Incoming
C0150032
#4163
ok

UtahAmerican Energy, Inc.

Genwal Resources, Inc.
P. O. Box 910
East Carbon, Utah 84520
Phone: (435) 888-4000
(435) 650-3157
Fax: (435) 888-4002

October 30, 2012

Mr. Daron Haddock,
Permit Manager
1594 West North Temple,
Suite 1210,
P.O. Box 145801,
Salt Lake City, Utah 84114-5801.

Re: Clean Copies Task #4138, Crandall Canyon Mine, DOGM Permit C\015\032

Dear Mr. Haddock,

Please find attached two complete clean copies of the Burma Pond Construction.

C1 and C2 forms are included.

Should you have any questions please call.

Sincerely,

R. Jay Marshall

R. Jay Marshall P.E.
Project Manager

APPLICATION FOR PERMIT PROCESSING

Permit Change ☐	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐	Permit Number: ACT/015/032

Title of Proposal: Burma Pond Clean Copies Task #4138

Mine: Crandall Canyon Mine

Permittee: UtahAmerican Energy, Inc.

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

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

☐ Yes	☐ No	1. Change in the size of the Permit Area? 7.32 acres Disturbed Area? ____ acres X increase X decrease.
☐ Yes	☐ No	2. Is the application submitted as a result of a Division Order? DO #
☐ Yes	☐ No	3. Does application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes	☐ No	4. Does application include operations in hydrologic basins other than as currently approved?
☐ Yes	☐ No	5. Does application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☐ No	6. Does the application require or include public notice/publication?
☐ Yes	☐ No	7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☐ No	8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes	☐ No	9. Is the application submitted as a result of a Violation? NOV #
☐ Yes	☐ No	10. Is the application submitted as a result of other laws or regulations or policies? Explain: Permit Renewal
☐ Yes	☐ No	11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes	☐ No	12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2?)
☐ Yes	☐ No	13. Does the application require or include collection and reporting of any baseline information?
☐ Yes	☐ No	14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	☐ No	15. Does application require or include soil removal, storage or placement?
☐ Yes	☐ No	16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☐ No	17. Does the application require or include construction, modification, or removal of surface facilities?
☐ Yes	☐ No	18. Does the application require or include water monitoring, sediment or drainage control measures?
☐ Yes	☐ No	19. Does the application require or include certified designs, maps, or calculations?
☐ Yes	☐ No	20. Does the application require or include subsidence control or monitoring?
☐ Yes	☐ No	21. Have reclamation costs for bonding been provided for?
☐ Yes	☐ No	22. Does application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes	☐ No	23. Does the application affect permits issued by other agencies or permits issued to other entities?

X Attach 6 complete copies of the application.

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

R Jay Marshall 10/30/12

Signed - Name - Position - Date

Subscribed and sworn to before me this 30th day of October, ~~19~~ 2012

Linda Kerns

Notary Public

My Commission Expires: 3-27-13, ~~19~~

Attest: STATE OF Utah

COUNTY OF Carbon

LINDA KERNS
NOTARY PUBLIC • STATE of UTAH
COMMISSION # 578211
COMM. EXP. 03-27-2013

Received by Oil, Gas & Mining

RECEIVED

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ASSIGNED TRACKING NUMBER

Application for Permit Processing
Detailed Schedule of Changes to the MRP

Clean Copies Burma Pond Task #4138

Permit Number: ACT/015/032

Mine: Crandall Canyon Mine

Permittee: UtahAmerican Energy, Inc.

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

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☐ REPLACE	☐ REMOVE	Table of contents and Pages 1-1 to 1-12 of Text in Chapter 1 of the MRP
☐ ADD	☐ REPLACE	☐ REMOVE	Proof Of Publication to the end of Appendix 1-8 of the MRP
☐ ADD	☐ REPLACE	☐ REMOVE	Section 3 "Murray Energy Corporation" in Appendix 1-9 of the approved MRP
☐ ADD	☐ REPLACE	☐ REMOVE	New Appendix 1-16 behind Existing Appendix 1-15 of the MRP
☐ ADD	☐ REPLACE	☐ REMOVE	Maps 1-1 and 1-1A found in Volume D of the MRP
☐ ADD	☐ REPLACE	☐ REMOVE	Text in Chapter 7 of MRP pages 7-xii-a, 7-xiii, 7-41, 7-47, and 7-54.
☐ ADD	☐ REPLACE	☐ REMOVE	New Appendix 7-66 to the end of Chapter 7 Appendices found in the approved MRP
☐ ADD	☐ REPLACE	☐ REMOVE	New bond calculations to the front of Appendix 5-20
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

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CHAPTER 1

LEGAL, FINANCIAL, COMPLIANCE, AND RELATED INFORMATION
(R645-301-100)

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LEGAL, FINANCIAL, COMPLIANCE, AND RELATED INFORMATION

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CHAPTER 1

LEGAL, FINANCIAL, COMPLIANCE, AND RELATED INFORMATION

R945-301-112 IDENTIFICATION OF INTERESTS

112.100 GENWAL Resources, Inc. is a corporation organized and existing under the laws of Utah and qualified to do business in Utah.

112.200 The applicant, GENWAL Resources, Inc. will also be the operator.

GENWAL Resources, Inc.
P.O. Box 910
East Carbon, Utah 84520
(435) 888-4000
David Hibbs - President

112.220 The resident agent of the applicant, GENWAL Resources, Inc., is:

David Hibbs
GENWAL Resources, Inc.
P.0. Box 910
East Carbon, Utah 84520
(435) 888-4000

112.230 GENWAL Resources, Inc. will pay the abandoned mine land reclamation fee.

112.300 thru 112.330 Ownership and Control - See Appendix 1-9.

GENWAL Resources, Inc. is the permittee and operator of the Crandall Canyon and the South Crandall Mines. GENWAL Resources, Inc. is a wholly owned subsidiary of ANDALEX Resources, Inc. GENWAL Resources, Inc. is a Utah corporation licensed to do business in the State of Utah. ANDALEX Resources, Inc, is a wholly owned subsidiary of UtahAmerican Energy Inc., which in turn is a wholly owned subsidiary of Murray Energy Corporation.

112.340 See Appendix 1-12

112.350 See Appendix 1-12

112.410 See Appendix 1-12

112.420 See Appendix 1-9

112.500 Surface Owners:

U.S. Forest Service
Manti-La Sal National Forest
599 West Price River Drive
Price, Utah 84501

School and Institutional Trust
Lands Administration
355 West North Temple, Suite 400
Salt Lake City, Utah 84180-1204

GENWAL Resources Inc.
P.O. Box 1077
Price, Utah 84501

Subsurface Owners:

Bureau of Land Management
Utah State Office
136 East South Temple
Salt Lake City, Utah 84111

School and Institutional Trust
Lands Administration
355 West North Temple, Suite 400
Salt Lake City, Utah 84180-1204

GENWAL Resources Inc.
P.O. Box 1077
Price, Utah 84501

112.600 Contiguous Surface Owners:

U.S. Forest Service
Manti-La Sal National Forest
599 West Price River Drive
Price, Utah 84501

School and Institutional Trust
Lands Administration
355 West North Temple, Suite 400
Salt Lake City, Utah 84180-1204

Dick Nielson
c/o Kris Ligon
4819 Mandell Street
Houston, Texas 77006

Contiguous Sub-Surface Owners:

Bureau of Land Management
Utah State Office
136 East South Temple
Salt Lake City, Utah 84111

School and Institutional Trust
Lands Administration
355 West North Temple, Suite 400
Salt Lake City, Utah 84180-1204
Dick Nielson
c/o Kris Ligon
4819 Mandell Street
Houston, Texas 77006

112.700 See Appendix 1-12

112.800 N/A

113 Violation Information:

113.100 The applicant or any subsidiary, affiliate or persons controlled by or under common control with the applicant has not had a federal or state permit to conduct coal mining and reclamation operations suspended or revoked in the five years preceding the date of submission of the application.

113.120 The applicant etc. has not forfeited any performance bond or similar security.

113.200 Not applicable

113.300 A listing of violations received by the applicant in connection with any coal mining and reclamation operation during the three year period preceding the application date is provided in Appendix 1-11. MSHA numbers for the operations can be found in Appendix 1-12. There have been no unabated violations or cessation orders issued to any affiliated companies during the previous three years.

113.400 N/A

114 RIGHT OF ENTRY INFORMATION

114.100 Applicant bases its legal right to enter and begin underground mining activities in the permit area upon the following:

- Federal Coal Lease U-54762, issued to GENWAL on December 1, 1986, is currently owned by Andalex and IPA. IPA and Andalex have undivided 50% interest as tenants in common of all leases previously under GENWAL's sole ownership (Andalex Resources, Inc has now assumed all leases or portions of the leases previously held by NEICO through the purchase and transfer of those rights to GENWAL Resources, Inc. effective 1/11/95).

- Federal coal lease UTU-78953 (also known as the South Crandall tract) was acquired in June 2003. (Refer to Appendix 1-13)

- A 40 acre parcel of the SITLA Millfork Lease was subleased from PacifiCorp in February, 2004. (Refer to Appendix 1-14).

- In December, 2004 the BLM issued a decision to approve Federal Lease UTU-68082, to include an additional 120 acres . (Refer to Appendix 15-A.) The approval became effective in the early part of 2005 (Refer to Appendix 1-15).

The present Joint Owners (Andalex and IPA) base their legal right to enter and continue underground mining activities in the permit area upon the following documents and the NEICO/Andalex sales contract:

<u>Federal Coal Lease Assignments</u>

Federal Coal Lease U-54762 was issued to Genwal Coal Co. on December 1, 1986 and was assigned to the previous Joint Owners (NEICO and IPA) on July 11, 1991. NEICO's interest was assigned to ANDALEX on January 11, 1995.

Federal Coal Lease SL-62648, was assigned to the previous Joint Owners (NEICO and IPA) on July 11, 1991. NEICO's interest was assigned to ANDALEX on January 11, 1995.

Federal Coal Lease UTU-68082, was assigned to the previous Joint Owners (NEICO and IPA) in March, 1994. NEICO's interest was assigned to ANDALEX on January 11, 1995.

<u>State Coal Lease Assignments</u>

Utah State Coal Lease ML-21568, was assigned to the previous Joint Owners (NEICO and IPA) on July 11, 1991. NEICO's interest was assigned to ANDALEX on January 11, 1995.

Utah State Coal Lease ML-21569, was assigned to the previous Joint Owners (NEICO and IPA) on July 11, 1991. NEICO's interest was assigned to ANDALEX on January 11, 1995.

Copies of the Assignments are included in Appendix 1-1.

