energy West for use as a waste rock disposal facility, land within the permit area was used as wildlife habitat. BRCW intends to reclaim the site in a manner that returns the site to a condition that will serve as wildlife habitat. This is consistent with the pre-mining land use and also the capability of the soil as defined in Section 2.2.2.4 of this application (Class 8 capability, indicating that the soil cannot support agricultural and other high-use activities but can support recreational uses, wildlife habitat, watershed, or esthetic uses). A post-mining land use of wildlife habitat is also consistent with current zoning ordinances (see Section 4.1.1.1 of this application).

#### **5.4.1.1 Commitment**

Upon the permanent cessation of coal recovery operations at the Deer Creek site, BRCW will reclaim the site so that it is compatible with use for wildlife habitat. Stockpiled soil will be redistributed over the disturbed area and this area will be revegetated using the approved seed mix.

#### **5.4.1.2 Surface Coal Mining and Reclamation Activities**

No underground openings, equipment, structures, or other facilities exist in the permit area.

### 5.4.1.3 Underground Coal Mining and Reclamation Activities

No surface equipment, structures, or other facilities exist in the permit area.

### 5.4.1.4 Environmental Protection Performance Standards

The plan presented herein is designed to meet the requirements of R645-301 and the environmental protection performance standards of the State Program.

## 5.4.2 Narratives, Maps, and Plans

### 5.4.2.1 Reclamation Timetable

A timetable for the completion of each major step in the reclamation plan is presented in Table 5-1. ~~Given the short anticipated time frame for reclamation of the site, the information presented in Table 5-1 is not presented on a map. Although significant precedence has been set in Utah for the reclamation of mine sites using a method known as deep gouging, BRCW will retain the sedimentation pond during initial site reclamation and implement reclamation of the Deer Creek site in a phased manner to satisfy the requirements of R645-31-763.100. This phasing is shown on Plate 5-3. However, it~~ is anticipated that reclamation of the site will proceed in the following general order:

1. Install temporary sediment controls (silt fences, straw wattles, etc.) in areas not otherwise controlled.
- ~~2. Remove asphalt from the access road surface and place this asphalt on the reject pile.~~
- ~~3.2.~~ Grade the reject pile to achieve the final configuration within the Phase I area noted on Plate 5-3.
- ~~4.3.~~ Construct reclamation temporary berms and diversion channels RC-1 through RC-6 across as needed along the edges of the regraded reject pile to convey runoff from the reject pile to the sedimentation pond.

- ~~5.4.~~ Remove the upper foot of soil from the soil stockpiles adjacent to the reject pile and temporarily segregate this for use as topsoil. Initially maintain the soil stockpiles that form the embankments for the sedimentation pond for later reclamation use.
- ~~6.5.~~ Place subsoil from the soil stockpiles onto the regraded reject pile ~~and the sedimentation pond.~~
6. Place topsoil on the subsoil that has been placed on the regraded reject pile ~~and the sedimentation pond.~~
7. Incorporate mulch and gouge the topsoil.
8. Revegetate the topsoil that was placed on the regraded reject pile ~~and the sedimentation pond.~~
9. Wait for 2 years to satisfy the requirements of R645-301-763.100.
10. Remove asphalt from the site access road and place this asphalt within the sedimentation pond.
11. Construct final reclamation channels RC-1 through RC-6 and regrade the surface of the reclaimed reject pile where disturbed by Phase II reclamation.
12. Regrade the areas of the current undisturbed-area diversions as needed to allow free drainage of off-site areas through the reclamation channels.
13. Place the material excavated for construction of the final reclamation channels in the area of the sedimentation pond and grade this material as needed.
14. Segregate the remaining topsoil from the berm of the sedimentation pond. Place the subsoil and topsoil from this berm on the reject exposed during construction of the reclamation channels and on the graded reject within the current boundaries of the sedimentation pond.
15. Incorporate mulch and gouge the topsoil.
- ~~8.16.~~ Revegetate the topsoil that was placed during Phase II as well as previously revegetated areas that were disturbed during construction of the reclamation channels and Phase II grading activities.
- ~~9.17.~~ Recontour the access road, construct the associated reclamation channels, and revegetate the area of the access road. This work will proceed from north to south in a manner that allows the efficient use of equipment.

BRCW acknowledges that the Utah Coal Regulatory Program calls for sedimentation ponds to be retained for a period of at least 2 years after the last augmented seeding following the initiation of reclamation activities (see R645-301-356.300 and R645-301-763). ~~However~~ Although, as indicated in Figure 5-3, this rule would prevent final reclamation and/or cause re-disturbance of at least 6.01 acres of the 14.69-acre total disturbed area following the waiting period after the last augmented seeding. BRCW will reclaim the site in a phased approach as indicated above to comply with the rule. ~~Thus, at least 41% of the disturbed area would remain un-reclaimed and/or~~

~~require re-disturbance following the initiation of reclamation activities. In reality, this percentage of un-reclaimed or re-disturbed land would likely be much greater in order to maintain reasonable site access and equipment operation efficiencies.~~

~~Given this situation, BRCW proposes to remove the sedimentation pond, regrade and reclaim the waste rock area, construct the final reclamation channels, and reclaim the site access road as one efficient operation. In lieu of the sedimentation pond, sediment control will be provided during reclamation using t~~The proven surface-roughening technique known as deep gouging retains essentially all of the precipitation that falls on a site. Justification for using this approach, rather than retaining the sedimentation pond for at least 2 years after the last augmented seeding, is provided as indicated in Appendix 5-4. Nonetheless, temporary diversion ditches will be installed at the locations shown on Plate 5-3 to provide an extra measure of assurance that runoff from the disturbed area will report to the sedimentation pond during the period between Phase I and Phase II reclamation. The design of these temporary diversions is discussed in Chapter 7. The temporary sediment controls installed at the beginning of Phase I reclamation will be retained to control sediment yield from areas not otherwise controlled.

#### **5.4.2.2 Plan for Backfilling, Soil Stabilization, Compacting, and Grading**

Prior to beginning reclamation operations, erosion and sediment yield from all areas to be affected by these operations will be controlled by installation of silt fences, straw wattles, or soil berms, except for breaks for vehicle access. The ground at any such breaks will be graded to prevent off-site transport of sediment.

~~Following the completion of coal recovery operations, the asphalt surface will be scraped from the site access road and placed on the reject pile. This will be accomplished using dozers, loaders, haul trucks, and/or other equipment as needed. The road surface will be graded and watered as needed following removal of the asphalt to allow efficient access to the site and to suppress dust during reclamation operations.~~

~~Following placement of waste asphalt on the reject pile, the~~ reject pile will be regraded to slope generally from east to west and north to south, as shown on Plate 5-3. ~~Reject material will be pushed into the sedimentation pond~~ This will be accomplished using dozers, loaders, trackhoes, and/or other equipment as needed. The material will be compacted using a sheepfoot roller or other appropriate equipment to achieve approximately 90% of standard Proctor density. ~~Filling of the pond will continue to the approximate elevation of the top of the originally excavated ground surface, thereby retaining all subsoil for capping of the final reject pile surface.~~

~~As the pile is being regraded, reclamation channels will be cut through the pile into the underlying soil (see Plate 5-3). These channels will be lined with riprap and have the dimensions described in Section 7.6.1 and Appendix 7-9 of this application.~~

A cap consisting of subsoil overlain by topsoil will be placed on the surface of the regraded reject pile. It is currently anticipated that topsoil will be removed first from the upper 12 inches of the north soil stockpile, to approximately the northwest edge of the Phase I reclamation area, and placed in a temporary stockpile located in an area of convenient access. The subsoil from that portion of the north stockpile will then be spread in 12-inch (maximum) uncompacted lifts over the northern portion of the regraded ~~are~~ reject pile. Spreading of the soil will be accomplished using loaders, dozers, trackhoes, and/or other equipment as needed. This subsoil will be compacted to achieve approximately 90% of standard Proctor density. The upper layer of the redistributed subsoil will be minimally compacted and scarified to promote bonding with topsoil. The topsoil material from the temporary stockpile will then be distributed over the redistributed subsoil layer. The topsoil will be spread using track-mounted equipment to minimize compaction so as not to interfere with plant root development.

Reclamation of the western and southern portions of the regraded ~~are~~ reject pile will occur as outlined above. Topsoil will be removed from the upper 12 inches of the adjacent soil stockpiles, to approximately the southwest corner of the Phase I reclamation area, and

temporarily stored in an area of convenient access. Subsoil will then be spread over the remainder of the regraded area, leaving the top layer of subsoil in a less-compacted state. The topsoil will then be placed on the reclaimed surface.

Mulch will be applied to the redistributed topsoil at the rates identified in Section 2.4.4.2 of this application. Following application of the mulch, the mulch will be crimped into the topsoil and the soil surface will be gouged to promote moisture retention and minimize erosion. Surface gouging will be accomplished using a trackhoe bucket or dozer blade to create small depressions throughout the soil surface. The reclaimed area will then be seeded as indicated in Section 3.4.1.2 of this application.

In accordance with R645301-763.100, two years following the completion of coal recovery Phase I reclamation operations, the asphalt surface will be scraped from the site access road and placed on the reject pile within the basin of the sedimentation pond. This will be accomplished using dozers, loaders, haul trucks, and/or other equipment as needed. The road surface will be graded and watered as needed following removal of the asphalt to allow efficient access to the site and to suppress dust during reclamation operations.

As the pile is being regraded, reclamation channels will then be cut through the previously-reclaimed reject pile into the underlying soil (see Plate 5-3). These channels will be lined with riprap and have the dimensions described in Section 7.6.1 and Appendix 7-9 of this application. Materials removed during excavation of the reclamation channels will be placed within the basin of the sedimentation pond and compacted as outlined above. The Phase I reclamation channels will also be removed using trackhoes and dozers as appropriate. Topsoil will then be stripped from the upper 12 inches of the sedimentation pond berms and set aside. The subsoil that comprises the remainder of the sedimentation pond berms will then be pushed onto the material that was placed in the pond basin, as outlined above. Subsoil will also be placed on the reject that was exposed during excavation of the reclamation channels and removal of the Phase I reclamation channels. The segregated topsoil will then be placed on the subsoil

and the topsoil will be mulched. All areas that were disturbed during Phase II reclamation of the reject pile will then be seeded as indicated above.

Information presented on Plate 2-1 indicates that the soil stockpiles adjacent to the current waste rock pile contain 33,898 yd<sup>3</sup> of subsoil and 2,303 yd<sup>3</sup> of topsoil. This is sufficient to place an average of approximately 35 inches of subsoil over the area of the former waste rock pile and sedimentation pond (to be occupied at that time by the reject pile), and 2.5 inches of topsoil over the reclaimed area. This thickness of cover over the reject is considered sufficient, given that the reject is neither acid- nor toxic-forming (see Section 6.2.3 of this application).

Final reclamation of the site access road will occur after the remainder of the site has been reclaimed (i.e., after access to the site by heavy equipment is no longer needed). The gravel road surface material and bottom ash road subgrade material will be graded against the inside cut slopes of the road cross-section. The topsoil on the embankment out slopes will be removed and temporarily stockpiled where it will not be damaged by subsequent reclamation efforts. The subsoil material from the embankment slopes will be spread over the redistributed road base. The topsoil material from the temporary stockpiles will then be spread over the area, mulched, gouged, and seeded as outlined above. This will be accomplished in phases as needed to allow equipment access to areas along the road requiring mulching and seeding.

#### **5.4.2.3 Final Surface Configuration Maps and Cross Sections**

The anticipated final surface configuration and associated cross sections are shown on Plate 5-3. This Plate also shows the approximate location of the dividing line used to determine reclamation cut and fill volumes in the area of the reject pile and along the site access road. These volumes were then used for the sake of determining reclamation costs. Reclamation cross sections are shown on Plates 5-4 and 5-5. No structures will remain on the site following reclamation.

#### **5.4.2.4 Removal of Temporary Structures**

All equipment required for coal recovery operations will be removed from the site prior to reclamation.

#### **5.4.2.5 Removal of Sedimentation Ponds**

The sedimentation pond will be backfilled during Phase II reclamation. Surface roughening during final reclamation will create a condition that minimizes the potential for erosion of reclaimed areas, thereby precluding ~~the need to retain~~ off-site impacts following removal of the sedimentation pond (see Appendix 5-4).

#### **5.4.2.6 Roads**

All roads within the permit area will be removed during reclamation of the site.

#### **5.4.2.7 Final Abandonment of Mine Openings and Disposal Areas**

There are no mine openings, areas of excess spoil, or areas for disposal of non-coal waste in the permit area. The reject from coal recovery operations will be reclaimed as described in Section 5.4.2.2 above.

#### **5.4.2.8 Estimated Cost of Reclamation**

The estimated cost to reclaim the Deer Creek site is provided in Chapter 8. Estimated quantities of materials involved in reclamation are also provided in Chapter 8.

### **5.50 Reclamation Design Criteria and Plans**

#### **5.5.1 Casing and Sealing of Underground Openings**

There are no underground openings within the permit area.

## **5.5.2 Permanent Features**

### **5.5.2.1 Small Depressions**

As indicated in Section 5.4.2.2, several small depressions (i.e., gouges) will be left in the reclaimed soil to retain moisture, minimize erosion, and enhance revegetation. This, in turn, will improve wildlife habitat following reclamation.

### **5.5.2.2 Permanent Impoundments**

No impoundments will be permanently retained on the site following reclamation.

## **5.5.3 Backfilling and Grading**

Plans for backfilling and grading of the site upon reclamation have been presented in Section 5.4.2.2 above. This plan was designed to comply with the applicable requirements of R645-301-500 and R645-301-700. As indicated in Section 5.4.2.2, backfilling and grading operations will be conducted in a controlled manner.

### **5.5.3.1 Disturbed Area Backfilling and Grading**

**Approximate Original Contour.** As indicated in Section 5.1.2.2 of this plan, non-coal rock and unrecoverable coal will remain at the site. However, due to the nature of such sites, no variance is being requested from the Approximate Original Contour requirements of the regulations.

**Elimination of Highwalls, Spoil Piles, and Depressions.** No highwalls or spoil piles exist at the site. The sedimentation pond will be removed during site reclamation. Cut slopes along the access road will be backfilled to extent feasible.