Forest Service Special Use Permit Assignments

Special Use Permit, 1.5 acres, 150 x 400 ft adjacent to the eastern boundary of GENWAL's Federal Coal Lease SL-062648 for construction of the Sediment Pond. (See Appendix 1-3)

Special Use Permit, .10 acres located in Section 6, SW quarter NE quarter T16S R7E SLBM for the Trailhead parking and snow storage. (See Appendix 1-3).

Special Use Permit, 1.4 acres for stockpiles 1, 2, 3 and 4 dated 8/17/87 (See Appendix 1-3)

Road Use Permit Assignment for F.S. No. 50248 road issued May 21, 1981 by the United States Forest Service (Appendix 1-2).

It should be noted that throughout this Mining and Reclamation Plan the combined area of Federal Lease UTU-78953 and the SITLA/PacifiCorp sublease are collectively referred to as the South Crandall lease area, the South Crandall tract, the South Crandall mining area, and similar such terms.

Emergency Drillholes and Access Roads

On August 6, 2007, the active mine workings in Main West barrier pillar section collapsed trapping six miners underground. In an emergency attempt to rescue these men a number of boreholes were drilled from the surface of East Mountain down to the underground workings (see Plate 1-1). Due to the emergency nature of this rescue operation all surface construction for the drillpads and access roads was done under the emergency provisions of the various surface management regulations. The Forest Service, BLM, SITLA and the Division all granted verbal authority to proceed in a cooperative effort to not hinder the rescue attempts. Due to the emergency nature of the operation no formal rights-of-entry were granted for the areas of surface disturbance. On August 30, MSHA officially called off the rescue effort. Reclamation of drill pads and access roads began shortly thereafter. Refer to Appendix 5-22(A) for the addendum to the reclamation plan for the East Mountain drillpads and access roads. This plan includes a more complete description of activities and land management issues involving this rescue attempt.

SITLA Special Use Lease #1708, Burma Evaporation Basin

This Special Use Lease is located in lower Huntington Canyon, and is the site of the Burma evaporation pond. Refer to Plate 1-1A for location. Refer to Appendix 1-16 for right-of-entry information. Refer to Appendix 7-66 for details of the evaporation basin facility.

PERMIT LEGAL DESCRIPTION

The permit area is located and described as follows:

PARCEL	ACREAGE	LEGAL DESCRIPTION		
FEDERAL LEASE U-68082	2979.49	T 15 S, R 6 E		
			Section 25:	S ½
			Section 26:	S ½
			Section 35:	ALL
		T 15 S, R 7 E		
			Section 30:	Lots 7-12
				SE ¼
			Section 31:	Lots 1-12
				NE ¼
				N½SE¼
				SW¼SE¼
		T 16 S, R 6 E		
			Section 1:	Lots 1-12
				SW¼
		T 16 S, R 7 E		
			Section 6:	Lots 2-4
				SW¼NE¼
MODIFICATION TO U-68082	120.00	T15S, R7E		
			Section 32:	W½NW¼
				NW¼SW¼

FEDERAL LEASE U-54762	256.49	T 15 S, R 7 E		
			Section 31:	SE¼SE¼
			Section 32:	S½SW¼
				SW¼SE¼
			T 16 S, R 7 E	
			Section 5:	Lots 2, 3, and 8
FEDERAL LEASE SL-062648	161.17	T 16 S, R 7 E		
			Section 5:	Lots 5 and 6
			Section 6:	Lot 1
				SE¼NE¼
FEDERAL LEASE U-78953	880.00	T 16 S, R 7 E		
			Section 4:	W½SW¼
				S½SW¼NW¼
			Section 5:	SE¼
				S½SE¼NE¼
			Section 8:	E½
				NE¼NW¼
				S½NW¼
			Section 9:	NW¼
STATE LEASE ML-21568	997.69	T 16 S, R 6 E		
			Section 2:	ALL
STATE LEASE ML-21569	640.00	T 15 S, R 6 E		
			Section 36:	ALL
FEE SURFACE AND COAL (Dellenbach)	160.00	T 16 S, R 7 E		
			Section 5:	SW¼

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BLM RIGHT OF WAY UTU-77975 (underground mining rights)	50.00	T 16 S, R 6 E		
			Section 3:	E½E½SE¼NE¼ E½E½NE¼SE¼ E½SE¼SE¼
			Section 10:	NE¼NE¼NE¼
SITLA/PACIFICORP SUBLEASE	40.0	T 16 S, R 7 E		
			Section 8:	NW¼NW¼
FOREST SERVICE SPECIAL USE AREAS: (all in T 16 S, R 7 E)				
SEDIMENT POND (7/28/83)	1.5		Section 5: located within SW¼SW¼SE¼NW¼,	
TOPSOIL PILE #1 (8/17/87)	0.2		Section 5: located within SE¼SE¼SE¼NW¼,	
TOPSOIL PILE #2 (8/17/87)	0.2		Section 5: located within SW¼NW¼SE¼NE¼,	
TOPSOIL PILE #3 (8/17/87)	0.5		Section 4: located within NW¼NW¼SE¼NW¼,	
TOPSOIL PILE #4 (8/17/87)	0.5		Section 4: located within SW¼SW¼NE¼NW¼	
SITLA SPECIAL USE LEASE* (Burma Evaporation Basin)	7.32	T 17 S, R 8 E Section 5: located within Lot 6		
TOTAL PERMIT AREA	**6295.06**			

* For complete legal description, refer to Appendix 1-16

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The right to continue underground mining operations will apply to the property attached hereto as Appendix 1-1.

The surface facility area and permit area is not within 300 feet of any occupied dwelling and is not subject to the prohibitions or limitations of the State and/or Federal Regulations.

GENWAL DISTURBED ACREAGE

AREA	LOCATION	ACRES	PARCEL
Minesite	NW1/4 of Sec 5 (1)	7.778*	Federal Lease UTU-54762
Minesite	SW1/4 of Sec 5 (1)	6.086	Dellenbach Fee
Topsoil Pile #1	NW1/4 of Sec 5 (1)	0.2	FS Special Use Permit
Topsoil Pile #2	NE1/4 of Sec 5 (1)	0.2	FS Special Use Permit
Topsoil Pile #3	NW1/4 of Sec 4 (1)	0.5	FS Special Use Permit
Topsoil Pile #4	NE1/4 of Sec 4 (1)	0.5	FS Special Use Permit
Rescue Drillholes	SE1/4 of Sec 35 (2)	2.27	Federal Lease UTU-68082
Rescue Drillholes	NE1/4 of Sec 2 (3)	5.64	State Lease ML-21568
SITLA Rescue Road	E1/2 of Sec 2 (3)	3.98	State Lease ML-21568
Burma Evaporation Basin	Lot 6 of Sec 5 (4)	7.32	SITLA Special Use Lease 1708
TOTAL		**34.47**	

Notes: (1) T16S, R7E
(2) T15S, R6E
(3) T16S, R6E
(4) T17S, R8E

* Includes all areas within "permitted" disturbed area. Not all acreage is presently disturbed. See Figure 8C.

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115 STATUS OF UNSUITABILITY CLAIMS

All available information concludes that the proposed permit area is not within an area designated as unsuitable for underground mining activities (refer to Appendix 1-7). The map required to be maintained by the regulatory authority under 764.25(b), does not indicate this permit area as unsuitable for underground mining. The regulatory authority has also stated that this area is not under study for designation in an administrative proceeding. The permit area is located in the Wasatch Plateau as described in the following, "Known Recoverable Coal Resource Area", as indicated in the San Rafael Planning Area Management

Framework Plan, published in July 1979, by the United States Department of Interior, Bureau of Land Management. Pages 43 and 44 of that publication, copies of which are included with this application and found at the end of this chapter as Appendix 1-6, indicate that none of the acreage in the KRCRA was determined to be unsuitable for underground mining. In addition, the Land Management Plan, Ferron-Price Planning Unit, Manti-La Sal National Forest, published in May 1979, by the United States Department of Agriculture, Forest Service, Intermountain Region. The Forest Service has stated that this permit area, which is included in the Section A3 minable coal area of this publication, will not be considered unsuitable for leasing or mining. Page 149 of the document is included with this application as Appendix 1-7.

The applicant was notified of a public hearing scheduled for June 2, 1981, at 3:00 p.m. in Huntington, Utah, at the Senior Citizens Center. An officer of GENWAL was present at the hearing. The public hearing dealt with the proposed mining activities of the Crandall Canyon Mine within 100 feet of a public road (Forest Service Development). The USFS has issued a Special Use Permit for the Crandall Canyon Mine and accepts that the operation will occur within 100 feet of the Forest Service Development road.

The surface facility area and permit area is not within 300 feet from any occupied dwelling and is not subject to the prohibitions or limitations of State and/or Federal Regulations.

The area to be included in the Incidental Boundary Change (IBC) is immediately adjacent to the current permit area. Since mining in the IBC will be primarily first mining (longwall setup entries and barrier pillars), no surface impacts are expected to occur. Protection of the resources in this IBC are provided under the Mining and Reclamation Permit as well as state and federal.

116 PERMIT TERMS

The applicant requests a permit term of five years from the date of approval, however mining activities will continue longer than five years if the coal becomes available and feasible to mine. The starting and termination dates in one year increments is shown on Plate 5-2. The horizontal extent of the underground mine workings is also shown. GENWAL will commit to comply with all applicable standards during times of temporary and permanent cessation of operations. Further discussion may be found in Chapter 5, Engineering.

117 INSURANCE, PROOF OF PUBLICATION

117.100 Insurance

A Certificate of Liability Insurance with Andalex and IPA is included in Appendix 1-10.

117.200 Proof of Publication

A copy of the newspaper advertisement of the application for a renewal of Crandall Canyon Mine permit was included in the permit package, as required under R645-300-121.100. Also, a copy of the newpaper advertisement for the permit amendment to install a culvert in Crandall Canyon has been included. See Appendix 1-8 for both copies.

118 FILING FEE

This permit application to conduct coal mining and reclamation operations pursuant to the State Program was accompanied by a fee of $5.00.

120 APPLICATION FORMAT AND CONTENTS

This application is structured based on the R645 regulations of the Division of Oil, Gas, and Mining. The chapter divisions in the application are based on the different sections of the R645 regulations. Each section of the application is based on the corresponding sections of the GENERAL CONTENTS of the R645 regulations.

APPENDIX 1 - 8

Appendix 1-8

AFFIDAVIT OF PUBLICATION

STATE OF UTAH)

ss.

County of Carbon,)

I, Richard Shaw, on oath, say that I am the Publisher of the Sun Advocate, a twice-weekly newspaper of general circulation, published at Price, State of Utah a true copy of which is hereto attached, was published in the full issue of such newspaper for 4 (Four) consecutive issues, and on the Utah legals.com website, the first publication was on the 14th day of February, 2012, and that the last publication of such notice was in the issue of such newspaper dated the 6th day of March 2012.

Richard Shaw – Publisher

Subscribed and sworn to before me this 6th day of March, 2012.

Notary Public My commission expires January 10, 2015 Residing at Price, Utah

Publication fee, $ 201.60

LINDA THAYN
NOTARY PUBLIC-STATE OF UTAH
COMMISSION# 604351
COMM. EXP. 01-10-2015

PUBLIC NOTICE FOR PERMIT REVISION
CRANDALL CANYON MINE

Genwal Resources, Inc., P.O. Box 910, East Carbon, Utah 85520, has filed with the Utah Division of Oil, Gas and Mining an application to revise the Crandall Canyon Mine Mining and Reclamation Plan (C/015/032). This revision would add 7.32 acres to the existing 6787.74 acre permit area for the purpose of construction an evaporation basin (a.k.a., the Burma Evaporation Basin) to be used as part of the treatment facility for the mine discharge water. Specifically, the basin would be located on SITLA land in lower Huntington Canyon-in Lot 6, Section 5, T17S, R8E, SLBM. Copies of this application are available for inspection at the Division of Oil, Gas and Mining, 1594 West Temple, Suite 1210, Salt Lake City, Utah and at the Emery County Courthouse, 75 East Main, Emery, Utah. Comments, objections or requests for an informal conference should be addressed to the Utah Division of Oil, Gas and Mining, 1594 West Temple, Suite 1210, P.O. Box 145801, Salt Lake City, Utah 84114-5801.

Published in the Sun Advocate February 14, 21, 28 and March 6, 2012.

AFFIDAVIT OF PUBLICATION

STATE OF UTAH)
ss.
County of Emery,)

I, Richard Shaw, on oath, say that I am the Publisher of the Emery County Progress, a weekly newspaper of general circulation, published at Castle Dale, State of Utah and County aforesaid, and that a certain notice, a true copy of which is hereto attached, was published in the full issue of such newspaper for 4 (Four) consecutive issues, and on the Utah legals.com webwsite; the first publication was on the 14th day of February, 2012, and that the last publication of such notice was in the issue of such newspaper dated the 6th day of March, 2012.

Richard Shaw

Richard Shaw – Publisher

Subscribed and sworn to before me this 6th day of March 2012.

Linda Thayn

Notary Public My commission expires January 10, 2015 Residing at Price, Utah

Publication fee, $ 144.00

LINDA THAYN
NOTARY PUBLIC-STATE OF UTAH
COMMISSION# 604351
COMM. EXP. 01-10-2015

PUBLIC NOTICE FOR PERMIT REVISION
CRANDALL CANYON MINE

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Published in the Emery County Progress February 14, 21, 27 and March 6, 2012.

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APPENDIX 1 - 9

Appendix 1-9

Section 3

MURRAY ENERGY CORPORATION
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Appointment of Officers

		Begin	End
Robert E. Murray	Chairman, President &	02/23/01	
	Chief Executive Officer	02/23/01	
John R. Forrelli	Vice President, Engineering & Planning	09/11/07	11/01/10
	Senior Vice Prsident	11/01/10	
Robert D. Moore	Executive Vice President &	08/01/08	
	Chief Financial Officer	08/01/08	
Robert Edward Murray	Vice President	09/11/07	
Ryan M. Murray	Vice President	09/11/07	
Roy A. Heidelbach	Asst. Vice President	09/11/07	
P. Bruce Hill	Vice President - Human Resources	12/18/03	11/05/09
B.J. Cornelius	Vice President	08/01/08	
Michael D. Loiacono	Treasurer	02/23/01	
Michael D. Loiacono	Chief Financial Officer	12/20/05	04/23/07
Michael O. McKown	Secretary	02/24/01	
	Senior Vice President, General Counsel & Secretary	08/01/08	
	Senior VP, HR & Legal	03/23/10	04/08/11
G. Christopher Van Bever	Asst. Secretary	10/22/07	

Incorporation Information:

State of Incorporation	Ohio; Charter No. 1211519
Date of Incorporation	February 23, 2001
ID#	34-1956752

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Shareholder:

	Begin	End
Murray Energy Holdings Co. (100%)	06/27/03	
Robert E. Murray	02/23/01	10/21/03

12169121.1

APPENDIX 1-16

SITLA LEASE 1708

(BURMA EVAPORATION BASIN)

Appendix 1-16

SPECIAL USE LEASE AGREEMENT NO. 1708

(*Industrial*)

Fund: School

THIS SPECIAL USE LEASE AGREEMENT (the "**Lease**") is made and entered into this 4th day of January 2012 by and between THE STATE OF UTAH, ACTING BY AND THROUGH THE SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION, 675 East 500 South, Suite 500, Salt Lake City, Utah 84102 ("**Lessor**"), and Genwal Resources, Inc., a Utah corporation, 794 North "C" Canyon Rd., East Carbon, Utah, 84520, with a mailing address of P.O. Box 910, East Carbon, Utah, 84520 ("**Lessee**").

RECITALS

A. Lessor owns certain state trust lands located in Emery County, Utah, more specifically described in **Exhibit A** attached hereto and incorporated herein by reference.

B. Lessee desires to lease the lands described in **Exhibit A**, for the purpose of constructing, operating, repairing, and maintaining a coal mine discharge water evaporation basin.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, and for other good and valuable consideration, receipt and sufficiency of which are hereby acknowledged, Lessor and Lessee agree as follows:

ARTICLE 1
LEASE OF PREMISES

1.1. Lease. In consideration of the covenants of Lessee contained in this Lease, Lessor leases to Lessee, effective as of the Commencement Date set forth in **Section 2.1**, the parcel of land situated in Emery County, State of Utah, which is described on **Exhibit A** to this Lease (the "**Premises**"), in "**AS-IS**" condition, subject to (a) current taxes and assessments, reservations in patents and all rights-of-way, easements, covenants, conditions, restrictions, obligations, liens, encumbrances, and liabilities of record as of the date hereof; (b) all matters which an accurate survey or physical inspection of the Premises would disclose; and (c) all applicable zoning and building requirements and other governmental laws, rules, and regulations now or hereafter in effect, including without limitation all rules and regulations enacted by Lessor with respect to use and management of state trust lands.

1.2. Execution Bonus. Not applicable.

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1.3. Permitted Uses. Lessee may use the Premises for all purposes reasonably necessary and useful for constructing, operating, repairing and maintaining a coal mine discharge water evaporation basin (the "**Facility**"), subject to the terms of the Lease. The Facility shall be used to evaporate water discharged from the Crandall Canyon Coal Mine, which after the water is evaporated, shall leave a thin fine grain iron precipitate material ("**Permitted Use**"). Lessee agrees not to conduct or permit to be conducted any industrial or commercial activities not related to the operation of the Facility, or any public or private nuisance, on or from the Premises. Lessee agrees not to permit or commit any waste of the Premises.

1.4. Reservations to Lessor. Subject to the rights and privileges granted to Lessee under this Lease, Lessor hereby excepts and reserves from the operation of this Lease the following rights and privileges:

(a) Rights-of-Way and Easements. Lessor reserves the right, following consultation with the Lessee, to establish rights-of-way and easements upon, through or over the Premises for roads, pipelines, electric transmission lines, transportation and utility corridors, mineral access, and any other purpose deemed reasonably necessary by Lessor, if Lessor determines in good faith that such grants will not unreasonably interfere with operations under this Lease.

(b) Minerals. Lessor reserves all oil, natural gas, coal, geothermal resources, metalliferous minerals, sand, gravel and other common varieties, and any other minerals, and the right to lease the same to third parties, as well as the right to utilize the surface estate of the Premises for exploration, development and extraction of the same under terms and conditions that Lessor determines in good faith will not unreasonably interfere with operations under this Lease.

(c) Use and Disposal of Surface. Subject to the rights granted to the Lessee pursuant to this Lease, Lessor reserves the right, following consultation with the Lessee, to use, lease, sell, or otherwise dispose of the surface estate or any part thereof if Lessor determines in good faith such use or disposal will not unreasonably interfere with operations under this Lease.

(d) Other Rights and Privileges. Lessor reserves all other rights and privileges of any kind or nature, except as herein granted, provided that any actions under such reservation will not, in Lessor's good faith determination, unreasonably interfere with operations under this Lease.

1.5. Lessee's Inspection of the Premises. Lessee has inspected and investigated the Premises to Lessee's complete satisfaction, observed its physical characteristics and existing conditions, the operations thereon and on adjacent areas, and Lessee hereby waives any and all objections to, complaints about, or claims regarding (including, but not limited to, federal, state or common law based actions and any private right of action under state and federal law, including, but not limited to, the Comprehensive Environmental Response, Compensation and Liability Act, and any state or local equivalent, to which the Premises is or may be subject) the Premises and its physical characteristics and existing conditions, including, without limitation, subsurface soil and water conditions and solid and hazardous waste and hazardous substances on, under or adjacent to the Premises. Lessee further hereby assumes the risk of changes in applicable laws and regulations relating to past, present and future environmental conditions on the Premises and the risk that adverse physical characteristics and conditions, including, without limitation, the presence of hazardous substances or other contaminants, may not have been revealed by its investigation. Lessor is hereby released from all responsibility and liability regarding the operation, condition (including the presence in the soil, air, structures, and surface and subsurface waters, of materials or substances that have been or may in the future be determined to be toxic, hazardous, undesirable or subject to regulation and that may need to be specially treated, handled and/or removed from the Premises under current or future federal, state and local laws and regulations), valuation or utility of the Premises, or its suitability for any purpose whatsoever. Lessee expressly acknowledges that Lessee has not relied on any warranties, promises, understandings or representatives, express or implied oral or written, of Lessor or of any agent of Lessor, relating to the Premises, except as specifically set forth in this Lease.

1.6. Covenant of Quiet Enjoyment. Lessor covenants that so long as Lessee shall perform the obligations of Lessee contained in this Lease and shall not be in default in the performance of any of such obligations, Lessor shall take no action or fail to take any action that would deny Lessee and its permitted sublessees, licensees, successors and assigns the right to freely, peaceably, and quietly have, hold and enjoy full use and enjoyment of the Premises for the purposes for which this Lease is granted.