**Slope Stability.** Reject from coal recovery operations will be placed at a slope that provides a minimum static safety factor of 1.62 (see Section 5.3.6.1 of this plan). Cut slopes on the site access road will be backfilled during reclamation at a slope no steeper than the angle of repose of the backfill material.

**Erosion and Water Pollution.** As indicated in Section 5.4.2.2, the reclaimed soil surface will be left in a roughened state. This will improve moisture retention, promote revegetation, and minimize erosion potential, thereby minimizing water pollution both on and off the site.

**Post-Mining Land Use.** The disturbed area will be reclaimed in a manner that supports the post-mining wildlife-habitat land use.

### 5.5.3.2 Spoil and Waste

**Spoil.** No spoil is generated within the permit area.

**Refuse Piles.** As indicated in Section 5.3.6.2 of this application, reject from coal recovery operations will be compacted as it is placed. As further indicated in that section, the reject will be placed at a slope that provides an adequate static safety factor. Hence, the pile will be stable following reclamation.

**Coal Processing Waste.** No coal processing waste exists within the permit area.

### 5.5.3.3 Exposed Coal Seams, Acid- and Toxic-Forming Materials, and Combustible Materials

**Exposed Coal Seams.** No coal seams will be exposed as part of this operation.

**Acid- and Toxic-Forming Materials.** No acid-forming materials exist at the site.

**Combustible Materials.** No combustible materials will be exposed or permanently stored at the site as part of coal recovery operations.

#### **5.5.3.4 Cut-and-Fill Terraces**

Cut and fill sections that currently exist along the access road will be regraded during reclamation.

#### **5.5.3.5 Highwalls From Previously Mined Areas**

No highwalls from previously mined areas exist within the permit area.

#### **5.5.3.6 Previously Mined Areas Special Compliance Measures**

No previously mined areas exist within the permit area.

#### **5.5.3.7 Backfilling and Grading - Thin Overburden**

No surface coal mining and reclamation activities involving thin overburden occur within the permit area.

#### **5.5.3.8 Backfilling and Grading - Thick Overburden**

No surface coal mining and reclamation activities involving thick overburden occur within the permit area.

#### **5.5.3.9 Regrading of Settled and Revegetated Fills**

No regrading of settled and revegetated fills is anticipated in the permit area.

### **5.60 Performance Standards**

Coal mining and reclamation operations at the Deer Creek site will be conducted in accordance with the approved permit and the requirements of R645-301-510 through R645-301-553.

**TABLE 5-1**

Reclamation Timetable

| Activity   | Approximate Time                      |
|--|---------------------------------------|
| Install temporary sediment controls  | 1 week                                |
| <del>Remove asphalt from access road surface and place on reject pile</del>  | <del>1 week</del>                     |
| Grade reject pile to <u>interim</u> final configuration  | 2 weeks                               |
| Construct <del>reclamation</del> <u>diversion</u> channels <del>aerossas</del> <u>needed to direct runoff from the reject pile to the sedimentation pond</u>   | <del>21 weeks</del>                   |
| Segregate topsoil and place subsoil and topsoil on <del>the reject pile and adjacent sedimentation pond</del>  | 2 weeks                               |
| <del>Mulch and r</del> Revegetate reject pile and <del>sedimentation pond</del> <u>complete Phase I reclamation</u>  | 1 week                                |
| <u>Wait for 2 years in order to satisfy the requirements of R645-301-763.100</u>   | <u>2 years</u>                        |
| <del>Remove asphalt from the site access road and place this material within the sedimentation pond</del>  | <u>1 week</u>                         |
| <u>Construct final reclamation channels across the reject pile and place this material in the area of the sedimentation pond, grading as needed to achieve final configuration and to construct final reclamation channels. Regrade undisturbed-area diversions.</u> | <u>2 weeks</u>                        |
| <u>Segregate the remaining topsoil and place subsoil and topsoil from the berm of the sedimentation pond on the area of the backfilled sedimentation pond</u>  | <u>1 week</u>                         |
| <u>Mulch and revegetate the area of the backfilled sedimentation pond and areas re-affected by construction of final reclamation channels across the reject pile</u>   | <u>1 week</u>                         |
| Recontour access road, construct associated reclamation channels, and revegetate access road   | 2 weeks                               |
| APPROXIMATE TOTAL TIME   | 1 <del>4</del> weeks <u>+ 2 years</u> |

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

**APPENDIX 5-1**

Road Certification

**APPENDIX 5-2**

Waste Rock Site Geotechnical Evaluation

**APPENDIX 5-3**

Stability Evaluation of Site Access Road and  
Sedimentation Pond

#### **APPENDIX 5-4**

Justification for Removal of the Sedimentation Pond at the  
Beginning of Site Reclamation

## **CHAPTER 7**

### **HYDROLOGY**

#### **7.10 Introduction**

##### **7.1.1 General Requirements**

This chapter was prepared by the applicant, BRC Wellington LLC (“BRCW”), and presents a description of:

- Existing hydrologic resources within the permit and adjacent areas;
- Proposed operations and the potential impacts to the hydrologic balance;
- Methods of compliance with design criteria;
- Applicable hydrologic performance standards; and
- Hydrologic reclamation plans for the Deer Creek waste rock site (the “Deer Creek site” or the “site”).

##### **7.1.2 Certification**

All appropriate maps, plans, and cross sections presented in this chapter have been certified by a qualified, registered professional engineer.

##### **7.1.3 Inspection**

Impoundments associated with the operations discussed herein will be inspected as described in Section 5.1.4.3 of this application.

## **7.20 Environmental Description**

### **7.2.1 General Requirements**

This section presents a description of the pre-operational hydrologic resources within the permit and adjacent areas that may be affected or impacted by the operation and reclamation of the site.

### **7.2.2 Cross Sections and Maps**

#### **7.2.2.1 Location and Extent of Subsurface Water**

A generalized hydrostratigraphic cross section of the region is presented in Figure 7-1. As indicated in Chapter 6 of this application, Rocks exposed on the surface of the permit area are marine-derived mudstones in the lower portion of the Masuk Member of the Mancos Shale. A test hole drilled at the site of the existing waste rock pile encountered groundwater at a depth of 33 feet below ground surface (see Appendix 5-3). The static water level was reported at a depth of 23 feet below ground surface in this hole. The subsurface material at this location was report as being “relatively impervious” in the upper 43 feet of the boring, with a hydraulic conductivity that ranged from 347 to 763 feet per year (1.0 to 2.1 ft/day) in the zone from 43 to 82 feet below ground surface).

It is assumed that groundwater occurs continuously beneath the site. Groundwater in the area is recharged by infiltration of local precipitation. However, given the low permeability of the shale that occurs on the surface, this groundwater is not available for beneficial use. Energy West installed a monitoring well at the site in 1989 at the location indicated on Figure 7-2 and has monitored this well continuously since that time. A completion log of this well is provided

in Appendix 7-1. Additional information regarding the data collected from that well is provided in Section 7.2.4.1 of this application.

### **7.2.2.2 Location of Surface Water Bodies**

A map showing the location of surface water bodies in the area is provided in Figure 7-3. No surface water bodies exist within the permit area. However, the map shows the following nearby surface water bodies:

- An evaporation pond located southwest of the permit area and maintained by Rocky Mountain Power Company in conjunction with the nearby Huntington Power Plant
- A small evaporation pond located east of the permit area adjacent to the coal-blending site operated by Rocky Mountain Power Company. This pond is located approximately 100 feet higher in elevation than the existing waste rock site and is, therefore, not in an area that could be impacted by site operations.
- Huntington Creek, which flows from northwest to southeast immediately south of the permit area.

### **7.2.2.3 Locations of Monitoring Stations**

Energy West installed a monitoring well in 1989 at the location shown on Figure 7-2 to monitor groundwater near the waste rock pile. The location of this monitoring well was selected in consultation with DOGM.

No perennial surface water bodies exist in the permit area. Thus, no surface water monitoring stations have been established for this site.

As indicated in Section 7.4.2.2, a sedimentation pond has been constructed on the west side of the existing waste rock pile. This pond was designed as a total containment structure, with the ability to contain twice the amount of runoff expected from a 100-year, 24-hour precipitation event. Hence, since discharge from the pond does not occur, the pond is not monitored.

#### **7.2.2.4 Location and Depth of Water Wells**

No water-supply wells currently exist in the permit area. A search of files maintained by the Utah Division of Water Rights also indicated that no water-supply wells are located in Sections 5 and 6 of T. 17 S., R. 8 E. (i.e., the general vicinity surrounding the permit area).

#### **7.2.2.5 Surface Topography**

Surface topographic features in the permit and adjacent areas are shown on Plate 5-1. The surface contour data presented on this plate were developed by an aerial survey conducted on September 26, 2014 by Aero-graphics. The 2-foot contour interval of this map is sufficient to clearly show surface topography and slope within the permit and adjacent areas.

#### **7.2.3 Sampling and Analysis**

The monitoring well located in the permit area was installed by Energy West in 1989 and has been monitored on a quarterly basis since that time. All samples have been collected and analyzed in accordance with standard procedures and in accordance with the requirements of R645-301-723. Given the extensive data base generated by monitoring this well over a 25-year period, continued quarterly monitoring of this well is considered unnecessary. However, at the request of the Division, BRCW will continue to monitor this well quarterly prior to abandonment of the well at the beginning of site reclamation. Proposed parameters to be analyzed are listed in Table 7-1.

#### **7.2.4 Baseline Information**

Surface water, groundwater, and climatic resource information is presented in this section to assist in determining the baseline hydrologic conditions which exist in the permit area. This information provides background data on the hydrologic balance of the area.

#### **7.2.4.1 Groundwater Information**

Groundwater in the permit area exists in shale weathered from the Masuk Member of the Mancos Shale. Groundwater in the area is recharged by infiltration of local precipitation. Data collected from the on-site monitoring well, as downloaded from the Division of Oil, Gas and Mining web site, are provided in Appendix 7-2. As indicated therein, groundwater at the site is saline, with an average total dissolved solids concentration of approximately 18,400 mg/l during the 25-year monitoring period. As would be expected for groundwater occurring in gypsiferous shale, the predominant anion in groundwater at the site is sulfate. The dominant cation is sodium.

Figure 7-4 shows concentration trends for sulfate, sodium, and total dissolved solids during the period of record. As indicated, concentrations of these constituents have been generally decreasing during the past 25 years. Hence, it is reasonable to conclude that storage of waste rock at the site has not adversely impacted groundwater quality.

As indicated in Section 7.2.2.1, the Masuk Member is only minimally permeable. Given the low permeability of the shale in which groundwater occurs and the saline nature of this groundwater, groundwater in the permit area is poorly suited for domestic, irrigation, or other beneficial uses.

#### **7.2.4.2 Surface Water Information**

The Deer Creek site is located on land that drains to the south toward Miller Creek, located approximately 3,000 feet south of the waste rock pile. No perennial streams are located in the

permit area. Drainage in the area occurs as overland flow or in ephemeral washes that flow only in direct response to precipitation events.

Huntington Creek is a perennial tributary of the San Rafael River. The U.S. Geological Survey maintained a stream gaging station on Huntington Creek from May 1909 to October 1979 at location approximately 800 feet south of the intersection of the site access road with State Route 31. Data downloaded from the USGS National Water Information System<sup>1</sup> collected from this gaging station are provided in Appendix 7-3. These data indicate that the average annual streamflow of Huntington Creek during the 70-year period of record was 109.0 cubic feet per second (“cfs”). Average monthly streamflow during this period of record ranged from a low of 28 cfs (during the months of December and January) to a high of 33 cfs (during the month of May). The peak flow recorded at this gaging station was 2,500 cfs on August 2, 1930. Annual peak flows on Huntington Creek generally occurred in May/June due to snowmelt runoff or in August/September due to high-intensity thunderstorms.

Published water quality data for the San Rafael River basin indicate that the quality of surface water decreases as it flows from the Wasatch Plateau toward the Green River. This decrease is attributed to the presence of soluble minerals in the surrounding rocks (principally the Mancos Shale), saline soils, and irrigation return flows. Typical TDS values are 150 to 300 mg/L in the upper reaches of Huntington Creek, 2,000 to 2,600 mg/L near Huntington, and 4,000 to 5,500 mg/L at the confluence with the San Rafael River, approximately 20 miles downstream from the permit area (Mundorff and Thompson, 1982).

### **7.2.4.3 Geologic Information**

Geologic information related to the permit and adjacent areas is presented in Chapter 6 of this document.

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<sup>1</sup> <http://nwis.waterdata.usgs.gov/nwis>

#### 7.2.4.4 Climatological Information

Data obtained from the Western Regional Climate Center<sup>2</sup> indicate that average annual precipitation at Castle Dale (located about 12 miles south-southeast of the site) was 7.89 inches for the 115-year period of record from February 1899 through December 2014 (see Appendix 7-4). Nearly one-fourth of this precipitation normally occurs in the months of August and September due to summer thunderstorms. Annual precipitation at Castle Dale has ranged from a low of 3.29 inches in 1934 to a high of 14.28 inches in 1965. The maximum recorded daily precipitation occurred on August 28, 2007 with a rainfall depth of 2.15 inches.

The average annual temperature at the Castle Dale station during the period of record was 46.8° F. Seasonally, this temperature has varied from an average monthly minimum of 6.7° F in January to an average monthly maximum of 88.5° F in July. The lowest temperature recorded at Castle Dale (-35° F) was measured on February 10, 1933. This highest recorded temperature (107° F) was measured on July 13, 2002.

The station closest to the site that reports wind data is located at the Price-Carbon County Airport, Utah (approximately 23 miles northeast of the site). The average annual wind speed at this location between September 1998 and September 2008 was 6.9 mph (see Appendix 7-4). A maximum wind gust of 71 mph was recorded at the Price station on May 30, 1999.

#### 7.2.4.5 Supplemental Information

No supplemental information is required at this time.

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<sup>2</sup> [www.wrcc.dri.edu](http://www.wrcc.dri.edu)

#### **7.2.4.6 Survey of Renewable Resource Lands**

The existence and recharge of aquifers in the permit and adjacent areas is discussed in Sections 7.2.2.1 and 7.2.4.1 of this document.