1.7. Lessor's Access to Premises. Lessor and its agents, at all reasonable times and upon prior notice to Lessee, shall have free and full access to the Premises for the purpose of examining or inspecting the condition thereof, for the purpose of determining if Lessee is performing the covenants and agreements of this Lease, and for the purpose of posting such notices as Lessor may desire to protect the rights of Lessor.

ARTICLE 2
TERM

2.1. Commencement Date and Original Term. The original term of this Lease (the "**Lease Term**") shall be for a period of thirty (30) years, commencing November 1, 2011, (the "**Commencement Date**") at 12:01 a.m., and continuing to October 31, 2041, subject to the terms and conditions set forth in this Lease which may permit or provide for earlier termination of the Lease.

2.2. Options to Extend Lease Term. Not applicable.

2.3. Termination for Failure to Build. In the event that Lessee has not commenced construction of the Facility, as set forth in the Development Plan described in **Section 4.1(a)**, within three (3) years of the Commencement Date, Lessor may terminate this Lease by giving written notice thereof to Lessee. Such termination shall be effective one year after the giving of such notice if Lessee has not commenced, and is not diligently pursuing to completion, construction of such improvements.

2.4. Holding Over. If Lessee or any successor in interest of Lessee should remain in possession of the Premises after termination of the Lease term without executing a new lease, then such holding over shall be construed as a tenancy from month-to-month, subject to all the covenants, terms, provisions and obligations of this Lease except for the provisions relating to the Minimum Rent payable hereunder, which Minimum Rent, during any holdover period shall be equal to two (2) times the amount of Minimum Rent otherwise calculated to be paid during the holdover period, together with all other sums owing to Lessor hereunder. Nothing contained herein shall be construed as Lessor's permission for Lessee to hold over or as limiting Lessor's remedies against a holdover Lessee, and if the Premises are not surrendered at the end of the Lease term, Lessee shall indemnify Lessor for, from and against any loss or liability resulting from delay by Lessee in so surrendering the Premises, including without limitation, any claims made by any succeeding Lessee based on such delay.

ARTICLE 3
RENT

3.1. Minimum Rent.

(a) Obligation to Pay Rent. Lessee shall pay to Lessor annually in advance during the Lease Term, the amount set forth in this **Section 3.1**, such amount, as adjusted from time to time as provided in **Section 3.1(c)** being referred to as the **"Minimum Rent"**. Rent shall be paid annually on or before November 1 of each year of the Lease Term, without any deduction or offset.

(b) Initial Minimum Rent. The Minimum Rent for the first three years of the Lease Term shall be Three Thousand Dollars ($3,000.00) per annum. Lessor acknowledges the receipt of $4,202.00, from Lessee, representing payment of the Minimum Rent for the first year of the Lease Term of $3,000.00, the $250.00 application fee, the $252.00 advertising fee, and the $700.00 lease processing charge.

(c) Rental Adjustments. Lessor may, but is not obligated to, adjust the Minimum Rent every three years. In no event shall the Minimum Rent for any three (3) year period be less than the Minimum Rent for the immediately preceding three (3) year period. Lessor, in its sole discretion, may elect to utilize either of the following methods to calculate the adjusted Minimum Rent:

(i) The Minimum Rent shall multiplied by a fraction, the numerator of which is the Consumer Price Index, published by the U.S. Bureau of Labor Statistics, All Urban Consumers, Western Region Average, All Items (1982-84 = 100) (the "CPI Index") for the most recent month available as of the date of adjustment, and the denominator of which is the CPI Index for the month in which the Commencement Date occurred, or for the month that was the most recent available when the most recent adjustment was made hereunder, as applicable. If, on an adjustment date, the CPI Index does not exist in the format described above, the Lessor may substitute any official index published by a governmental agency which is then in existence and which is then most comparable to the CPI Index.

or

(ii) Lessor may obtain an independent appraisal of the Premises as of the adjustment date. The adjusted Minimum Rent shall be calculated by multiplying the appraised value of the Premises by the then current prime rate, as published by Zion's First National Bank or other statewide financial institution.

3.2. Percentage Rental. Not Applicable

3.3. Net Lease. This is a net lease and it is the intention of the parties that, except as otherwise provided or limited by the specific provisions of this Lease, Lessee shall be responsible for all costs and expenses of the ownership, maintenance, repair and operation of the Premises incurred or accrued during the Lease Term, specifically including real estate taxes payable on account of Lessee's use of the Premises. Any present or future law to the contrary notwithstanding, this Lease shall not terminate, nor shall Lessee be entitled to any abatement, reduction, set-off, counterclaim, defense or deduction with respect to any Rent or other sum payable hereunder, nor shall the obligations of Lessee hereunder be affected, by reason of any damage to or destruction of the Premises or by any taking of the Premises or any part thereof by condemnation, except as provided in this Lease.

3.4. Interest and Penalty on Past Due Obligations. Any amount due to Lessor which is not paid when due and within any applicable notice and cure period shall incur interest at a rate (the **"Default Rate"**) equal to the lesser of: (a) one and one half per cent (1½ %) per month, or (b) the maximum rate of interest permissible under Utah law from the due date until paid. Lessee is also subject to penalties as provided by Utah Administrative Code R850-5-200 (2008) or by any replacement rule that shall be then in effect.

3.5. Audit. Lessor may from time to time cause an audit of Lessee's business to be made for the purpose of verifying the accuracy of the fees paid for any period within the Lease Term. Lessee agrees to make all records available for the audit at offices located within the State of Utah, unless Lessor agrees to a different location. If the results of the audit show that Lessee's payments for any period have been understated, then, within thirty (30) days of the determination of such deficiency, Lessee shall pay any applicable deficiency to Lessor, together with interest thereon at the Default Rate from the date such payment should originally been made until the date actually paid. If the results of the audit show that Lessee's payments for any period have been understated by four percent (4%) or more, then, within thirty (30) days of the determination of such deficiency, Lessee shall also pay Lessor the cost of the audit. If the results of the audit show that Lessee's payment of royalties and all fees for any period have been overstated, then within thirty (30) days of the determination of the overstatement, Lessor shall pay any such applicable overpayment to Lessee.

ARTICLE 4
DEVELOPMENT OF THE PREMISES AND CONSTRUCTION OF IMPROVEMENTS

4.1. Construction.

(a) Development Plan. The Facility shall be constructed and operated in accordance with the following:

i. the site plan, architectural renderings and environmental controls attached hereto as **Exhibit B** (collectively, the "**Site Plan**"); and

ii. the Crandall Canyon Mining and Reclamation Plan (MRP) C/015/032, as amended to include the Premises (the "**Mining Plan**"); and

iii. any approvals and/or restrictions or guidelines that may be required by the Utah Division of Oil, Gas and Mining or the Utah Department of Environmental Quality (collectively, the "**UDOGM Approvals**"). The Site Plan, the Mining Plan, and the UDOGM Approvals shall collectively be referred to as the "**Development Plan**".

Lessee shall construct and operate the Facility pursuant to the Development Plan. No material modifications shall be made to the Development Plan without the prior written consent of Lessor, such consent not to be unreasonably withheld or delayed. In the event Lessor fails to consent or object to a proposed modification(s) within thirty (30) days after receiving notice thereof, Lessor's consent shall be deemed approved. In the event Lessee receives a notice of violation from any governmental agency or authority, including the Utah Division of Oil, Gas and Mining ("**UDOGM**"), Lessee shall give Lessor a copy of such notice within twenty (20) days following receipt. Failure to timely give Lessor such notice shall be default under this Lease.

(b) Construction. No construction may occur on the Premises until such time as: (1) all amendments to the Mining Plan to incorporate the Facility have been completed, and (2) all UDOGM Approvals have been been issued. Prior to commencing construction of the Facility, Lessee shall provide copies of all UDOGM Approvals to Lessor. Lessee's construction of the Facility shall be prosecuted diligently to completion and in accordance with the Development Plan. All improvements shall be constructed in a good workmanlike manner, and in accordance with the requirements of any and all laws, ordinances and regulations applicable thereto, including zoning and building code requirements of any municipal or other governmental agency having jurisdiction over the Premises at time said improvements are constructed.

(c) Construction Bonding. Not applicable.

(d) As-Built Drawings. Upon completion of the Facility, or from time to time as Lessor may reasonably request, Lessee shall provide Lessor with an as-built survey showing the location of all physical improvements constructed on the Premises. The as-built survey shall be prepared by a licensed engineer.

4.2. Development at Lessee's Expense. Lessee shall bear all expenses in connection with the development, improvement, construction, alteration and repair of the Premises and all improvements thereon and shall indemnify, defend and hold Lessor and the Premises harmless from any and all claims arising therefrom.

4.3. Mechanics' Liens.

(a) Lessee is Not Lessor's Agent. The parties agree, and notice is hereby given, that Lessee is not the agent of Lessor for the construction, alteration or repair of any Improvements, the same being done at the sole direction and expense of Lessee. All contractors, materialmen, mechanics, and laborers are hereby charged with notice that they must look only to Lessee for the payment of any charge for work done or material furnished on the Premises during the Lease Term. Lessee shall have no right, authority or power to bind Lessor or any interest of Lessor for the payment of any claim for labor or material, or for any charge or expense, incurred by Lessee as to improvements, alterations or repairs on or to the Premises, and Lessee shall post notices on the Premises during all construction work of any nature whatsoever that Lessor is not responsible for any material and labor used on the Premises.

(b) Covenant Against Mechanic's Liens. Lessee shall not suffer or permit to be enforced against the Premises, or any part thereof, and shall indemnify and hold Lessor and the Premises harmless for, from, and against (i) any mechanic's, material men's, contractor's or subcontractor's liens arising from, and (ii) any claim for damage growing out of the work of, any construction, repair, restoration, replacement, or improvement done by or on behalf of Lessee. Lessee shall pay or cause to be paid all of such liens, claims, or demands before any action is brought to enforce the same against the Premises. If Lessee shall in good faith contest the validity of any such lien, claim, or demand, then Lessee shall, at its expense, defend itself and Lessor against the same and shall pay and satisfy any adverse judgment that may be rendered thereon prior to execution thereof and in the event of any such contest Lessee shall at the request of Lessor provide such security and take such steps as may be required by law to release the Premises from the effect of such lien.

ARTICLE 5
REGULATORY COMPLIANCE

5.1. Observance of Governmental Regulations. In Lessee's use and occupancy of the Premises and the performance by Lessee of its rights and obligations under this Lease, Lessee shall fully comply with all laws, orders, rules, regulations, directives, ordinances and requirements of all governmental authorities having jurisdiction over Premises, or any part thereof, and Lessee shall pay all costs, expenses, liabilities, losses, fines, penalties, claims and demands including, without limitation, attorney's fees as defined in **Section 13.1,** that may in any way arise out of or be imposed because of the failure of Lessee to comply with such laws, orders, rules, regulations, directives, ordinances and requirements.

5.2. Right of Contest. Lessee shall have the right to contest the validity of any laws, orders, rules, regulations, directives, ordinances and requirements in the manner and under the conditions provided in this Lease with respect to contesting the validity of taxes, assessments or other liens. During such contest, Lessee may refrain from complying therewith, provided that, (a) Lessor is not subjected to criminal prosecution as a result thereof, (b) Lessor's title to the Premises is not subject to lien or forfeiture as a result thereof, and (c) neither the Premises nor any rights or interest of Lessor are otherwise prejudiced or jeopardized thereby.

5.3. Hazardous Materials.

(a) Restrictions on Hazardous Substances; Remedial Work. Lessee shall not cause or permit any Hazardous Substance (as hereinafter defined) to be brought, kept or used in or about the Premises by Lessee, its officers, directors, owners, agents, sublessees, assignees, contractors, subcontractors, invitees, or concessionaires except in commercial quantities not in violation of Applicable Environmental Law and similar to those quantities usually kept on similar premises by others in the same business or profession. Lessee, its officers, directors, owners, agents, employees, sublessees, assignees, contractors, subcontractors, invitees, or concessionaires shall store, use and dispose of such materials in compliance with all applicable federal, state and local laws, including, without limitation, Applicable Environmental Law (as hereinafter defined). If the presence of any Hazardous Substance on, in or under the Premises caused or permitted by Lessee, its officers, directors, owners, agents, employees, sublessees, assignees, contractors, subcontractors, invitees, or concessionaires results in any contamination of the Premises, Lessee shall promptly take all actions, at its sole expense, as are necessary to return the affected area to the condition existing prior to the introduction of any such Hazardous Substance, including, without limitation, any investigation or monitoring of site conditions or any clean up, remediation, response, removal, encapsulation, containment or restoration work required because of the presence of any such Hazardous Substance on, in or under the Premises or any release or suspected release or threat of release of any such Hazardous Substance in the air, soil, surface water or ground water (collectively, the **"Remedial Work"**). Lessee shall obtain all necessary licenses, manifests, permits and approvals to perform the Remedial Work. Lessee shall promptly perform all Remedial Work and the disposal of all waste generated by the Remedial Work in accordance with all Applicable Environmental Law.

(b) Compliance with Applicable Environmental Law. Without limiting the generality of the foregoing or any other provision of this Lease, Lessee shall be solely and completely responsible for insuring that the Premises and all activities thereon (including activities of Lessee, its officers, directors, owners, employees, agents, contractors, subcontractors, sublessees, assignees, licensees, and concessionaires) comply fully with Applicable Environmental Law and for responding to, defending against and/or complying with administrative order, request or demand relating to potential or actual contamination on the Premises, or third party claims (including the claims of current or

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future sublessees in the Premises, for Remedial Work or for the costs of any such Remedial Work or for the costs of any such Remedial Work which the third-party claimant has undertaken, whether such order, request, demand or claim names Lessor, Lessee or both, or refers to the Premises in any way, except where the contamination or other violation of Applicable Environmental Law occurred prior to the date of execution of the Lease or was caused solely by Lessor or any prior owner or Lessee (other than sublessees of Lessee) of the Premises. Lessee's responsibility under this Section includes but is not limited to promptly responding to such orders, requests, demands and claims on behalf of Lessor and defending against any assertion of Lessor's financial responsibility or individual duty to perform thereunder.

(c) Definitions. As used herein, the term **"Hazardous Substance"** means any hazardous or toxic substance, material, or waste which is or becomes regulated by any local governmental authority, the State in which the Premises are located, or the United States Government, including, without limitation, (i) any substance, chemical or waste that is or shall be listed or defined as hazardous, toxic or dangerous under Applicable Environmental Law, (ii) any other chemical, material or substance, exposure to which is prohibited, limited or regulated by any federal, state or local governmental authority pursuant to any environmental, health and safety or similar law, code, ordinance, rule, regulation, order or decree and which may or could pose a hazard to the health and safety of occupants or users of the Premises or any part thereof, any adjoining property or cause damage to the environment, (iii) any petroleum products, (iv) PCB's, (v) leaded paint, and (vi) asbestos. As used in this Lease, the term **"Applicable Environmental Law"** shall include the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9601 *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 *et seq.*, the Federal Water Pollution Control Act, 33 U.S.C. §§ 1251 *et seq.*, the Clean Air Act, 42 U.S.C. §§ 7401 *et seq.*, the Hazardous Materials Transportation Act, 49 U.S.C. §§ 1801 *et seq.*, the Toxic Substances Control Act, 15 U.S.C. §§ 2601 *et seq.*, and the Safe Drinking Water Act, 42 U.S.C. §§ 300f through 300j-26, as such Acts have been or are hereafter amended from time to time; any so called Superfund or Superlien law; and any other federal, state and local statute, law, ordinance, code, rule, regulation, order or decree regulating, relating to or imposing liability or standards of conduct concerning any hazardous, toxic or dangerous waste, substance or material as now or any time hereafter in effect.

(d) Environmental Indemnity. Lessee shall indemnify, save harmless and defend each of the Lessor Indemnitees (as defined in **Section 6.1**) for, from and against any and all Claims incurred by, sought from or asserted directly or indirectly against any Lessor Indemnitee during or after the term of this Lease as a result of the presence of any Hazardous Substance on, in or under the Premises or any release of any Hazardous Substance into the air, soil, surface water or ground water, which Hazardous Substance was brought, kept or used in or about the Premises by Lessee, its officers, directors, owners, employees, agents, contractors or subcontractors, or as a result of a breach by Lessee of its obligations under this **Section 5.4**. Lessee shall assume, pursuant to the foregoing indemnity, any liabilities or responsibilities which are assessed against any Lessor Indemnitee in any action described under this **Section 5.4**. Lessee shall promptly provide to Lessor copies of all communications, filings or other writings, photographs or materials given to or received from any Person or Governmental Authority in connection with any cleanup or Remedial Work conducted by Lessee, and shall notify Lessor of, and permit Lessor's representative to attend any meetings or oral communications relating thereto.

5.4. Endangered Species; Migratory Birds. In its use of the Premises Lessee shall take all actions reasonably necessary for the protection of endangered, threatened and sensitive species, as the same may be defined by federal or state law; migratory birds as defined by the Migratory Bird Treaty Act, 16 U.S.C. § 703 *et seq*; and eagles as defined in the Bald and Golden Eagle Protection Act, 16 U.S.C. § 668a *et seq*.

5.5. Antiquities. All articles of antiquity, cultural resources, paleontological resources, and treasure-trove in or upon the Premises are and shall remain the property of Lessor. Prior to surface disturbance of the Premises, Lessee shall obtain cultural resources clearances from Lessor and the State Historic Preservation Officer in accordance with Utah Administrative Code R850-60 and applicable state historic preservation law. All costs associated with archaeological and paleontological investigations on the Premises will be borne by Lessee. In the event that Lessee discovers ancient human remains or a "site" or "specimen," as defined in Section 9-8-302 or 63-73-1 Utah Code Annotated (1953), as amended, on the Premises, Lessee shall cease all construction until such time as such items have been treated in accordance with state law.

5.6. Wildfire. Lessee shall at all times take reasonable precautions to prevent wildfires from starting or spreading on the Premises, and shall comply with all applicable laws, regulations and directives of any governmental agency having jurisdiction with respect to fire prevention and control. In the event that Lessee or its employees, contractors or licensees cause a wildfire that necessitates suppression action, Lessee agrees to reimburse the State of Utah and local fire authorities for the costs of any necessary fire suppression activities incurred as a result of the wildfire.

5.7. Fill Materials and Waste. Lessee shall not allow any deposit of rock, earth, ballast, refuse, garbage, waste matter, chemical, biological or other wastes, hydrocarbons, any other pollutants, or other matter within or upon the Premises, except as specifically authorized by this Lease. If the Lessee fails to remove all non-approved fill material, wastes or materials described above from the Premises, Lessor may at its option remove such materials and charge the Lessee for the cost of removal and disposal.

ARTICLE 6
INSURANCE AND INDEMNITY

6.1. Indemnification of State.

(a) General Indemnity. Lessee shall indemnify, save harmless and defend Lessor, its officers, directors, trustees, employees, agents, successors, and assigns (collectively the **"Lessor Indemnitees"**) for, from and against any and all claims (including, without limitation, third party claims for death or personal injury, environmental contamination, natural resources damages, or real or personal property damage), actions, administrative proceedings (including informal proceedings), judgments, damages, punitive damages, penalties, fines, costs, liabilities, interest or losses, and sums paid in settlement of claims, attorney's fees, consultant fees, expert fees, and any fees and expenses incurred in enforcing this indemnity incurred by, sought from or asserted directly or indirectly against any of the Lessor Indemnitees during or after the term of this Lease arising out of or in any way related to the use of the Premises under this Lease by Lessee, its employees, contractors, licensees, successors and assigns. Lessee shall assume, pursuant to the foregoing indemnity, any liabilities or responsibilities which are assessed against any Lessor Indemnitee in any action described under this **Section 6.1(a)**. Lessee shall promptly provide to Lessor copies of all communications, filings or materials given to or received from any person, entity or agency in connection with any such claim, and shall notify Lessee of, and permit Lessee's representative to attend any meetings or oral communications relating thereto.

(b) Breach of Lease. Lessee shall indemnify, save harmless and defend the Lessor Indemnitees for, from and against any and all claims (including, without limitation, third party claims for death or personal injury, environmental contamination, natural resources damages, or real or personal property damage), actions, administrative proceedings (including informal proceedings), judgments, damages, punitive damages, penalties, fines, costs, liabilities, interest or losses, and sums paid in settlement of claims, attorney's fees, consultant fees, expert fees, and any fees and expenses incurred in enforcing this indemnity incurred by, sought from or asserted directly or indirectly against any of the Lessor Indemnitees during or after the term of this Lease arising out of or in any way related to any failure of Lessee to comply with any of Lessee's obligations under this Lease.

(c) Survival. The obligations of Lessee and the foregoing indemnities by Lessee set forth in **Section 5.4(d)** and this **Section 6.1** shall survive the termination or expiration of this Lease.