#### **7.2.4.7 Alluvial Valley Floor Requirements**

Information regarding the presence or absence of alluvial valley floors in the permit and adjacent areas is presented in Chapter 9 of this document.

#### **7.2.5 Baseline Cumulative Impact Area Information**

Information concerning the hydrology of the region is available in various publications, including Mundorff and Thompson (1982), Waddell et al. (1981), and Gloyn et al. (2003). Since the hydrologic impact of the operations will be insignificant, it is not anticipated that revisions will be needed to the Cumulative Hydrologic Impact Assessment of the area.

#### **7.2.6 Modeling**

No numerical groundwater or surface water modeling was conducted in support of this document.

#### **7.2.7 Alternative Water Source Information**

No surface mining has been or will be conducted in the permit and adjacent areas. Therefore, this section does not apply to the Deer Creek site.

## **7.2.8 Probable Hydrologic Consequences**

This section addresses the probable hydrologic consequences of coal recovery and reclamation operations in the permit and adjacent areas. Mitigating measures are discussed generally in this section and as well as in Section 7.30 of this document.

### **7.2.8.1 Potential Impacts to Surface and Groundwater**

It is anticipated that coal recovery and reclamation operations at the site will not adversely impact the quality and quantity of surface and groundwater in the area. This conclusion is based on the facts that no perennial surface-water sources exist within the permit area, that erosion and sediment yield are adequately controlled through on-site practices, and that the natural quality and quantity of groundwater in the area precludes its beneficial use. Additional information regarding the potential hydrologic impacts of coal recovery and reclamation operations at the site is addressed in the following sections of this document.

### **7.2.8.2 Baseline Hydrologic and Geologic Information**

Baseline geologic information is presented in Chapter 6 of this document. Baseline hydrologic information is presented in Sections 7.2.4.1 and 7.2.4.2 of this document.

### **7.2.8.3 PHC Determination**

**Potential Impacts to the Hydrologic Balance.** Potential impacts to the hydrologic balance are addressed in the following subsections of this document.

**Acid- or Toxic- Forming Materials.** As noted in Section 6.2.3 of this application, the waste rock from which the coal will be recovered is neither acid- nor toxic-forming. Thus, no impacts will occur at the site due to the presence of acid- or toxic-forming materials.

**Sediment Yield.** The potential impact of coal recovery and reclamation on sediment yield is an increase in sediment in the surface waters downstream from disturbed areas. Sediment-control measures (such as a sedimentation pond, silt fencing, drainage ditches, etc.) have been designed and constructed to minimize this impact. All runoff from the facility is directed toward the on-site sedimentation pond, straw wattles, or silt fences, thereby capturing sediment and precluding its off-site discharge. The sedimentation pond is designed as a total containment structure. Nonetheless, this pond contains an emergency spillway to control discharge in the unlikely event that the pond overflow. All runoff controls will be regularly inspected (see Section 5.1.4) and maintained.

Planned reclamation practices include leaving the surface of reclaimed areas in a roughened state. This practice will enhance moisture retention and revegetation success, thereby reducing post-reclamation sediment yields to levels that are substantially lower than would naturally occur on the site under pre-operations conditions (see Appendix 7-5). Hence, activities at the site will greatly minimize the potential for off-site impacts from sediment.

**Acidity, Total Suspended Solids, and Total Dissolved Solids.** Probable impacts of operations on the acidity and total suspended solids concentrations of surface and groundwater in the permit and adjacent areas were addressed previously in this section. By retaining runoff on site, natural contributions of salinity to regional surface waters will also be reduced.

**Flooding or Streamflow Alteration.** The disturbed area is isolated from surrounding areas by runoff control structures such as straw wattles, silt fences, diversion ditches, and a sedimentation pond. Runoff from all disturbed areas flows to sediment controls prior to discharge

to adjacent undisturbed drainages. Since no mining or exploration will occur at this site, there will be no impacts due to subsidence. Thus, impacts due to flooding or streamflow alteration will not occur.

**Groundwater and Surface Water Availability.** Runoff controls at the site will minimize impacts to adjacent surface resources. As noted in Section 7.2.4.2, impacts to groundwater are also considered to be insignificant due to a combination of limited groundwater resources, poor groundwater quality, and relatively impermeable geologic materials at the site. Furthermore, coal recovery and reclamation operations will use only limited amounts of water (primarily for dust suppression), thereby further minimizing potential adverse impacts to surface and groundwater.

**Potential Hydrocarbon Contamination.** Diesel fuel, oils, greases, and other hydrocarbon products will be used at the site for equipment operation. Diesel will either be transported to the site in a mobile fueling truck or stored in a temporary above-ground tank that will be provided with secondary containment. Spills onto the ground have the potential to occur during filling of the storage tank or filling of mobile equipment. Similarly, spills of grease and oil may potentially occur during use at the site.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for four reasons. First, any on-site storage will be temporary. Second, any tanks or drums stored on site will be provided with secondary containment structures that prevent leaks from reaching the ground. Third, spills caused by filling operations outside of the secondary containment structures will be minimized due to the economic value of the product. Fourth, because filling operations and potential on-site storage will all occur above ground, leakage from these operations will be readily detected and mitigated.

**Road Salting.** No salting of the haul road occurs within the permit area. Hence, no impact will result from this action in the permit or adjacent areas.

**Coal Haulage.** Coal will be hauled on the access road within the permit area. If coal is spilled, it will be promptly picked up. In addition to spills, wind may carry coal dust or small pieces of coal away from recovery operations and the open top of coal trucks. Fugitive dust control measures will be implemented at the site, including watering of piles, crushing operations, and screening operations as needed. Coal truck speed will be minimized by access road site distances. There, the impact from fugitive coal dust is considered to be insignificant due to the fugitive dust control measures implemented at the site.

### **7.2.9 Cumulative Hydrologic Impact Assessment (CHIA)**

Information is provided in this application that will allow DOGM to update a Cumulative Hydrologic Impact Assessment if necessary.

## **7.30 Operation Plan**

### **7.3.1 General Requirements**

This permit application includes an operation plan which addresses the following:

- Groundwater and Surface Water Protection and Monitoring Plan
- Design Criteria and Plans
- Performance Standards
- Reclamation Plan.

#### **7.3.1.1 Hydrologic-Balance Protection**

**Groundwater Protection.** As indicated in Section 6.2.3, neither acid- nor toxic-forming materials are present in the permit area. Furthermore, groundwater quality data collected from an on-site monitoring well since 1989 indicate that the salinity of groundwater at the site has been

decreasing during the past 25 years. Since the operations proposed herein consist of the recovery of coal from an existing waste rock pile and eventual reclamation of the site, BRCW operations will not adversely impacted groundwater quality.

**Surface Water Protection.** A runoff control plan has been implemented to minimize, to the extent possible, additional contributions of suspended solids to streamflow outside the permit area, and otherwise prevent water pollution. BRCW will maintain adequate runoff- and sediment-control facilities to protect local surface waters during coal recovery and reclamation operations at the site.

#### **7.3.1.2 Water Monitoring**

**Groundwater Monitoring.** Energy West installed one groundwater monitoring well within the permit area in 1989. Monitoring of this well will occur as outlined in Section 7.2.3.

**Surface Water Monitoring.** No intermittent or perennial streams exist within permit area. The sedimentation pond at the site is designed for total containment. Therefore, no surface water monitoring will be conducted in conjunction with this application.

#### **7.3.1.3 Acid- and Toxic-Forming Materials**

As noted in Section 6.2.3 of this application, the waste rock from which the coal will be recovered is neither acid- nor toxic-forming. Thus, no acid- or toxic-forming materials exist on the site.

#### **7.3.1.4 Transfer of Wells**

No wells exist at the facility.

### **7.3.1.5 Discharges**

No discharges will occur into, from, or within underground mines in the permit area. Operations at the site will be conducted in a manner that precludes contamination, diminishment, or interruption of State-appropriated water supplies.

### **7.3.1.6 Stream Buffer Zones**

No operations in the permit area will be conducted within 100 feet of any perennial or intermittent stream channels. Thus, no buffer zones have been designated.

### **7.3.1.7 Cross Sections and Maps**

Maps showing the locations of appropriated points of diversion for current users of surface water in the general area are provided in Appendix 7-6. These maps and the associated data were downloaded from the Utah Division of Water Rights web site.<sup>3</sup>

Plate 7-1 shows the location and cross sections of the existing sedimentation pond as well as the location of an emergency spillway on the sedimentation pond. It is not anticipated that water will discharge from the sedimentation pond since it is designed as a total containment structure.

The locations of ditches and culverts used to divert water at the site are shown on Plate 7-2. The location of the site monitoring well is noted on Figure 7-2. No other water monitoring stations exist in the permit and adjacent areas.

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<sup>3</sup> <http://www.waterrights.utah.gov/wrinfo/default.asp>

### **7.3.1.8 Water Rights and Replacement**

BRCW will replace the water supply of an owner of interest in real property who obtains all or part of his or her supply of water for domestic, agricultural, industrial, or other legitimate use from an underground or surface source, where that supply has been adversely impacted by contamination, diminution, or interruption proximately resulting from activities conducted by BRCW in the permit area.

### **7.3.2 Sediment Control Measures**

The existing sediment control measures within the permit area have been designed, constructed, and maintained to prevent additional contributions of sediment to streams or to runoff outside the permit area. In addition, they have been designed to meet applicable effluent limitations, and minimize erosion. The structures that control runoff at the site include diversion channels, a sedimentation pond, containment berms, straw wattles, silt fences, and road diversions and culverts.

#### **7.3.2.1 Siltation Structures**

The siltation structures within the permit area consist of the sedimentation pond described in Section 7.3.2.2.

#### **7.3.2.2 Sedimentation Ponds**

A sedimentation pond was constructed by Energy West immediately west of the waste rock pile as indicated on Plate 7-1. This pond was designed as a total-containment structure (see Section 7.4.2.2). Thus, runoff collected in this pond is allowed to evaporate or percolate into the ground. Sediment that accumulates in the ponds will be removed as needed. Runoff may be

pumped out of the sediment pond and used for dust suppression in accordance with the air quality permit. If used, this water will be applied to non-paved areas within the disturbed-area boundary. As such, any excess water applied for dust suppression will be captured by sediment controls that have been installed at the site (i.e., the sedimentation pond, straw wattles, or silt fences).

**Compliance Requirements.** The sedimentation pond will be maintained until the site is reclaimed. The sedimentation ponds were designed to contain sediment in addition to the runoff resulting from two back-to-back 100-year, 24-hour storm events. The spillway on the sedimentation pond was designed to adequately pass the peak flow resulting from the 100-year, 24-hour precipitation event.

**MSHA Requirements.** The sedimentation pond at the site does not meet the size criteria of MSHA requirements defined in 30 CFR 77.216.

### **7.3.2.3 Diversions**

The objective of the runoff control plan is to isolate, to the maximum degree possible, runoff from disturbed areas. All diversion ditches are maintained with adequate erosion protection in the ditch sections where flow velocities are great enough that a ditch lining is necessary. Adequate ditch capacities are maintained in all ditch sections. Culverts are kept free of debris. Detailed diversion design information is presented in Section 7.4.2.

### **7.3.2.4 Road Drainage**

Road drainage facilities include diversion ditches and culverts. Additional road drainage design information is presented in Section 7.4.2. All road drainage systems will be maintained and repaired as needed following the occurrence of a large storm event. Culvert inlets and outlets will be kept clear of sediment and other debris.

### 7.3.3 Impoundments

#### 7.3.3.1 General Plans

One sedimentation pond has been constructed at the site as described above.

**Certification.** Maps and cross sections of the sedimentation pond have been prepared by or under the direction of and certified by a qualified, registered, professional engineer.

**Maps and Cross Sections.** The topography and cross sections for the sedimentation pond are located on Plate 7-1.

**Narrative.** A description of the sedimentation pond is presented in Sections 7.3.2.2 and 7.4.2 of this document.

**Subsidence Survey Results.** Since no mining occurs at the site, a subsidence survey is not presented.

**Hydrologic Impact.** The hydrologic and geologic information required to assess the hydrologic impacts of the impoundments can be found in Section 7.2.4 and Chapter 6, respectively.

**Design Plans and Construction Schedule.** No additional impounding structures are proposed for construction at the site. Designs of all existing structures are described in this document.

### **7.3.3.2 Permanent and Temporary Impoundments**

**Requirements.** The only impoundment at the site consists of the one sedimentation pond. This pond is a temporary impoundment. The pond was designed and constructed using current, prudent, engineering practices. Since the pond was constructed below grade, it is considered stable. Specific hydrologic design criteria for this pond are presented in Section 7.4.3. The pond will be inspected regularly based on the schedule contained in Section 5.1.4.3. The sedimentation pond meets the requirements of the rules concerning temporary impoundments.

**Hazard Notifications.** The sedimentation pond will be examined for structural weakness and erosion at least four times per year.

### **7.3.4 Discharge Structures**

The only discharge structure at the site consists of the emergency spillway on the sedimentation pond. Since the pond was designed as a total-containment structure, discharges from the pond are not anticipated. This discharge structure is further described in Section 7.4.4.

### **7.3.5 Disposal of Excess Spoil**

No excess spoil is generated at the facility.

### **7.3.6 Coal Mine Waste**

The existing waste-rock pile complies with the requirements of R645-301-746. Areas designated for disposal of reject from coal-recovery operations will also be constructed and maintained in accordance with that same regulation.

### **7.3.7 Noncoal Mine Waste**

Non-coal mine waste is not stored or disposed of on site (see Chapter 5).

### **7.3.8 Temporary Casing and Sealing of Wells**

The groundwater monitoring well at the site was constructed in compliance with R645-301-748.

## **7.40 Design Criteria and Plans**

### **7.4.1 General Requirements**

The criteria set forth in R645-301-740 were used to design structures to control drainage from disturbed and undisturbed areas at the Deer Creek site. Details regarding hydrologic design methods and calculations operational period are presented in Appendix 7-7. It should be noted that the design information presented in Appendix 7-7 was prepared by Energy West based on the assumption that the waste rock pile would eventually be larger than under its current configuration. Thus, these calculations assumed that two sedimentation ponds and associated drainage structures would be constructed. Therefore, the reviewer should ignore the information provided in Appendix 7-7 concerning structures that were not built.

It should be noted that some of the statements in Appendix 7-7 may leave the reader with the impression that sediment control measures other than the sedimentation pond are not needed at the site. For instance, page 4-11 of Appendix 7-7, speaking of the original Phase I site design (i.e., the phase occupied by the existing waste rock pile), states that “all runoff will be drained to the basin on the west end of the site.” The use of the word “all” is obviously an over-simplification that refers to runoff from the top of the pile as well as runoff that collects on the inside of the soil

storage berm. Runoff from the east side of the waste rock pile and the outside of the soil storage berm is not and never was directed to the sedimentation pond. As a result, alternate sediment controls (straw wattles and silt fences) have been and will continue to be used in these areas to retain sediment within the disturbed area. For these reasons, the reader is encouraged to exercise reasonable judgement when reviewing specific statements in Appendix 7-7. Nonetheless, the design information related to the existing sedimentation pond and the existing diversions is considered applicable to this permit application.

## **7.4.2 Sediment Control Measures**

### **7.4.2.1 General Requirements**

**Design.** Existing sediment control measures have been designed, constructed, and maintained to:

- Prevent additional contributions of sediment to stream flow or to runoff outside the permit area,
- Meet the effluent limitations defined in R645-301-751, and
- Minimize erosion to the extent possible.

**Measures and Methods.** The sediment control measures at the facility include:

- Retention of sediment within the disturbed area;
- Diversion of runoff using channels or culverts through disturbed areas to prevent additional erosion; and
- Provide riprap, a sedimentation pond, silt fencing, and other measures that reduce overland flow velocities, reduce runoff volumes, or trap sediment.

### **7.4.2.2 Siltation Structures**

**General Requirements.** Additional contributions of suspended solids and sediment to stream flow or runoff outside the permit area is being prevented to the extent possible using a sedimentation pond as a siltation structures. This pond located immediately west of the existing waste rock pile. This structure has been certified by a qualified registered professional engineer and was designed, constructed, and will be maintained as described in Chapter 5 and Sections 7.3.3 and 7.4.3. Sediment yields from area that do not flow to the sedimentation pond will be controlled using silt fences and straw wattles as indicated below in the subsection entitled “Exemptions.”

**Sedimentation Ponds.** The sedimentation pond was designed to receive runoff from the waste rock pile and its immediate vicinity. The pond is not located in a perennial stream channel.

Sediment Storage Volume. The sedimentation pond was designed to contain 0.1 acre-foot of sediment for each acre drained. Thus, with a design watershed area of 9.8 acres, the pond was constructed with a sediment storage volume of 0.98 acre-foot (42,690 cubic feet). As indicated on Plate 7-1, this sediment storage volume corresponds to an elevation of 6313.45 feet.

Detention Time. The sedimentation pond was designed as a retention pond that will contain all water that flows into it without discharging, thereby meeting applicable effluent limitations. Water may be periodically pumped from the ponds and used for dust suppression within the permit area.

Design Runoff Event. The sedimentation pond is designed to fully contain its inflow. The drainage characteristics, including contributing area, runoff curve number, and hydraulic length for the operational period were calculated as shown in Appendix 7-7. As indicated therein, the runoff storage volume resulting from a 100-year, 24-hour precipitation event was calculated to be 1.11 acre-feet, with the design volume being twice that amount (2.22 acre-feet). However, as indicated on Plate 7-1, the pond was constructed with a runoff storage volume of 3.66 acre-feet above the design maximum sediment storage elevation. Thus, the storm-water storage pool in the pond

actually exceeds three times the amount of runoff expected from the 100-year, 24-hour precipitation event.

Sediment Removal. Sediment will be removed from the pond when the sediment level reaches an elevation corresponding to 60% of the total sediment storage volume. As noted on Plate 7-1, the 60% clean-out elevation for the pond is 6312.7 feet. Sediment that contains a significant amount of coal will be recovered and processed at the Wellington coal cleaning facility. Sediment that contains an insignificant amount of coal will be placed with reject from coal recovery operations.

Excessive Settlement. The sedimentation pond was excavated into natural soil. Excessive settlement has not been observed and, given the excavated construction, is not anticipated in the future.

Embankment Material. The sedimentation pond was excavated into natural soil and does not contain an embankment. The berms adjacent to the pond are soil stockpiles, not pond embankments.

Compaction. The sedimentation pond was excavated into natural soil and does not contain an embankment. Hence, no embankment materials were compacted.

**MSHA Sedimentation Ponds.** The sedimentation pond at the site does not meet the size criteria of MSHA requirements defined in 30 CFR 77.216.

**Sedimentation Pond Spillways.** The sedimentation pond is equipped with an emergency spillway to protect the pond in the extremely unlikely event that discharge occurs. The spillway is trapezoidal in cross section and measures approximately 2 feet deep and 3 feet wide with 2H:1V side slopes and a grouted riprap invert. The spillway was designed to safely discharge the peak

flow resulting from the 100-year, 24-hour precipitation event (10.77 cfs) without consideration for routing of that flow through the pond (see Appendix 7-7). In the extremely unlikely event that the pond spills, this water will discharge into the unnamed ephemeral drainage adjacent to the south side of the permit area and along the west side of the site access road, eventually reaching Huntington Creek if it does not first infiltrate. Since the sedimentation pond can store sufficient volume to contain several years' worth of sediment yield and the runoff resulting from over three back-to-back-to-back 100-year, 24-hour precipitation events, it is extremely unlikely that the ponds will spill during BRCW operations.

**Other Treatment Facilities.** No other water treatment facilities are located within the permit area.

**Exemptions.** Two alternate sediment control areas exist at the site (see Plate 7-2). ASCA-1 occupies 3.46 acres and exists on the out slopes of the waste rock pile and the soil stockpiles. Silt fences and straw wattles will be installed and maintained to control sediment yield from these out slopes. These materials will be installed in accordance with manufacturer's recommendations. Where practical, the soil in these areas has also been revegetated. The effectiveness of these methods at reducing sediment yields in ASCA-1 is further discussed in Appendix 7-8. The calculations in this appendix assume that runoff can discharge beyond the silt fences and straw wattles even though this runoff is retained on the uphill side of those controls. Thus, no sediment is actually yielded from areas protected by these controls.

ASCA-2 consists of 0.73 acre of out slope on the site access road. The effectiveness of revegetation efforts on these out slopes is discussed in Section 3.2.1.2 and Appendix 3-2 of this application. The data presented therein indicate that revegetation of the road out slopes has resulted in ground cover that exceeds that in undisturbed areas. In May 2007, the Division of Oil, Gas and Mining acknowledged that vegetation had established to a point that it alone could control

erosion and sedimentation. Approval was granted by the Division and the silt fence along the toe of the embankment fill of the access road was removed.

### 7.4.2.3 Diversions

**General Requirements.** The diversions within the permit area consist of drainage ditches and culverts. All diversions within the permit area have been designed to minimize adverse impacts to the hydrologic balance, to prevent material damage outside the permit area, and to assure the safety of the public. They have been designed, located, constructed, maintained, and used to:

- Be stable
- Provide protection against flooding and resultant damage to life and property
- Prevent, to the extent possible, additional contributions of suspended solids to stream flow outside the permit area
- Comply with all applicable local, state, and federal laws and regulations

All drainage ditches at the site were installed to divert undisturbed-area runoff away from disturbed areas. Culverts were installed to safely convey this water beneath the site access road.

**Diversion of Perennial and Intermittent Streams.** There are no diversions of perennial or intermittent streams in the permit area.

**Diversion Ditches and Culverts.** All diversion ditches adjacent to the waste rock pile were designed based on the peak flow resulting from the 100-year, 24-hour precipitation event. Those adjacent to the site access road were designed based on the peak flow resulting from the 10-year, 24-hour precipitation event. Manning's equation for open channels was used to determine the design flow depth and velocity in each channel. The designed channels are trapezoidal with 3H:1V side slopes and varying bottom widths. Riprap was sized as needed to ensure that the diversion ditches would be non-erosive (see Haan et al., 1994). A filter layer was constructed

under the riprap channel lining materials. This filter consists of 2-inch minus road base material and is placed in a layer equal in thickness to that of the median diameter of the overlying riprap.

Calculations used in the design of drainage ditches for the operational period are presented in Appendix 7-7. A summary table of the geometry, channel slope, peak discharge, erosion protection, maximum flow velocity, and minimum depth values for each diversion ditch and culvert at the facility is presented in Table 7-2. Refer to Plate 7-2 for the locations and typical cross section of each diversion ditch.

Ditches UD-1 through UD-4 divert runoff from undisturbed areas around the waste rock pile. Ditch UD-4 discharges into a pre-existing man-made channel that was constructed by Utah Power and Light Company to divert runoff around their evaporation pond located south of the permit area. This pre-existing channel is protected from the erosive forces of discharge from UD-4 by a rock apron consisting of the same size and distribution of rocks as the channel lining used in the ditch itself. The apron is fan shaped, 12 feet wide on the discharge side, and extends 15 feet from the end of the ditch (see Plate 7-2).

Ditches UD-5 through UD-7 are constructed along the east side of the site access road. These ditches drain to culverts that convey runoff beneath the road to the adjacent ephemeral channel. As indicated on Plate 5-1, these ditches were typically constructed with 3H:1V side slopes adjacent to the road and 1.5H:1V side slopes on the opposite bank. The ditches are generally 1 foot deep.

Six culverts were installed in the permit area along the site access road. Each culvert consists of 18-inch diameter corrugated metal, installed at the locations shown on Plate 7-2. Rock aprons were installed to dissipate energy from the culvert discharge in areas where a table channel does not exist at the culvert outlet. The design of these rock aprons is shown on Plate 7-2.

#### **7.4.2.4 Road Drainage**

Drainage control along the site access road includes the use of diversion ditches and culverts. This road is not located in the channel of an intermittent or perennial stream. As noted on Plate 5-1, the surface of the access road was constructed to drain. All roads have been located to minimize downstream sedimentation and flooding. Diversion ditches and culverts for all roads are described in Section 7.4.2.3 above.

#### **7.4.3 Impoundments**

The existing impoundment within the permit area consists of one sedimentation pond along the western boundary of the waste rock pile. Pertinent information regarding this pond is presented in Sections 7.3.2.2 and 7.4.2.2.

#### **7.4.4 Discharge Structures**

##### **7.4.4.1 Erosion Protection**

As indicated in Section 7.4.2.2, a spillway was constructed on the sedimentation pond to safely discharge the peak flow resulting from the 100-year, 24-hour precipitation event in the extremely unlikely event that such a discharge would occur (since the pond was designed as a total containment structure). As noted on Plate 7-1, this spillway was designed with roughness elements to dissipate the energy associated with any outflowing water.

Rock aprons (see Plate 7-2) have been installed where channel UD-4 discharges into a pre-existing man-made channel and at locations where culverts discharge onto unstable areas. The purpose of these rock aprons was to dissipate energy at the points of discharge.

#### **7.4.4.2 Design Standards**

All discharge structures within the permit area were designed and constructed according to standard engineering design procedures.

#### **7.4.5 Disposal of Excess Spoil**

No excess spoil is generated or disposed of within the permit area.

#### **7.4.6 Coal Mine Waste**

##### **7.4.6.1 General Requirements**

Reject from coal recovery operations will be placed within the footprint of the existing waste rock pile. By placing this material within the existing footprint (i.e., within the area that is currently designed to control off-site impacts), this reject will be placed in a manner that minimizes adverse impacts to surface and groundwater quantity and quality.

##### **7.4.6.2 Refuse Piles**

As indicated on Plate 5-1, a wet-weather seep exists beneath the existing waste rock pile. A drainage system was installed to divert the water from this seep prior to placement of the soil stockpile and the waste rock. This diversion system consists of a 4-inch diameter perforated drain pipe around which an envelope of 2-inch rock was placed at a thickness of 12 inches. The rock envelope was wrapped in a non-woven filter fabric and then covered with 12 inches of clay prior to placing the waste rock fill.

Coal recovery operations will be conducted in such a manner that runoff from the waste rock pile will either flow to the sedimentation pond or be controlled from off-site discharge by temporary pollution-prevention methods such as silt fences, soil berms, straw wattles, etc. Specifically, a berm will be maintained along the outside of the waste rock pile as it is excavated. This berm will continue to direct surface runoff from the top of the pile toward the sedimentation pond as indicated in Figure 7-5. Some surface runoff may collect locally in excavations, but the peripheral berm will keep water from discharging from the top of the pile to locations outside of the disturbed area boundary. Silt fences and straw wattles will be maintained during coal recovery operations at the downstream edge of ASCA-1 (shown on Plate 7-2) to continue providing sediment control in areas that cannot flow to the sedimentation pond.

#### **7.4.6.3 Impounding Structures**

No impounding structures will be constructed of coal mine waste or used to impound coal mine waste within the permit area.

#### **7.4.6.4 Return of Coal Processing Waste to Underground Workings**

No underground workings are located at this facility. No reject from coal recovery operations will be returned to underground workings.

#### **7.4.7 Disposal of Noncoal Mine Waste**

Disposal of noncoal waste is discussed in Section 5.2.8.3 of this application.

#### **7.4.8 Casing and Sealing of Wells**

The groundwater monitoring well at the site was cased and sealed at the surface to prevent potential acid or other toxic drainage from entering groundwater via the well. A steel cover protects the well and ensures the safety of people, livestock, wildlife, and machinery.

## **7.50 Performance Standards**

All operations and reclamation will be conducted to minimize disturbance to the hydrologic balance within the permit and adjacent areas, prevent material damage to the hydrologic balance outside the permit area, and support approved post operations land uses.

### **7.5.1 Water Quality Standards and Effluent Limitations**

Discharges of water from disturbed areas will be in compliance with all applicable Utah and federal water quality laws and regulations and with applicable effluent limitations for coal mining contained in 40 CFR Part 434.

### **7.5.2 Sediment Control Measures**

All sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs presented in Sections 7.3.2, 7.4.2, and 7.6.0.

#### **7.5.2.1 Siltation Structures and Diversions**

Siltation structures and diversions will be located, maintained, constructed and reclaimed according to plans and designs presented in Sections 7.3.2, 7.4.2, and 7.6.3.