(d) Provisions Relating to All Indemnities. Each provision of this Lease imposing an indemnification obligation on Lessee is in addition to all other indemnification provisions and shall not be construed in a manner that modifies or limits any other indemnification provision in this Lease. All indemnification provisions in this Lease shall survive the expiration or earlier termination of this Lease as to Claims arising or accruing prior to the expiration or earlier termination of this Lease. The indemnification provided by Lessee in this **Section 6.1** and elsewhere in this Lease shall not be construed or interpreted as in any way restricting, limiting or modifying Lessee's insurance or other obligations under this Lease, and such indemnification provisions are independent of Lessee's insurance and other obligations. Lessee's compliance with the insurance requirements and other obligations under this Lease does not in any way restrict, limit or modify Lessee's indemnification obligations under this Lease.

6.2. Casualty Insurance. Not applicable.

6.3. Liability Insurance. Lessee, at the sole cost and expense of Lessee, shall at all times during the Lease Term, maintain in force an insurance policy or policies which will name Lessor and Lessee as insureds against all liability resulting from property damage, injury or death occurring to persons in or about the Premises, with limits for each occurrence of not less than $2,500,000, combined single limit, with respect to personal injury, death and property damage. The original of such policy or policies shall remain in possession of Lessee; provided, however, that Lessee shall provide Lessor, without necessity of written demand, a duplicate policy or policies of any such insurance.

6.4. Other Insurance. Lessee shall, at all times during the Lease Term and at the sole cost and expense of Lessee, maintain and keep in force:

(a) Workmen's Compensation Insurance. All workmen's compensation insurance on its employees, if any, required under the applicable workmen's compensation laws of the State of Utah;

(b) Environmental Impairment Insurance. Not applicable.

(c) Other Coverages. Such other and additional insurance policies as a prudent ground lessee in the position of Lessee would maintain or as is required from time to time by applicable law, consistent with industry standards applicable to Lessee's business. Lessor shall be an additional insured on all such policies.

6.5. Policy Requirements. All insurance policies required or otherwise provided and maintained under this **Article 6** shall contain provisions to the effect that the insurance shall not be canceled or modified without thirty (30) day's prior written notice to Lessor and that no modification shall be effective unless approved in writing by Lessor. All such policies shall be issued by a company or companies rated "A" or better by the then most current edition of Best's Insurance Guide (or if such guide is no longer published, then having a comparable rating as specified by Lessor from time to time), responsible and authorized to do business in the state in which the Premises are located, as Lessee shall determine, and shall be approved by Lessor.

6.6. Mutual Release of Subrogation Rights. Without in any way limiting the applicability of **Section 6.1**, Lessee and Lessor each hereby release and relieve the other and the officers, directors, owners, shareholders, employees, agents and representatives of the other, and waive their entire right of recovery against the other and the officers, directors, owners, shareholders, employees, agents and representatives of the other, for loss or damage arising out of or incident to the perils insured against under this **Article 6**, which perils occur in, on or about the Premises, whether due to the negligence of Lessor or Lessees or their agents, employees, contractors, concessionaires and/or invitees, but only to the extent of insurance proceeds actually paid. Lessee shall, upon obtaining the policies of insurance required hereunder, give notice to and obtain waiver of subrogation agreements or endorsements from the insurance carrier or carriers concerning the foregoing mutual waiver of subrogation contained in this Lease.

ARTICLE 7
ASSIGNMENT AND SUBLETTING

7.1. Assignments.

(a) Prohibition against Assignment. Lessee shall not assign all or part of this Lease without Lessor's prior written consent, which consent shall not be unreasonably withheld, and any attempted assignment without such consent shall be null and void, and shall constitute a default under this Lease.

(b) Indirect Transfers. The sale, issuance or transfer of any voting capital stock of Lessee, if Lessee is a corporate entity, or of any ownership interests, if Lessee is a noncorporate entity, or any voting capital stock of any corporate entity which directly or indirectly controls Lessee, or any interests in any noncorporate entity with directly or indirectly controls Lessee which results in a change in the direct or indirect voting control (or a change in the identity of any person, persons, entity or entities with the power to vote or control at least fifty percent (50%) of the voting shares of any class of stock or other interests in Lessee) of Lessee or any corporate or noncorporate entity which directly or indirectly controls Lessee shall be deemed to be an assignment of this Lease within the meaning of this **Section 7.1**.

7.2. Subleases. Lessee shall not sublease all or any part of this Lease without Lessor's prior written consent, which consent may be withheld in Lessor's sole discretion, and any attempted sublease without such consent shall be null and void, and shall constitute a default under this Lease.

7.3. Subleases Subject to this Lease. Any approved sublease shall be subject to all of the terms and conditions of this Lease and each sublessee, by accepting any sublease and entering into possession of any portion of the Premises shall be deemed to have covenanted directly with the Lessor to observe and perform all of the provisions of this Lease as they relate to the portion of the Premises subject to the sublease.

7.4. No Release. No assignment or sublease shall release Lessee from any of Lessee's obligations under this Lease.

ARTICLE 8
LESSEE FINANCING

8.1. Lessee's Right to Mortgage. Not applicable.

ARTICLE 9
CONDEMNATION

9.1. Eminent Domain; Cancellation. If the Premises are taken by any entity with the power of eminent domain (a **"Condemning Authority"**) or if the Premises are conveyed to a

Condemning Authority by a negotiated sale, or if part of the Premises is so taken or conveyed such that the use of the remaining Premises is materially interfered with, or such that the improvements cannot be rebuilt so that upon completion Lessee may again use the Premises without substantial interference, Lessee may terminate this Lease by giving Lessor written notice at any time after the occurrence of any of the foregoing and such termination shall be effective as of the date of the transfer to the Condemning Authority. If this Lease is terminated pursuant to this **Section 9.1**, Lessor shall refund to Lessee any rent prepaid beyond the effective date of termination.

9.2. Partial Taking. If part of the Premises or any of the Improvements are taken or conveyed without substantially interfering with the use of the Premises, this Lease shall not terminate and rent shall not abate. In such event, Lessor shall receive the portion of the award attributed to the value of the fee title estate taken, and Lessee shall receive all remaining awards and other compensation or sums.

9.3. Basis of Awards. All payments made for any taking or conveyance of the land as described in this **Article 9** shall be paid to Lessor and Lessee hereby agrees that it shall have no claim to any such awards paid to Lessor for the taking of Lessor's fee simple estate. Damages, if any, authorized for the loss of Lessee's leasehold estate shall be determined by the laws of Utah. Lessee shall have the right to full recovery of the costs of improvements located on the Premises. Lessee shall have the right to full recovery of the costs of improvements located on the Premises.

ARTICLE 10
ADDITIONAL COVENANTS

10.1. Water Rights.

(a) Water Rights in Name of Lessor. Any new appropriation of water rights for use in association with this lease or operations upon the Premises shall be made in the name of Lessor and shall be considered an appurtenance to the Premises. Lessee shall have the right to use such water right at no cost during the term of this Lease. Upon termination of the Lease, Lessee shall make all necessary filings to confirm Lessor's ownership of such rights.

(b) Option to Purchase. If Lessee purchases or acquires an existing water right for use in association with this lease or operations upon the Premises, Lessor shall have the option to acquire that portion of such water right as was used on the Premises upon expiration or termination of this Lease. The option price for such water right shall be the fair market value of the water right as of the date of expiration or termination of this Lease. Upon expiration or termination of this Lease, Lessee shall notify Lessor in writing of all water rights purchased or acquired by Lessee for operations on the Premises and its estimate of the fair market value of such water right. Lessor shall then have forty-five (45) days to exercise its option to acquire the water by payment to Lessee of the estimated fair market value. If Lessor disagrees with Lessee's estimate of fair market value, Lessor shall notify Lessee of its disagreement within the 45 day option exercise period. The fair market value of the water right shall then be appraised by a single appraiser mutually acceptable to both parties, which appraisal shall be final and not subject to review or appeal. If the parties cannot agree upon the choice of an appraiser, the fair market value of the water right shall be determined by a court of competent jurisdiction. Conveyance of any water right pursuant to this paragraph shall be by quit claim deed.

(c) Proration in the Event of Unitization. Not Applicable

10.2. Intermediate Reclamation. Upon completion of construction of individual cells or other facilities on the Premises, Lessee shall reclaim disturbed areas not required for continuing operations by leveling, seeding and other reasonably necessary steps to prevent soil erosion, ensure the establishment of suitable vegetation, and control noxious weeds and pests.

10.3. Waste Certification. The Lessee shall provide upon any transfer of operation, assignment of rights, permanent cessation of operations, or lease termination, certification to the Lessor that, based upon a complete search of all the operator's records for the Lease, and upon its knowledge of past operations, there have been no reportable quantities of hazardous substances as defined in 40 Code of Federal Regulations §302.4, or used oil as defined in Utah Administrative Code R315-15, discharged (as defined at 33 U.S.C. §1321(a)(2)), deposited or released within the Premises, either on the surface or underground, and that all remedial actions necessary have been taken to protect human health and the environment with respect to such substances. Lessee shall additionally provide to Lessor a complete list of all hazardous substances, hazardous materials, and their respective Chemical Abstracts Service Registry Numbers, used or stored on, or delivered to, the Premises. Such disclosure will be in addition to any other disclosure required by law or agreement.

10.4. Bonding. Lessee shall comply with all bonding requirements established for the Facility by the UDOGM in conjunction with the Mine Permit. Upon notice to Lessee, the Lessor may, in its reasonable discretion, determine that any bond on file is insufficient to protect Lessor's interests. In such an event the Lessor shall enter written findings as to the basis for calculation of the perceived insufficiency and enter an order requiring Lessee to execute and file with the Lessor a good and sufficient bond or other financial guarantee acceptable to Lessor in order to guarantee Lessee's performance of all covenants and obligations under this Lease, including reclamation pursuant to Section 12.2. The bond shall remain in full force and effect until liability thereunder is released by Lessor. Lessee shall file any required additional bond with Lessor within thirty (30) days after demand by Lessor. Lessor may increase or decrease the amount of any additional bond from time to time in accordance with the same procedure.

10.5. Survey Monuments. Lessee shall take reasonable precautions to protect, in place, all public land survey monuments and private property corners.

10.6. Fencing. Lessee may fence any portion of the Premises at its own expense. In the event Lessee erects any fencing, Lessee agrees to provide gated access at reasonable locations to Lessor and to any lessees or permittees granted rights or access to or across the Subject Property, or any part thereof, by Lessor pursuant to **Section 1.4**. Lessee shall take appropriate steps, including fencing, to secure such ponds, structures and facilities from unauthorized access and prevent loss of wildlife.

10.7. Prior Improvements. If existing fences, range improvement projects, or other prior improvements currently exist on the Premises by authority of the Lessor, Lessee shall allow the owner of such improvements to remove them within ninety (90) days of notice from Lessee, with a copy of such notice to Lessor.