#### **7.5.2.2 Road Drainage**

All roads were located, designed, constructed, reconstructed, and will be used, maintained and reclaimed according to plans and designs presented in Sections 7.3.2.4, 7.4.2.4, and 7.6.2. All roads have been designed to:

- Control or prevent erosion and siltation by maintaining or stabilizing all exposed surfaces in accordance with current, prudent engineering practices;
- Control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area;
- Neither cause nor contribute to, directly or indirectly, the violation of effluent standards given under Section 7.5.1.
- Minimize the diminution to or degradation of the quality or quantity of surface- and ground-water systems;
- Refrain from significantly altering the normal flow of water in streambeds or drainage channels.

### **7.5.3 Impoundments and Discharge Structures**

Impoundments and discharge structures are located, maintained, constructed and will be reclaimed as described in Sections 7.3.3, 7.3.4, 7.4.3, 7.4.5, and 7.6.0.

### **7.5.4 Disposal of Excess Spoil, Coal Mine Waste and Noncoal Mine Waste**

Handling and disposal of coal mine waste and noncoal mine waste is described in Sections 7.3.6, 7.3.7, 7.4.6, 7.4.7, 7.6.0 and Chapter 5.

### **7.5.5 Casing and Sealing of Wells**

When no longer needed, the groundwater monitoring well in the permit area will be abandoned in accordance with R645-301-765 and the requirements of the Utah Division of Water Rights.

## 7.60 Reclamation

### 7.6.1 General Requirements

A detailed reclamation plan for the facility is presented in Section 5.40 of this application. BRCW will ensure that all temporary structures are removed and reclaimed. Permanent diversions will be maintained properly and will meet the requirements of the approved reclamation plan for permanent structures and impoundments.

The diversion channels that currently convey runoff around the north and west sides of the waste rock pile are subject to frequent maintenance (due to siltation of the channel as runoff is forced to make substantial changes in flow direction). Therefore, these channels will be removed as part of Phase II site reclamation. The channels shown on Plate 5-3 will be constructed during Phase II reclamation to more efficiently convey across the reclaimed site.

The design of the reclamation channels is detailed in Appendix 7-9 and summarized in Table 7-3. The Phase I channels were designed to safely convey runoff resulting from the 10-year, 24-hour precipitation event while the Phase II reclamation channels were designed to safely convey runoff resulting from a 100-year, 24-hour precipitation event, with a trapezoidal shape and bottom widths varying from 0 (triangular) to 10 feet. The Phase I reclamation channels were designed with 2H:1V side slopes and a depth of 1 foot. All Phase II reclamation channels were designed with 2H:1V side slopes and a riprapped depth of 2 feet. A filter layer, consisting of minus 2-inch road-base gravel, will be installed in the Phase II reclamation channels between the riprap and the underlying native soil.

### 7.6.2 Roads

The site access road will be reclaimed when it is no longer needed for site access. Reclamation of the road will include:

- Restoring natural drainage patterns
- Reshaping cut and fill slopes to be compatible with the post-mining land use and to complement the drainage patterns of the surrounding terrain.

### 7.6.3 Siltation Structures

#### 7.6.3.1 Maintenance of Siltation Structures

The sedimentation pond and other siltation structures (i.e., silt fences, wattles, etc.) will be maintained until removed in accordance with the approved reclamation plan.

#### 7.6.3.2 Removal of Siltation Structures

~~With reclamation of the access road, entrance to the site will no longer be feasible without substantial damage to reclaimed areas. Therefore, t~~The sedimentation pond will be removed during reclamation of the general area surrounding the existing waste rock pile. BRCW acknowledges that the Utah Coal Regulatory Program calls for sedimentation ponds to be retained for a period of at least 2 years after the last augmented seeding following the initiation of reclamation activities (see R645-301-356.300 and R645-301-763). ~~However, such an approach presents unique problems at this site. Therefore, BRCW proposes to remove the sedimentation pond, construct the final reclamation channels, and reclaim the site access road as one efficient operation.~~This will be done to satisfy regulatory requirements even though the reject pile will be reclaimed using the proven surface-roughening technique known locally as deep gouging to substantially reduce erosion of the reclaimed surface and essentially eliminate runoff to the pond. ~~Justification for using this approach is provided in Appendix 5-4.~~

#### **7.6.4 Structure Removal**

A timetable for the removal of each structure is presented in Table 5-1.

#### **7.6.5 Permanent Casing and Sealing of Wells**

When no longer needed, the groundwater monitoring well in the permit area will be abandoned in accordance with R645-301-765 and the requirements of the Utah Division of Water Rights.

## REFERENCES

- Gloyn, R.W., D.E. Tablet, B.T. Tripp, C.E. Bishop, C.D. Morgan, J.W. Gwynn, and R.E. Blakett. 2003. Energy, Mineral, and Groundwater Resources of Carbon and Emery Counties, Utah. Bulletin 132, Utah Geological Survey, Utah Department of Natural Resources. Salt Lake City, Utah.
- Haan, C.T., B.J. Barfield, and J.C. Hayes. 1994. Design Hydrology and Sedimentology for Small Catchments. Academic Press. San Diego, California.
- Mundorff, J.C. and K.R. Thompson. 1982. Reconnaissance of the Quality of Surface Water in the San Rafael River Basin, Utah. Technical Publication No. 72. Utah Department of Natural Resources. Salt Lake City, Utah.
- Waddell, K.M., P.K. Contratto, C.T. Sumsion, and J.R. Butler. 1981. Hydrologic Reconnaissance of the Wasatch Plateau-Book Cliffs Coal-Fields Area, Utah. Water-Supply Paper 2068. U.S. Geological Survey. Washington, D.C.

**TABLE 7-1**

Proposed Groundwater Analytical List

| Parameter                        |
|----------------------------------|
| <b>Field Measurements</b>        |
| Depth to water                   |
| Temperature                      |
| pH                               |
| Specific conductance             |
| <b>Laboratory Analyses</b>       |
| Bicarbonate as CaCO <sub>3</sub> |
| Calcium                          |
| Carbonate as CaCO <sub>3</sub>   |
| Chloride                         |
| Iron, dissolved                  |
| Iron, total                      |
| Magnesium                        |
| Manganese, dissolved             |
| Manganese, total                 |
| Nitrate/Nitrite as N             |
| Potassium                        |
| Sodium                           |
| Sulfate                          |
| Total dissolved solids           |

**TABLE 7-2**

Summary of Operational Drainage  
 Ditch Design Data

| Structure | Description  | Peak Design Flow (cfs) <sup>(a)</sup> | Design Flow Depth (ft) | Design Flow Velocity (fps) | Design Riprap D <sub>50</sub> (in) |
|-----------|--|---------------------------------------|------------------------|----------------------------|------------------------------------|
| UD-1      | Trapezoidal, 3:1 side slopes, 2% channel slope, 1.5' deep, 2' bottom width | 8.58                                  | 0.62                   | 3.56                       | 3.5                                |
| UD-2      | Trapezoidal, 3:1 side slopes, 2% channel slope, 1.5' deep, 3' bottom width | 34.59                                 | 1.14                   | 4.72                       | 7                                  |
| UD-3      | Trapezoidal, 3:1 side slopes, 2% channel slope, 1.5' deep, 4' bottom width | 47.65                                 | 1.23                   | 5.03                       | 7                                  |
| UD-4      | Trapezoidal, 3:1 side slopes, 4% channel slope, 1.5' deep, 5' bottom width | 72.37                                 | 1.25                   | 6.59                       | 14                                 |
| UD-5      | Triangular, 3:1 side inslope, 1.5: 1 outslope, 2% channel slope, 1' deep   | 4.29                                  | 0.74                   | 3.52                       | None                               |
| UD-6      | Triangular, 3:1 side inslope, 1.5: 1 outslope, 2% channel slope, 1' deep   | 4.29                                  | 0.69                   | 3.94                       | None                               |
| UD-7      | Triangular, 3:1 side inslope, 1.5: 1 outslope, 2% channel slope, 1' deep   | 4.29                                  | 0.76                   | 3.33                       | None                               |

<sup>(a)</sup> Channels UD-1 through UD-4 were designed based on the peak flow from a 100-yr, 24-hr precipitation event; channels UD-5 through UD-7 were designed based on the peak flow from a 10-yr, 24-hr precipitation event (see Appendix 7-7).

**TABLE 7-3**

Reclamation Channel Design Summary

| Reclamation Channel | Contributing Watershed     | Bottom Width (ft) | Maximum Velocity (ft/s) |               | Riprap D <sub>50</sub> (in) |
|---------------------|----------------------------|-------------------|-------------------------|---------------|-----------------------------|
|                     |                            |                   | 10-yr, 24-hr            | 100-yr, 24-hr |                             |
| RC-1                | RWS-1                      | 8                 | 7.03                    | 8.71          | 12                          |
| RC-2                | RWS-2                      | 0                 | 4.66                    | 5.56          | 4                           |
| RC-3                | RWS-2                      | 0                 | 4.66                    | 5.56          | 4                           |
| RC-4                | RWS-3                      | 2                 | 5.46                    | 6.59          | 6                           |
| RC-5                | RWS-1, RWS-2, RWS-3, RWS-5 | 4                 | 6.01                    | 7.37          | 9                           |
| RC-6                | RWS-5                      | 0                 | 4.94                    | 5.91          | 4                           |
| RC7                 | RWS-4                      | 10                | 7.32                    | 9.13          | 12                          |
| RC-8                | RWS-6                      | 2                 | 6.52                    | 7.86          | 9                           |
| RC-9                | RWS-6                      | 2                 | 6.52                    | 7.86          | 9                           |
| RC-10               | RWS-7                      | 0                 | 6.05                    | 7.20          | 9                           |
| RC-11               | RWS-8                      | 0                 | 6.76                    | 8.04          | 12                          |

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

**APPENDIX 7-1**

Monitoring Well Lithologic Log

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

## **APPENDIX 7-2**

Groundwater Quality Data

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

### **APPENDIX 7-3**

Data from, USGS Gaging Station  
on Huntington Creek

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

## **APPENDIX 7-4**

Climatological Data

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

## **APPENDIX 7-5**

Sediment Yield Evaluation of  
Reclaimed vs. Natural Conditions

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

## **APPENDIX 7-6**

Water Rights Information

**APPENDIX 7-7**

Operational Hydrology Design  
Methods and Calculations

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

## **APPENDIX 7-8**

ASCA-1 Sediment Yield Calculations

BRC Wellington LLC  
Deer Creek Waste Rock Site

Permit Application  
~~February~~June 2016

## **APPENDIX 7-9**

Reclamation Hydrology Design  
Methods and Calculations



State of Utah

GARY R. HERBERT  
Governor

SPENCER J. COX  
Lieutenant Governor

Department of  
Environmental Quality

Alan Matheson  
Executive Director

DIVISION OF AIR QUALITY  
Bryce C. Bird  
Director

March 16, 2016

DAQC-286-16  
Site 14239 (B1)

Galen W. Williams  
EarthFax Engineering Group  
7324 South Union Park Avenue #100  
Midvale, Utah 84047

Dear Mr. Williams:

Re: EarthFax Engineering Group - Temporary Relocation/Operation, Notice of Intent – Emery County

Your Notice of Intent dated March 4, 2016, to relocate portable aggregate equipment to the temporary project located at the Deer Creek Waste Rock Storage Site, State Hwy 31, Huntington, Utah, was received by the Utah Division of Air Quality (DAQ) and has been reviewed.

The following equipment has been approved for operation for this temporary project:

Metso-Lokotrack LLT1213S 77882 portable crusher  
C-13 KWJ01245 310 kW crusher diesel engine

Approval is granted to relocate and operate this equipment at the new location for a period not to exceed 180 operational days. As per Utah Administrative Code (UAC) R307-401-17, the operation of equipment at this temporary site may be for up to 180 working days in any calendar year not to exceed 365 consecutive days, starting from the initial relocation date. The operational days per site cannot be extended beyond the stipulated 365 consecutive day period. Approval is subject to the conditions of the dust control plan submitted for this location and the current Wheeler Machinery Company Approval Order (AO) DAQE-AN142390010-15 dated April 8, 2015. Hours of operation shall be held to 16 hours per each 24-hour day. The maximum production rate shall be held to the requested 350 tons per hour. Emissions for this project have been estimated at the following:

| <u>Pollutant</u> | <u>gram/sec</u> | <u>lbs/hr</u> | <u>lbs/24 hr</u> | <u>tons/yr</u> |
|------------------|-----------------|---------------|------------------|----------------|
| PM10             | 1.47            | 11.66         | 116.60           | 9.10           |
| SOx              | 0.55            | 4.40          | 44.05            | 3.44           |
| NOx              | 3.72            | 29.55         | 295.46           | 23.05          |
| CO               | 0.99            | 7.88          | 78.83            | 6.15           |
| VOC              | 0.16            | 1.24          | 12.44            | 0.97           |

The owner/operator shall maintain records of the actual operation hours of the above referenced equipment at this relocation site and have the ability to submit the information to the DAQ upon the request of representatives of the Director. Please make certain that the plant operator is aware of all the location specific requirements for this site and the conditions of the aforementioned AO.

NSPS Subpart OOO requires that initial Method 9 observations be performed for all applicable portable crushers, screens and attached conveyors. Subpart OOO also mandates that all crushers constructed, modified, or reconstructed on or after April 22, 2008, which are not enclosed, must install spray bars on the equipment and keep maintenance records to ensure proper spray bar operations.

Utah Division of Water Quality Storm Water Permits and regulations may apply to this temporary project. Please refer to <https://secure.utah.gov/deq-dashboard/index.html> for additional information.

This approval for relocation in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including the UAC.

If you have any questions regarding this relocation authorization or the temporary relocation process please contact Susan Weisenberg at (801) 536-4045.

Sincerely,



Rusty Ruby, Manager  
Compliance Branch

RR:SPW:bp

Enclosure: Submitted Temporary Relocation Form

cc: Southeastern Utah District Health Department



# Utah Division of Air Quality CK# 2083

\$130.00

## Notice of Temporary Relocation of Portable Equipment Form 15a

In accordance with Utah Administrative Code (UAC) R307-401-17, the following information must be submitted to the Division in order to evaluate a temporary relocation of equipment.

|                  |   |  |
|------------------|---|--|
| Contact Person   | Galen W. Williams                       | UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY |
| Company Name     | EarthFax Engineering Group              |  |
| Mailing Address  | 7324 South Union Park Avenue, Suite 100 | MAR 07 2016                              |
| City, State, Zip | Midvale, Utah 84047                     |  |
| Phone Number     | 801-561-1555                            | DIVISION OF AIR QUALITY                  |
| Email Address    | gwilliams@earthfax.com                  |  |

### PROPOSED RELOCATION INFORMATION

Site address or brief directions to find the site:

Deer Creek Waste Rock Storage Site State Highway 31 near the Huntington Power Plant

Closest City Huntington County Emery

UTM Coordinate of site: 494673.51 E., 4358973.65 N, Zone 12S

Approximate distance to the nearest house or business:

0.6 Mile South (Figure 1)

UTM Coordinates of the nearest house or business:

494544.18 E., 4358016.99 N., Zone 12S

Is this site permitted by the Division of Air Quality? (Yes or No). If yes, please provide permit holder's name and the permit number, if known

No

Attach a site diagram showing the equipment layout and general site dimensions to this relocation request.

In an effort to coordinate state and local regulations, please provide the name of the issuing agency and the date of any Conditional Use Permits issued for this project N/A.

Total hours of operation per 24 hour period 16 starting at 06:00 am am/pm ending at 10:00 pm am/pm.

Maximum hourly production rate for project 350 TPH

Expected Startup Date: April 1, 2016 Expected Completion Date: March 31, 2017

Existing Approval Orders permitting the equipment or permitting the relocation site (e.g. DAQE-XXXXXXXX-XX) DAQE-AN142390010-15

|  |   |
|--|---|
| Equipment Type: <u>Portable Crusher</u><br>Make/Model <u>Metso-Lokotrack LLT1213S</u><br>Serial or ID # <u>77882</u><br>Manufactured Date <u>03-2014</u><br>Design Capacity <u>350 TPH</u> | Equipment Type: <u>Crusher Diesel Engine</u><br>Make/Model <u>C-13</u><br>Serial or ID # <u>KWJ01245</u><br>Manufactured Date <u>03-2014</u><br>Design Capacity <u>310kW/415 HP</u> |
| Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____  | Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____   |
| Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____  | Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____   |
| Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____  | Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____   |
| Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____  | Equipment Type: _____<br>Make/Model _____<br>Serial or ID # _____<br>Manufactured Date _____<br>Design Capacity _____   |
|  |   |

## FUGITIVE DUST CONTROL PLAN

Utah Administrative Code (UAC) 307-309-6 requires that any person owning or operating a source of fugitive dust within PM10 and PM2.5 non-attainment and maintenance plan areas on cleared land greater than one-quarter acre in size must submit a completed Fugitive Dust Control Plan.

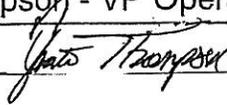
DAQ Fugitive Dust Control Plans for temporary projects in these areas can be found on line at: <https://secure.utah.gov/deq-dashboard/index.htm>

The program requires that you have an account with Utah.gov. If you do not have a Utah.gov account, you will need to create one. The first time you access the program and click on "Start a New Permit", you will be directed to a login page. Please select "Create an Account". Creating a Utah.gov account only takes a few minutes and will only be required once. After you have a username and password with Utah.gov, return to the above web address and login to complete the Storm Water Permit and FDCP application. When completed, enter the FDCP permit number below:

FDCP Permit# Not Applicable - Deer Creek Waste Rock Site in in Emery County, which is an Attainment Area

Temporary projects that are not located within PM10 and PM2.5 non-attainment and maintenance plan areas may submit a formal FDCP application or complete the following indicating how the operators will address all applicable sources of fugitive dust.

1. Material storage See attached narrative. Only storage will be non-coal rock already stored at the waste rock site.
2. Material handling See attached narrative. Material to be loaded directly to trucks from crusher and leave the site.
3. Material processing See attached narrative and Figure 2.
4. Road ways and yard areas See attached narrative for roadway dust control
5. Loading, hauling, and dumping materials See attached narrative.
6. Drilling, blasting, and pushing See attached narrative. There will be no drilling or blasting.
7. Clearing, leveling, and excavation There will be no clearing, leveling or excavation other than into rock piles.
8. Tailing piles and ponds N/A
9. Exposed surfaces See attached narrative. Exposed surfaces are only inside the waste rock site.
10. Surface mining operations See attached narrative.

|  |                    |
|--|--------------------|
| <b>16. Owner/Operator Representative</b>   |                    |
| Justin THompson - VP Operations, Bowie Resource Partners   |                    |
| Signature <u></u> | Date <u>3/2/16</u> |

**BOWIE REFINED COAL-WELLINGTON  
DEER CREEK WASTE ROCK RECLAMATION  
APPLICATION FOR TEMPORARY RELOCATION OF PORTABLE EQUIPMENT**

**NARRATIVE OF PROPOSED PROCESSES AND EQUIPMENT TO BE USED THAT IS  
SUBJECT TO EMISSIONS REGULATIONS AND SITE CONTROLS**

**1.0 INTRODUCTION AND PURPOSE**

This narrative is provided as supplemental information to the attached request for approval of Temporary Relocation of Portable Equipment (Utah DAQ Form 15A). Bowie Refined Coal plans to relocate a portable crusher to recover coal from 362,000 tons of waste rock currently stored at the Deer Creek Waste Rock Site. As shown on Figure 1, the site is located approximately six miles northwest of Huntington, Utah at UTM coordinates 494673.51 E., 4358973.65 N., Zone 12 S in Emery County, Utah. The nearest house is 0.6 miles southwest of the waste rock site and the closest city is Huntington.

Crushing activities will be conducted using a mobile crusher provided by Wheeler Machinery in Salt Lake City, Utah. The unit is a Meso-Lokotrack 350 TPH LT1213S, Serial Number 77882 that was manufactured in March 2014. The power plant mounted to the unit is a Caterpillar C-13, 415 HP/310 kW diesel fueled engine. As required by DEQ for portable or relocatable machinery, the LT1213 (engine and crusher) provided by Wheeler is permitted separately under DAQE-AN142390008-14 (Attached). It is understood that under the Form 15A application process the only fuel emissions and PM calculations that must be submitted for the Deer Creek Waste Rock Site during the planned period of operation are for the crusher and its power plant. Spreadsheets with these calculations are provided as attached Tables 1 and 2. For specific details on the screens, fuel requirements, engine performance and emission control measures as well as DAQ forms 11 and 15 related to the crusher and engine, reference is made to the above Approval Order.

The other equipment planned for use at this site consists of diesel powered, double capacity trucks making 40 to 100 round trips per day, a CAT 336F Hydraulic Excavator and a CAT 980M, rubber tired front end ("RTFE") loader to feed the crusher from the stockpile.

**2.0 PROCESS AND SEQUENCE**

Approximately 362,000 tons of waste rock are currently stored at the Deer Creek site. It is anticipated that re-processing will yield approximately 217,200 tons (60%) of coal with approximately 114,800 tons of waste rock (40%) remaining at the site. The sequence of events is as detailed below and shown on the attached flow diagram (Figure 2). Figure 3 shows the waste rock site, topography, exit entrance road and typical layout of the crusher, excavator, loader and trucks.

- The LT1213S Crusher will be set up at an optimal location within the first work area.
- The 336F Excavator will pull material from the stockpile and load it into the crusher.

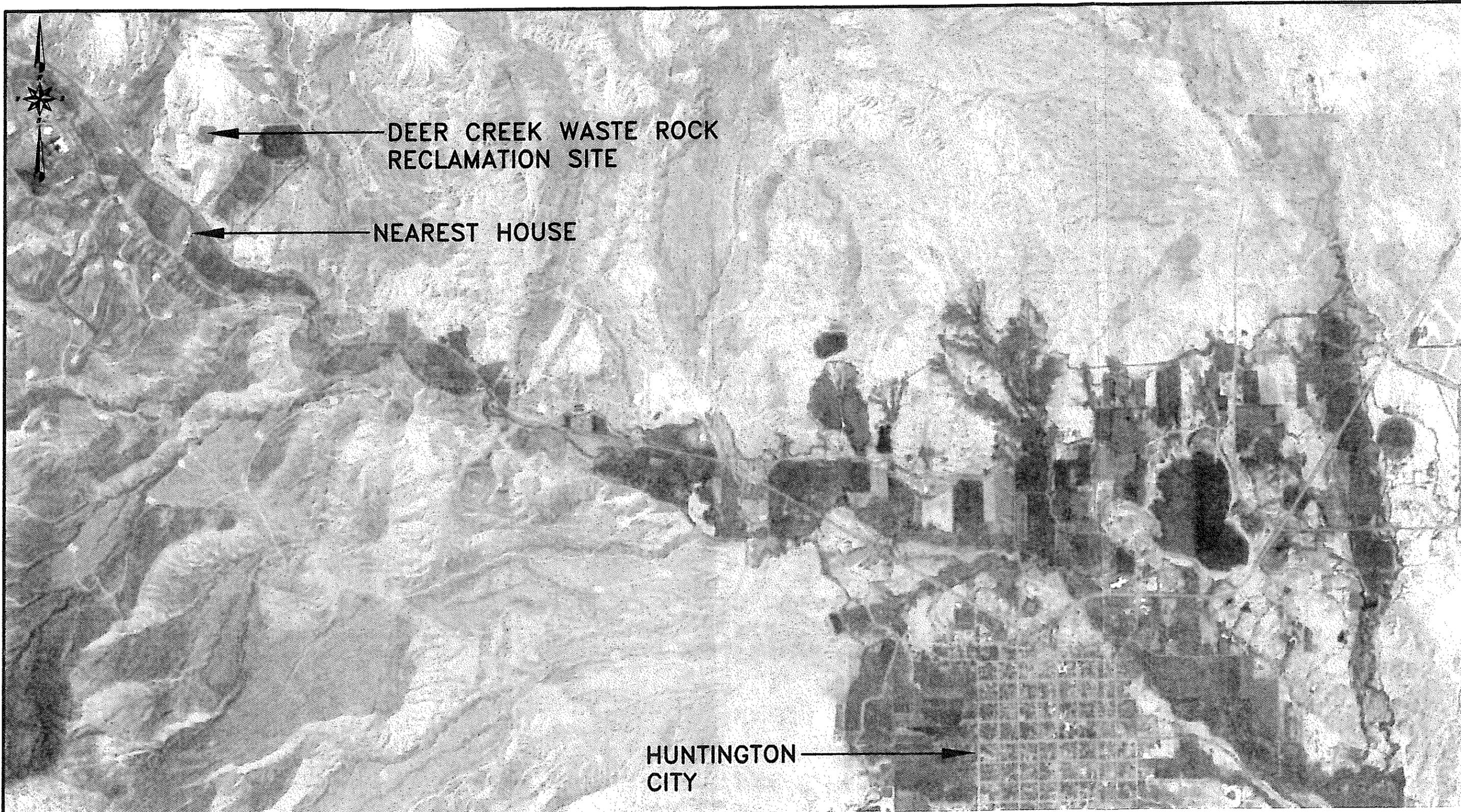
- The 980M RTFE loader will move material from around the area into the stockpile pile to maintain a workable size supply pile for the excavator to feed the crusher.

### **3.0 DURATION**

At the Deer Creek site the only unpaved area within which the portable crusher will travel is inside the waste rock site. If needed, the most effective dust control method is treatment with a salt solution, most likely magnesium chloride or calcium chloride. Tests have shown that the use of magnesium chloride can create an efficient rating of 95% for up to 22 days after application (USBM, 1987)<sup>1</sup>. Re-application is simple with the frequency dependant on total traffic load wear and any precipitation that could bring the chloride into solution and runoff. Chlorides also absorb moisture from the atmosphere and tend to maintain travelable, lower dust moisture content in the haul road surface soils.

---

<sup>1</sup> USBM, [1987]. Fugitive Dust Control for Haulage Roads and Tailings. Olson KS & Veith DL. US Bureau of Mines.