ARTICLE 11
DEFAULT

11.1. Events of Default. Any of the following occurrences or acts shall constitute an event of default (**"Events of Default"**) under this Lease:

(a) Breach of Obligations. If Lessee shall fail to:

(i) Pay any Minimum Rent, Additional Rent or other sum, within ten (10) days of the date such payment is due; or

(ii) Provide any insurance coverage as required by this Lease, within ten (10) days of written request, or

(iii) Observe or perform any other provision hereof and such failure shall continue for thirty (30) days after notice to Lessee of such failure or such longer period as reasonably may be required to cure such default if the same cannot be cured within such 30 day period and Lessee commences to effect the cure within such 30 day period and diligently pursue such cure thereafter.

(b) Bankruptcy. If Lessee shall file a petition in bankruptcy or for reorganization or for an arrangement pursuant to any federal or state bankruptcy law or any similar federal or state law, or shall be adjudicated a bankrupt or shall make an assignment for the benefit of creditors or shall admit in writing its inability to pay its debts generally as they become due, or if a petition or answer proposing the adjudication of Lessee as a bankrupt or its reorganization pursuant to any federal or state bankruptcy law or any similar federal or state law shall be filed in any court and Lessee shall consent to or acquiesce in the filing thereof or such petition or answer shall not be discharged or denied within sixty (60) days after the occurrence of any of the foregoing;

(c) Other Insolvency Events. If a receiver, trustee or liquidator of Lessee or of all or substantially all of the assets of Lessee or of the Premises or Lessee's leasehold interest therein shall be appointed in any proceeding brought by Lessee, or if any such receiver, trustee or liquidator shall be appointed in any proceeding brought against Lessee and shall not be discharged within sixty (60) days after the occurrence thereof, or if Lessee shall consent to or acquiesce in such appointment; or

(d) Abandonment. If, following commencement of development of the Premises and at any time thereafter during the Lease Term, Lessee shall abandon the Premises, with Lessee's cessation of operations for a period of ninety (90) consecutive days to be conclusive evidence that the Premises have been abandoned.

11.2. Remedies. If an Event of Default shall have happened and be continuing, Lessor shall have the following rights and remedies, to the maximum extent available or permitted under applicable law:

(a) Right to Terminate. Lessor shall have the right to give Lessee notice of Lessor's termination of the Lease. Upon the giving of such notice, the term of this Lease and the estate hereby granted shall expire and terminate on the date set forth in such notice as fully and completely and with the same effect as if such date were the date herein fixed for the expiration of the Lease Term, and all rights of Lessee hereunder shall expire and terminate, but Lessee shall remain liable as hereinafter provided.

(b) Right to Re-enter. Lessor shall have the immediate right, whether or not the term of this Lease shall have been terminated pursuant to **Section 11.2(a)**, to re-enter and repossess the Premises by summary proceedings, ejectment, any other legal action or in any lawful manner Lessor determines to be necessary or desirable and to remove all persons and property therefrom. No such re-entry or repossession of the Premises shall be construed as an election by Lessor to terminate the term of this Lease unless a notice of such termination is given to Lessee pursuant to **Section 11.2(a)**.

(c) Reletting of the Premises. At any time or from time to time after the re-entry or repossession of the Premises pursuant to **Section 11.2(b)**, whether or not the term of this Lease shall have been terminated pursuant to **Section 11.2(a)**, Lessor shall use reasonable efforts to relet the Premises for the account of Lessee at a rent which is reasonable in light of the then existing market conditions in the community, in the name of Lessee or Lessor or otherwise, without notice to Lessee, for such term or terms and on such other conditions and for such uses as Lessor, in its absolute discretion, may determine. Lessor may collect and receive any rents payable by reason of such reletting.

(d) No Release. No expiration or termination of the term of this Lease pursuant to **Section 11.2(a)**, by operation of law or otherwise, and no re-entry or repossession of the Premises pursuant to **Section 11.2(b)** or otherwise, and no reletting of the Premises pursuant to **Section 11.2(c)** or otherwise, shall relieve Lessee of its liabilities and obligations hereunder, all of which shall survive such expiration, termination, re-entry, repossession or reletting.

11.3. Remedies Not Exclusive. No right or remedy herein conferred upon or reserved to Lessor is intended to be exclusive of any other right or remedy, and each and every right and remedy shall be cumulative and in addition to any other right or remedy given hereunder, or now or hereafter existing by law, in equity or by statute.

11.4. Lessor Breach. Should Lessor be in default of its obligations under this Lease, Lessee shall notify Lessor of such default in writing. Should such default continue for more than thirty (30) days after Lessor's receipt of such notice, or if such default cannot be cured within thirty (30) days should Lessor have failed to commence and be diligently prosecuting the cure of such default, Lessee shall have, as its sole and exclusive remedy under this Lease, the right to file suit against Lessor in a court of competent jurisdiction for specific performance or damages, as the case may be. Notwithstanding the foregoing, in no event shall Lessee be allowed to any offset or abatement of any rental amounts hereunder, nor shall Lessee be allowed to terminate this Lease, except as specifically provided herein. Notwithstanding anything contained herein to the contrary, Lessee agrees to look solely to the estate and property of the Lessor in the Premises, and subject to the prior rights of any mortgage or beneficiary of any trust deed or any security interest on the same, for the collection of any judgment (or other judicial process) requiring the payment of money by Lessor in the event of any default or breach by Lessor with respect to any of the terms, conditions and covenants of this Lease to be observed and/or performed by Lessor, and no other assets of Lessor shall be subject to levy, execution or other procedures for the satisfaction of Lessee's remedies.

11.5. Force Majeure. If either Party, without fault or negligence by such Party, is rendered unable by Force Majeure, as defined herein, to perform any obligation of under this Lease, other than Lessee's obligation to pay Minimum Rent, Additional Rent, or other consideration, including late fees, then upon such Party promptly giving written notice to the other Party, the performance of such obligation shall be suspended during the period of time the inability to perform continues as a result of an event of Force Majeure, and such Party shall be relieved of liability for its failure to perform during such period of time; provided that the Party asserting an inability to perform shall use its best efforts to correct such inability and to resume promptly its performance as required under the Lease. The term Force Majeure shall mean causes or events such as an act of God, act of civil or military authority, fire, epidemic, flood, earthquake, riot, war, terrorism, sabotage, or other similar cause or event not within such Party's reasonable control, but not including generalized economic conditions, recession, or depression. The written notice provided under this Paragraph shall set forth the particular nature and circumstances of the Force Majeure, the expected effect of the Force Majeure on the Party's performance under the Lease, and the expected date the Party will resume performance.

ARTICLE 12
OBLIGATIONS ON LEASE TERMINATION

12.1. Improvements. Upon the termination of this Lease for any cause whatsoever, Lessee shall upon request of Lessor immediately surrender peaceable possession of the Premises, including all buildings, structures, fixtures and other improvements (collectively, the **"Improvements"**) then located thereon, but not including personal property, in a good, clean and useable condition (ordinary depreciation, reasonable wear and tear, casualty loss, and condemnation loss excepted). In the event Lessor chooses not to retain the Improvements upon the termination or early expiration of the Lease, Lessee shall remove the Improvements within ninety (90) days of notice from the Lessor requiring such, and reclaim the Premises in accordance with **Section 12.2**. Removal of the Improvements and restoration of the Premises shall be at Lessee's sole cost and expense. In the event that Lessee fails to remove the

Improvements upon notice from Lessor, Lessor may do so, in which case Lessee shall reimburse Lessor for all reasonable costs of removal and restoration.

12.2. Reclamation. Upon termination of this Lease, Lessee shall reclaim the Premises by properly removing structures, equipment and debris, recontouring the Premises to their approximate original contour, burying the iron precipitate material under at least four feet (4') of earth and revegetating the Premises, as necessary in the reasonable judgment of Lessor to prevent soil erosion, ensure the establishment of suitable vegetation, and control noxious weeds and pests. Lessee shall further abate any hazardous condition on or associated with the Premises. Lessee's shall comply with all reclamation requirements set forth in the Mining Plan as well as any other requirements by applicable governmental authorities including UDOGM. Lessee and representatives of all governmental agencies having jurisdiction shall have the right to re-enter the Premises for reclamation purposes for a reasonable period after termination of the Lease. In the event that the leasehold in the Premises is taken by condemnation, as provided in Article 9, Lessee is relieved of its reclamation obligations under the Lease; and the costs of reclamation shall be borne by the Condemning Authority.

ARTICLE 13
GENERAL PROVISIONS

13.1. Waiver of Breach. No waiver of the breach of any provisions of this Lease shall be construed as a waiver of any preceding or succeeding breach of the same or any other provision of this Lease, nor shall the acceptance of rent by Lessor during any period of time in which Lessee is in default in any respect other than payment of such rent be deemed to be a waiver of such default.

13.2. Notices. Notices shall be in writing and shall be given by (a) personal delivery, (b) deposit in the United States mail, certified mail, return receipt requested (which receipt shall be preserved as evidence of delivery), postage prepaid, or c) overnight express delivery service, addressed or transmitted to Lessor and Lessee at the following addresses, or to such other addresses as either party may designate to the other in a writing delivered in accordance with the provisions of this Section:

If to Lessor:	School and Institutional Trust Lands Administration Attn: Assistant Director - Surface 675 East 500 South, Suite 500 Salt Lake City, Utah 84102
If to Lessee:	Genwal Resources, Inc. P.O. Box 910 East Carbon, Utah 84520

All notices shall be deemed to have been delivered and shall be effective upon the date on which the notice is actually received, if notice is given by personal delivery or by overnight express delivery service, or on the third day after mailing if notice is sent through the United States mail.

13.3. Attorney's Fees. If any action is brought by any party to this Lease in respect of its rights under this Lease, the prevailing party shall be entitled to reasonable attorney's fees and court costs as determined by the court. In the event that any person who shall not be a party to this Lease shall institute an action against a party to this Lease in which the other party to this Lease shall be involuntarily and without cause joined as a party, the party against whom said action is instituted shall reimburse the other party to this Lease for all attorney's fees incurred by such party in connection therewith.

13.4. Severability. The invalidity of any provision of this Lease, as determined by a court of competent jurisdiction, shall in no way affect the validity of any other provision hereof.

13.5. Recording. A Memorandum of this Lease may be recorded after execution of this Lease.

13.6. Cumulative Remedies. No remedy or election hereunder shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies hereunder or at law or in equity.