BASE MAP GOOGLE EARTH 8-17-15



FIGURE 1 - DEER CREEK WASTE ROCK RECLAMATION LOCATION MAP



**Bowie Refined Coal**  
Deer Creek Waste Rock Site  
Coal Recovery  
Form 15A

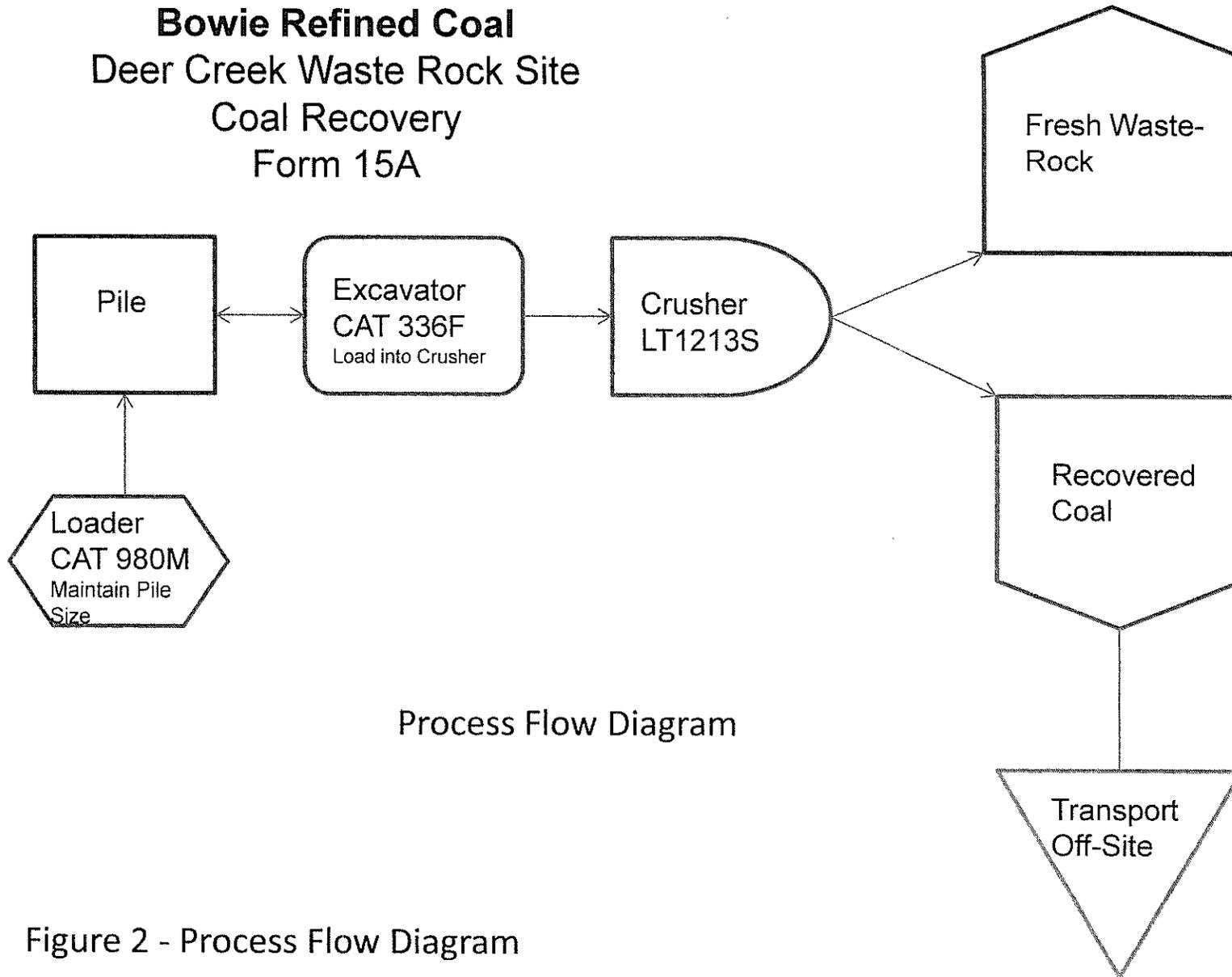


Figure 2 - Process Flow Diagram



**LEGEND**

-  CRUSHER WITH CAT C-13 415 HP DIESEL ENGINE. THIS IS A PERMIT REGULATED ENGINE EXHAUST EMISSION SOURCE
-  EXCAVATOR CAT 336F HYDRAULIC EXCAVATOR
-  LOADER CAT 980M RUBBER TIRE FRONT END LOADER
-  DOUBLE TRUCK - 42 TON CAPACITY

EQUIPMENT LOCATION AND ORIENTATION SHOWN IS TYPICAL. MOBILE CRUSHER AND SUPPORT EQUIPMENT WILL RELOCATE TO AREAS OF RECOVERABLE COAL AS NEEDED THROUGHOUT THE OPERATION

**NOTES:**

UTM 494544.18 E., 4358016.99 N.  
 ZONE 12S  
 APPROXIMATELY 6 MILES NW OF  
 HUNTINGTON, EMERY COUNTY, UTAH

AVERAGE SURFACE ELEVATION 6344 FT.  
 ASL. WASTE ROCK STORAGE SITE IS  
 APPROXIMATELY 3.0 ACRES

362,000 TONS OF WASTE ROCK  
 EST 217,200 TONS RECOVERABLE (60%)  
 EST 144,800 TONS BACK TO WASTE PILE  
 (40%)

BASE MAP GOOGLE EARTH 8-17-15



FIGURE 3 - DEER CREEK WASTE ROCK RECLAMATION SITE PLAN



## TABLE 1 - Deer Creek Waste Rock Site Gasoline & Diesel Industrial Engines

Company: BRC  
Site: Deer Creek  
Date: March 1, 2016

Note: SO<sub>2</sub> Calculated using DAQ AP42 Template. Caterpillar does not provide these values. See explanation page for details.

|                | PM <sub>10</sub><br>tons/yr | SO <sub>2</sub><br>tons/yr | NO <sub>x</sub><br>tons/yr | CO<br>tons/yr | Lead<br>tons/yr | PM <sub>10</sub> - F<br>tons/yr | PM <sub>10</sub> - NF<br>tons/yr | PM <sub>2.5</sub><br>tons/yr | VOC<br>tons/yr | HAP's<br>tons/yr | CO <sub>2</sub> eq.<br>tons/yr |
|----------------|-----------------------------|----------------------------|----------------------------|---------------|-----------------|---------------------------------|----------------------------------|------------------------------|----------------|------------------|--------------------------------|
| Uncontrolled   | 0.86                        | 0.80                       | 12.17                      | 2.62          |                 |                                 |                                  | 0.86                         | 0.99           | 0.01             | 453                            |
| PTE/Controlled | 0.86                        | 0.80                       | 12.17                      | 2.62          |                 |                                 | 0.86                             | 0.86                         | 0.99           | 0.01             | 453                            |

### Diesel Industrial Engine

1,900 hours/year  
415 hp  
7,000 BTU/hp-hr  
2.905 MMBTU/hr

|                     | lb/MMBtu | lbs/hr | tons/year | lb/hp-hr | lbs/hr | tons/year |                   |
|---------------------|----------|--------|-----------|----------|--------|-----------|-------------------|
| NO <sub>x</sub>     | 4.41     | 12.81  | 12.17     | 3.10E-02 | 12.87  | 12.22     | AP-42 Table 3.3-1 |
| CO                  | 0.95     | 2.76   | 2.62      | 6.68E-03 | 2.77   | 2.63      | AP-42 Table 3.3-1 |
| PM <sub>10</sub>    | 0.31     | 0.90   | 0.86      | 2.20E-03 | 0.91   | 0.87      | AP-42 Table 3.3-1 |
| PM <sub>2.5</sub>   | 0.31     | 0.90   | 0.86      | 2.20E-03 | 0.91   | 0.87      | AP-42 Table 3.3-1 |
| SO <sub>2</sub>     | 0.29     | 0.84   | 0.80      | 2.05E-03 | 0.85   | 0.81      | AP-42 Table 3.3-1 |
| VOC                 | 0.36     | 1.05   | 0.99      | 2.51E-03 | 1.04   | 0.99      | AP-42 Table 3.3-1 |
| CO <sub>2</sub>     | 164      | 476    | 453       | 1.15     | 477    | 453       |                   |
| CO <sub>2</sub> eq. |          |        | 453       |          |        | 453       |                   |
| HAPs                | 21.38    | 0.01   | 0.01      | 21.38    | 0.01   | 0.01      |                   |

| HAP's                  | lb/MMBtu | lbs/year | lbs/hr   | tons/year | AP-42 Table 3.3-2 |
|------------------------|----------|----------|----------|-----------|-------------------|
| Benzene                | 9.33E-04 | 5.15     | 2.71E-03 | 2.57E-03  |                   |
| Toluene                | 4.09E-04 | 2.26     | 1.19E-03 | 1.13E-03  |                   |
| Xylenes                | 2.85E-04 | 1.57     | 8.28E-04 | 7.87E-04  |                   |
| 1,3-Butadiene          | 3.91E-05 | 0.22     | 1.14E-04 | 1.08E-04  |                   |
| Formaldehyde           | 1.10E-03 | 6.51     | 3.43E-03 | 3.26E-03  |                   |
| Acetaldehyde           | 7.67E-04 | 4.23     | 2.23E-03 | 2.12E-03  |                   |
| Acrolein               | 9.25E-05 | 0.51     | 2.69E-04 | 2.55E-04  |                   |
| Naphthalene            | 8.48E-05 | 0.47     | 2.46E-04 | 2.34E-04  |                   |
| Acenaphthylene         | 5.06E-06 | 0.03     | 1.47E-05 | 1.40E-05  |                   |
| Acenaphthene           | 1.42E-06 | 0.01     | 4.13E-06 | 3.92E-06  |                   |
| Fluorene               | 2.92E-05 | 0.16     | 8.48E-05 | 8.06E-05  |                   |
| Phenanthrene           | 2.94E-05 | 0.16     | 8.54E-05 | 8.11E-05  |                   |
| Anthracene             | 1.87E-05 | 0.01     | 5.43E-06 | 5.16E-06  |                   |
| Fluoranthene           | 7.61E-06 | 0.04     | 2.21E-05 | 2.10E-05  |                   |
| Pyrene                 | 4.78E-06 | 0.03     | 1.39E-05 | 1.32E-05  |                   |
| Benz(a)anthracene      | 1.68E-06 | 0.01     | 4.88E-06 | 4.64E-06  |                   |
| Chrysene               | 3.53E-07 | 0.00     | 1.03E-06 | 9.74E-07  |                   |
| Benzo(b)fluoranthene   | 9.91E-08 | 0.00     | 2.88E-07 | 2.73E-07  |                   |
| Benzo(k)fluoranthene   | 1.55E-07 | 0.00     | 4.50E-07 | 4.28E-07  |                   |
| Benzo(a)pyrene         | 1.86E-07 | 0.00     | 5.46E-07 | 5.19E-07  |                   |
| Indeno(1,2,3-cd)pyrene | 3.75E-07 | 0.00     | 1.09E-06 | 1.03E-06  |                   |
| Dibenz(a,h)anthracene  | 5.63E-07 | 0.00     | 1.69E-06 | 1.61E-06  |                   |
| Benzo(g,h,i)perylene   | 4.89E-07 | 0.00     | 1.42E-06 | 1.35E-06  |                   |
|                        |          | 21.38068 | 0.011253 | 0.01069   |                   |

LT1213 is a mobile crusher producing 350 Tons Per Hour

Has a mister piped through the network.

Mobile crushers are considered mobile equipment but are they exempt from emissions like trucks, loaders and excavators.

Mobile crusher is 6am to 10 PM 180 days/year

Engine on crusher is 415 hp/310 kW.

Wheeler Machinery sending me emission and dust specs on crusher, dozer and loader. Trucks data calculated from the mine input.

# Aggregate Processing

Company: BRC  
 Site: Deer Creek  
 Date: March 1, 2016

## TABLE 2 - Deer Creek Waste Rock Site NOI

|                | PM <sub>10</sub><br>tons/yr | SO <sub>2</sub><br>tons/yr | NO <sub>x</sub><br>tons/yr | CO<br>tons/yr | Lead<br>tons/yr | PM <sub>10</sub> - F<br>tons/yr | PM <sub>10</sub> - NF<br>tons/yr | PM <sub>2.5</sub><br>tons/yr | VOC<br>tons/yr | HAP's<br>tons/yr | CO <sub>2</sub> eq.<br>tons/yr | PM <sub>10</sub><br>lb/hr | SO <sub>2</sub><br>lb/hr | NO <sub>x</sub><br>lb/hr | CO<br>lb/hr | Lead<br>lb/hr | PM <sub>10</sub> - F<br>lb/hr | PM <sub>10</sub> - NF<br>lb/hr | PM <sub>2.5</sub><br>lb/hr | VOC<br>lb/hr | HAP's<br>lb/hr |
|----------------|-----------------------------|----------------------------|----------------------------|---------------|-----------------|---------------------------------|----------------------------------|------------------------------|----------------|------------------|--------------------------------|---------------------------|--------------------------|--------------------------|-------------|---------------|-------------------------------|--------------------------------|----------------------------|--------------|----------------|
| Uncontrolled   | 0.38                        |                            |                            |               |                 | 0.38                            |                                  | 0.11                         |                |                  |                                | 1.23                      |                          |                          |             |               | 1.23                          |                                | 0.37                       |              |                |
| PTE/Controlled | 0.06                        |                            |                            |               |                 | 0.06                            |                                  | 0.01                         |                |                  |                                | 0.21                      |                          |                          |             |               | 0.21                          |                                | 0.04                       |              |                |

|   | Uncontrolled     |                   | Controlled       |                   | (lb/ton)              |
|---|------------------|-------------------|------------------|-------------------|-----------------------|
|   | PM <sub>10</sub> | PM <sub>2.5</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |                       |
| Primary, Secondary, Tertiary Crushing     | 0.0024           | 0.00072           | 0.00054          | 0.00010           | AP-42 Table 11.19.2-2 |
| Fines Crushing                            | 0.0150           | 0.0045            | 0.00120          | 0.00007           |                       |
| Screening                                 | 0.0087           | 0.00261           | 0.00074          | 0.00005           |                       |
| Fines Screening                           | 0.0720           | 0.0216            | 0.00220          | 0.0011            |                       |
| Conveyor Transfer Point                   | 0.0011           | 0.00033           | 0.000046         | 0.000013          |                       |
| Wet Drilling                              | 0.00008          | 0.000024          |                  |                   |                       |
| Truck Unloading - Fragmented Stone        | 0.000016         | 4.8E-06           |                  |                   |                       |
| Truck Unloading - Conveyor, Crushed Stone | 0.00010          | 0.00003           |                  |                   |                       |

|                           | Controlled | Number  | Yearly<br>Amount<br>(tons) | Hourly<br>Rate<br>(tons) | Uncontrolled<br>PM <sub>10</sub> Emissions |         | Controlled<br>PM <sub>10</sub> Emissions |         | Uncontrolled<br>PM <sub>2.5</sub> Emissions |         | Controlled<br>PM <sub>2.5</sub> Emissions |         |
|---------------------------|------------|---------|----------------------------|--------------------------|--|---------|--|---------|---|---------|---|---------|
|                           |            |         |                            |                          | tons/yr                                    | lb/hour | tons/yr                                  | lb/hour | tons/yr                                     | lb/hour | tons/yr                                   | lb/hour |
| Times Crushed             | 1          | 217,200 | 350                        | 0.26                     | 0.84                                       | 0.06    | 0.19                                     | 0.08    | 0.25  | 0.01    | 0.04                                      |         |
| Times Fine Crushed        | 0          | 217,200 | 350                        | 0.00                     | 0.00                                       | 0.00    | 0.00                                     | 0.00    | 0.00  | 0.00    | 0.00                                      |         |
| Times Screened            | 0          | 217,200 | 350                        | 0.00                     | 0.00                                       | 0.00    | 0.00                                     | 0.00    | 0.00  | 0.00    | 0.00                                      |         |
| Times Fine Screened       | 0          | 217,200 | 350                        | 0.00                     | 0.00                                       | 0.00    | 0.00                                     | 0.00    | 0.00  | 0.00    | 0.00                                      |         |
| Number of Transfer Points | 1          | 217,200 | 350                        | 0.12                     | 0.39                                       | 0.00    | 0.02                                     | 0.04    | 0.12  | 0.00    | 0.00                                      |         |
| Unloading                 | 0          | 217,200 | 350                        | 0.00                     | 0.00                                       | 0.00    | 0.00                                     | 0.00    | 0.00  | 0.00    | 0.00                                      |         |
| <b>Total Emissions</b>    |            |         |                            |                          | 0.38                                       | 1.23    | 0.06                                     | 0.21    | 0.11  | 0.37    | 0.01                                      | 0.04    |

**DEER CREEK WASTE ROCK SITE  
DESIGN OF PHASE I RECLAMATION  
TEMPORARY DIVERSION CHANNELS**

**1.0 METHODS**

The reject pile at the Deer Creek waste rock site will be deep gouged during reclamation. As indicated in Appendix 5-4, this will preclude runoff from all areas thus reclaimed. Furthermore, silt fences and/or straw wattles will be installed adjacent to the Phase I reclaimed area to capture all runoff and associated sediment from the outside edges of the gouges. Thus, although the site sedimentation pond will be retained prior to Phase II reclamation in order to satisfy the requirements of R645-301-763.100, it is anticipated that no runoff will flow from the reclaimed area to the pond.

Nonetheless, the Division has required that “the Permittee must show all runoff from the disturbed area reporting to the total containment pond until the second year of successful seeding.” Therefore, in the unlikely event that runoff is generated from the outer edges of the gouges and not otherwise captured by the sedimentation pond or site-wide temporary sediment control, temporary diversions will be installed on the north and south sides of the reclaimed reject pile, as indicated on Plate 5-3, during Phase I site reclamation.

The design peak flow was estimated using the 10-year, 24-hour rainfall event (2.2 inches), consistent with the calculations performed by others for the design of the operational drainage system at the Deer Creek site. This provides a substantial safety factor since the required design event for diversions draining ephemeral watersheds of less than one square mile is a 2-year, 6-hour event (see R645-301-742.333). As a design check, the ability of the temporary diversions to safely handle the peak flow from a 100-year, 24-hour event (3.4 inches) was also calculated.

HydroCAD was used to model runoff using the Type II rainfall distribution. A curve number of 90 was used for all runoff analyses. The time of concentration was estimated using the lag method as developed by the U.S. Natural Resources Conservation Service (1997).

Channel capacity and flow velocity were calculated within HydroCAD using the Manning equation. A value of 0.040 was selected for Manning’s roughness coefficient. Each channel was designed with a triangular shape, 2H:1V side slopes, and a depth of 1 foot.

Since the surface of the reclaimed reject pile will be extensively gouged, only the outside edges of the gouges nearest to the temporary diversions have the potential of contributing runoff to the diversions. The length of these edges will likely be less than 10 feet. However, as a conservative measure, an edge length of 20 feet was assumed. Adding the 4-foot channel top width and an additional foot to account for a berm on the downstream side of the channel, the watersheds draining to the temporary diversions will have maximum dimensions of 25 feet wide for the length of each channel. Slopes within these watersheds and along the channels were determined from Plate 5-3.

## 2.0 RESULTS

The output from HydroCAD is attached and the results of those calculations are summarized in Table 1 below. The indicated velocities are all considered non-erosive. The calculated flow depths provide sufficient freeboard, even during the 100-year event. Therefore, the proposed designs are considered sufficient to meet the requirements of the regulatory agency.

**TABLE 1**

Phase I Reclamation  
Temporary Diversion Design Summary<sup>(a)</sup>

| Temporary Channel <sup>(b)</sup> | Peak Discharge (cfs) |                     | Peak Velocity (ft/s) |                     | Peak Flow Depth (ft) |                     |
|----------------------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|
|                                  | 10-yr, 24-hr Event   | 100-yr, 24-hr Event | 10-yr, 24-hr Event   | 100-yr, 24-hr Event | 10-yr, 24-hr Event   | 100-yr, 24-hr Event |
| TRC-1                            | 0.70                 | 1.27                | 1.73                 | 2.02                | 0.41                 | 0.52                |
| TRC-2                            | 0.051                | 0.92                | 1.16                 | 1.36                | 0.42                 | 0.53                |

<sup>(a)</sup> All modeling based on a precipitation duration of 24 hours

<sup>(b)</sup> See Plate 5-3

## 3.0 REFERENCES

U.S. Natural Resources Conservation Service. 1997. National Engineering Handbook, Part 630 Hydrology. U.S. Department of Agriculture. Washington, D.C.

## Temp rec channels

Type II 24-hr 10-yr, 24-hr Rainfall=2.20"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment TWS-1: Phase I Watershed** Runoff Area=0.330 ac 0.00% Impervious Runoff Depth>1.17"  
Flow Length=570' Slope=0.0417 '/' Tc=7.0 min CN=90 Runoff=0.70 cfs 0.032 af

**Subcatchment TWS-2: Phase I Watershed** Runoff Area=0.250 ac 0.00% Impervious Runoff Depth>1.17"  
Flow Length=440' Slope=0.0184 '/' Tc=8.5 min CN=90 Runoff=0.51 cfs 0.024 af

**Reach TRC-1: Temp Reclamation** Avg. Flow Depth=0.41' Max Vel=1.73 fps Inflow=0.70 cfs 0.032 af  
n=0.040 L=570.0' S=0.0211 '/' Capacity=6.30 cfs Outflow=0.57 cfs 0.032 af

**Reach TRC-2: Temp Reclamation** Avg. Flow Depth=0.42' Max Vel=1.16 fps Inflow=0.51 cfs 0.024 af  
n=0.040 L=440.0' S=0.0091 '/' Capacity=4.14 cfs Outflow=0.41 cfs 0.024 af

**Total Runoff Area = 0.580 ac Runoff Volume = 0.057 af Average Runoff Depth = 1.17"**  
**100.00% Pervious = 0.580 ac 0.00% Impervious = 0.000 ac**

## Temp rec channels

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Type II 24-hr 10-yr, 24-hr Rainfall=2.20"

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### Summary for Subcatchment TWS-1: Phase I Watershed

Runoff = 0.70 cfs @ 11.98 hrs, Volume= 0.032 af, Depth > 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-yr, 24-hr Rainfall=2.20"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| * 0.330   | 90 |                       |
| 0.330     |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 7.0      | 570           | 0.0417        | 1.36              |                | <b>Lag/CN Method,</b><br>Contour Length= 300' Interval= 2' |

### Summary for Subcatchment TWS-2: Phase I Watershed

Runoff = 0.51 cfs @ 12.00 hrs, Volume= 0.024 af, Depth > 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-yr, 24-hr Rainfall=2.20"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| * 0.250   | 90 |                       |
| 0.250     |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.5      | 440           | 0.0184        | 0.86              |                | <b>Lag/CN Method,</b><br>Contour Length= 100' Interval= 2' |

### Summary for Reach TRC-1: Temp Reclamation Channel

Inflow Area = 0.330 ac, 0.00% Impervious, Inflow Depth > 1.17" for 10-yr, 24-hr event  
Inflow = 0.70 cfs @ 11.98 hrs, Volume= 0.032 af  
Outflow = 0.57 cfs @ 12.13 hrs, Volume= 0.032 af, Atten= 19%, Lag= 8.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.73 fps, Min. Travel Time= 5.5 min  
Avg. Velocity = 0.69 fps, Avg. Travel Time= 13.7 min

Peak Storage= 190 cf @ 12.03 hrs  
Average Depth at Peak Storage= 0.41'  
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.30 cfs

0.00' x 1.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 2.0 '/' Top Width= 4.00'  
Length= 570.0' Slope= 0.0211 '/'  
Inlet Invert= 6,346.00', Outlet Invert= 6,334.00'

## Temp rec channels

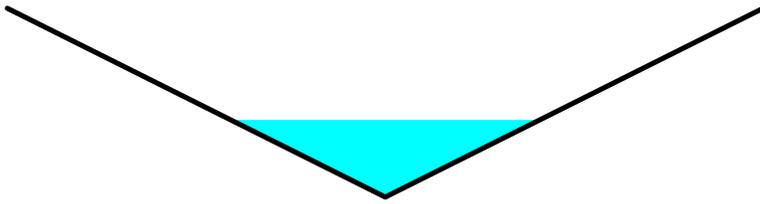
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Type II 24-hr 10-yr, 24-hr Rainfall=2.20"

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### Summary for Reach TRC-2: Temp Reclamation Channel

Inflow Area = 0.250 ac, 0.00% Impervious, Inflow Depth > 1.17" for 10-yr, 24-hr event  
Inflow = 0.51 cfs @ 12.00 hrs, Volume= 0.024 af  
Outflow = 0.41 cfs @ 12.16 hrs, Volume= 0.024 af, Atten= 19%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.16 fps, Min. Travel Time= 6.3 min

Avg. Velocity = 0.47 fps, Avg. Travel Time= 15.6 min

Peak Storage= 155 cf @ 12.06 hrs

Average Depth at Peak Storage= 0.42'

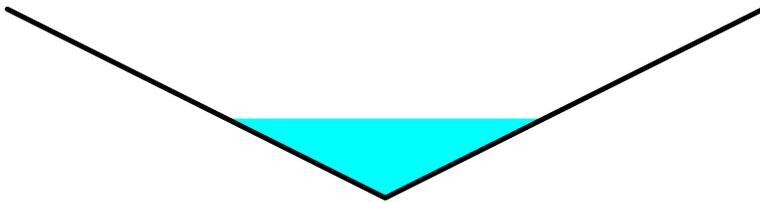
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 4.14 cfs

0.00' x 1.00' deep channel, n= 0.040

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

Length= 440.0' Slope= 0.0091 '/'

Inlet Invert= 6,324.00', Outlet Invert= 6,320.00'



## Temp rec channels

Type II 24-hr 100-yr, 24-hr Rainfall=3.40"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment TWS-1: Phase I Watershed** Runoff Area=0.330 ac 0.00% Impervious Runoff Depth>2.20"  
Flow Length=570' Slope=0.0417 '/' Tc=7.0 min CN=90 Runoff=1.27 cfs 0.060 af

**Subcatchment TWS-2: Phase I Watershed** Runoff Area=0.250 ac 0.00% Impervious Runoff Depth>2.20"  
Flow Length=440' Slope=0.0184 '/' Tc=8.5 min CN=90 Runoff=0.92 cfs 0.046 af

**Reach TRC-1: Temp Reclamation** Avg. Flow Depth=0.52' Max Vel=2.02 fps Inflow=1.27 cfs 0.060 af  
n=0.040 L=570.0' S=0.0211 '/' Capacity=6.30 cfs Outflow=1.06 cfs 0.060 af

**Reach TRC-2: Temp Reclamation** Avg. Flow Depth=0.53' Max Vel=1.36 fps Inflow=0.92 cfs 0.046 af  
n=0.040 L=440.0' S=0.0091 '/' Capacity=4.14 cfs Outflow=0.77 cfs 0.045 af

**Total Runoff Area = 0.580 ac Runoff Volume = 0.106 af Average Runoff Depth = 2.20"**  
**100.00% Pervious = 0.580 ac 0.00% Impervious = 0.000 ac**

## Temp rec channels

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Type II 24-hr 100-yr, 24-hr Rainfall=3.40"

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### Summary for Subcatchment TWS-1: Phase I Watershed

Runoff = 1.27 cfs @ 11.98 hrs, Volume= 0.060 af, Depth > 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-yr, 24-hr Rainfall=3.40"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| * 0.330   | 90 |                       |
| 0.330     |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 7.0      | 570           | 0.0417        | 1.36              |                | <b>Lag/CN Method,</b><br>Contour Length= 300' Interval= 2' |

### Summary for Subcatchment TWS-2: Phase I Watershed

Runoff = 0.92 cfs @ 12.00 hrs, Volume= 0.046 af, Depth > 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-yr, 24-hr Rainfall=3.40"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| * 0.250   | 90 |                       |
| 0.250     |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.5      | 440           | 0.0184        | 0.86              |                | <b>Lag/CN Method,</b><br>Contour Length= 100' Interval= 2' |

### Summary for Reach TRC-1: Temp Reclamation Channel

Inflow Area = 0.330 ac, 0.00% Impervious, Inflow Depth > 2.20" for 100-yr, 24-hr event  
Inflow = 1.27 cfs @ 11.98 hrs, Volume= 0.060 af  
Outflow = 1.06 cfs @ 12.10 hrs, Volume= 0.060 af, Atten= 16%, Lag= 7.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.02 fps, Min. Travel Time= 4.7 min  
Avg. Velocity = 0.77 fps, Avg. Travel Time= 12.3 min

Peak Storage= 306 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.52'  
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.30 cfs

0.00' x 1.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 2.0 '/' Top Width= 4.00'  
Length= 570.0' Slope= 0.0211 '/'  
Inlet Invert= 6,346.00', Outlet Invert= 6,334.00'

## Temp rec channels

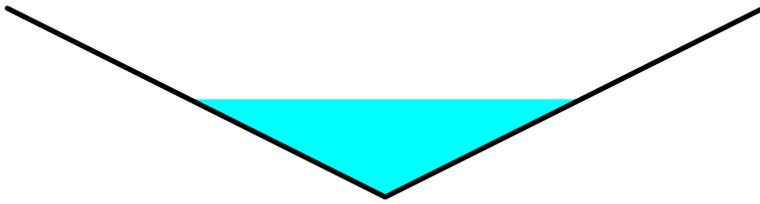
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Type II 24-hr 100-yr, 24-hr Rainfall=3.40"

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### Summary for Reach TRC-2: Temp Reclamation Channel

Inflow Area = 0.250 ac, 0.00% Impervious, Inflow Depth > 2.20" for 100-yr, 24-hr event  
Inflow = 0.92 cfs @ 12.00 hrs, Volume= 0.046 af  
Outflow = 0.77 cfs @ 12.14 hrs, Volume= 0.045 af, Atten= 16%, Lag= 8.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.36 fps, Min. Travel Time= 5.4 min

Avg. Velocity = 0.52 fps, Avg. Travel Time= 14.0 min

Peak Storage= 251 cf @ 12.05 hrs

Average Depth at Peak Storage= 0.53'

Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 4.14 cfs

0.00' x 1.00' deep channel, n= 0.040

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

Length= 440.0' Slope= 0.0091 '/'

Inlet Invert= 6,324.00', Outlet Invert= 6,320.00'