13.7. Construction. The titles which are used following the number of each Section are so used only for convenience in locating various provisions of this Lease and shall not be deemed to affect the interpretation or construction of such provisions. The parties acknowledge that each party and its counsel have reviewed and revised this Lease. This Lease shall not be construed for or against Lessor or Lessee. References in this Lease to **"Sections"** and **"Articles"** refer to the Sections and Articles of this Lease unless otherwise noted.

13.8. Lessor's Consent. Whenever this Lease provides for or requires the consent or approval of Lessor, such consent or approval may be given or withheld in the sole and absolute discretion of Lessor, unless a standard of reasonableness is expressly stated.

13.9. Successors. Subject to the restrictions contained in **Article 7**, this Lease and all of provisions hereof shall be binding upon and inure to the benefit of the successors and assigns of Lessor and Lessee.

13.10. Governing Law; Venue. The terms, conditions, covenants, and agreements herein contained shall be governed, construed, and controlled according to the laws of the state of Utah. Any action brought in connection with this Lease shall be brought in the Third District Court for Salt Lake County, Utah, subject, however, to any legal requirement for prior exhaustion of administrative remedies.

13.11. Broker's Commission. Lessee and Lessor represent and warrant to each other that there are no claims for brokerage commissions or finder's fees in connection with this Lease and each agrees to indemnify the other for, from and against all liabilities arising from any claims, including any attorney's fees connected therewith, relating to claims arising out of the other's actions.

13.12. Time is of the Essence. Time is of the essence of this Lease and in the performance of all of the covenants and conditions hereof.

13.13. Relationship of the Parties. The relationship of the parties hereto is that of Lessor and Lessee, and it is expressly understood and agreed that Lessor does not in any way, nor for any purpose, become a partner of Lessee or a joint venturer with Lessee in the conduct of Lessee's business, or otherwise, and that the provisions of any agreement between Lessor and Lessee relating to rent are made solely for the purpose of providing a method whereby rental payments are to be measured and ascertained.

13.14. Time Periods. In the event the time for the performance of any obligation or the taking of any action hereunder expires on a Saturday, Sunday or legal holiday, the time for performance or taking such action shall be extended to the next succeeding day which is not a Saturday, Sunday or legal holiday.

13.15. Quitclaim. At the expiration or earlier termination of this Lease, Lessee shall execute, acknowledge and deliver to Lessor, within five (5) days after written demand, from Lessor to Lessee, any quitclaim deed or other document deemed necessary or desirable by Lessor's counsel to remove the cloud of this Lease and the limited right of first refusal granted hereunder from the real property subject to this Lease.

13.16. Tax and Zoning Immunity. Nothing contained in this Lease shall be deemed to constitute a waiver of applicable laws providing tax and zoning immunity to state property or any interest therein or income therefrom.

13.17. No Waiver of Sovereign Immunity. By this Lease, Lessor does not waive, limit, or modify any sovereign immunity from suit except as specifically provided herein.

13.18. Entire Agreement. This Lease sets forth all the promises, inducements, agreements, conditions, and understandings between Lessor and Lessee relative to the Premises, and there are no promises, agreements, conditions, or understandings, either oral or written, express or implied, between them other than are set forth therein. No subsequent alteration, amendment, change, or addition to this Lease shall be binding upon Lessor or Lessee unless in writing and signed by each of them.

IN WITNESS WHEREOF, the parties hereto have executed this Lease on the day and year first written above.

LESSOR:

STATE OF UTAH, SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION

By: ______________________
Kevin S. Carter, Director

LESSEE:

GENWAL RESOURCES, INC.

By: David W. Hibbs
Its: President

APPROVED AS TO FORM:
MARK L. SHURTLEFF
ATTORNEY GENERAL

By: ______________________
Special Assistant Attorney General

INCORPORATED
NOV 0 9 2012
Div. of Oil, Gas & Mining

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 4th day of January, 2012, appeared before me **Kevin S. Carter**, the Director of the School and Institutional Trust Lands Administration of the State of Utah (SITLA), who, his identity and position having been satisfactorily established to me, affirmed to me upon oath that the governing body of SITLA, has authorized him to execute the foregoing Special Use Lease Agreement No. 1708, and did duly acknowledged in my presence having executed the same for the purpose stated therein.

Seal:

Linda Bianchi
Notary Public

LINDA BIANCHI
Notary Public State of Utah
My Comm. Exp: Feb. 7, 2015
Comm. Number: 605993

STATE OF Utah)
: ss.
COUNTY OF Carbon)

On this 26th day of December, 2011, appeared before me (name) David W. Hibbs, the (title) President of Genwal Resources, Inc., a Utah corporation, who, his/her identity and position having been satisfactorily established to me, affirmed to me upon oath that the governing body of Genwal Resources, Inc. has authorized him/her to execute the foregoing Special Use Lease Agreement No. 1708, and did duly acknowledged in my presence having executed the same for the purpose stated therein.

Seal:

LYNNETTE ALLRED
Notary Public, State of Utah
Commission # 606839
My Commission Expires
August 31, 2015

Lynnette Allred
Notary Public

INCORPORATED
NOV 09 2012
Div. of Oil, Gas & Mining

EXHIBIT A

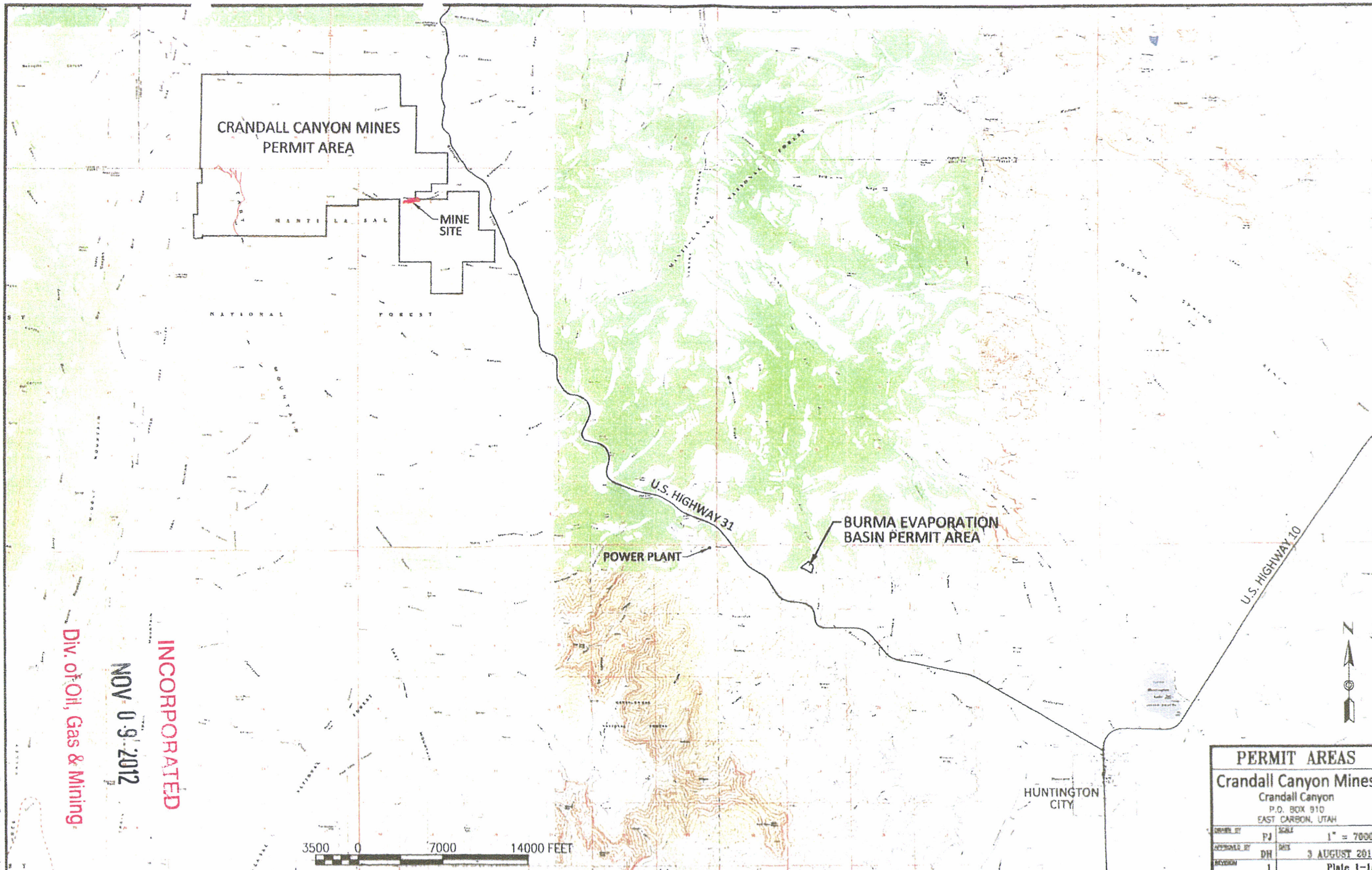
LEGAL DESCRIPTION

Township 17 South, Range 8 East, SLB&M
Section 5: Lot 6 (within)

Beginning at a point located S89°55'W a distance of 348.68 feet from the northeast corner of Lot 6 within Section 5, Township 17 South, Range 8 East, of the SLB&M to the east edge of the Old Construction Road; thence S61°55'04"E a distance of 24.47 feet; thence S72°25'21"E a distance of 23.90 feet; thence S64°24'35"E a distance of 21.03 feet; thence S50°52'27"E a distance of 20.76 feet; thence S35°44'44"E a distance of 55.91 feet; thence S02°28'53"W a distance of 44.51 feet; thence S73°13'55"E a distance of 89.66 feet; thence S60°15'20"E a distance of 43.41 feet; thence S41°13'26"E a distance of 32.53 feet; thence S31°03'49"E a distance of 59.87 feet; thence S10°41'32"E a distance 66.67 feet; thence S01°55'27"E a distance of 79.97 feet; thence S11°15'16"E a distance of 60.90 feet; thence S18°48'58"W a distance of 28.67 feet; thence S41°35'52"W a distance of 29.99 feet; thence S53°54'34"W a distance of 28.12 feet; thence S47°10'44"W a distance of 6.91 feet; thence West a distance of 601.02 feet; thence N52°12'01"W a distance of 270.05 feet; thence N49°44'24"E a distance of 101.47 feet; thence N50°04'42"E a distance of 95.86 feet; thence N49°46'07"E a distance of 88.53 feet; thence N52°15'08"E a distance of 91.68 feet; thence N53°24'39"E a distance of 73.72 feet; thence N53°38'00"E a distance of 134.79 feet; thence East a distance of 99.89 feet to the point of beginning. Containing 7.32 acres, more or less.

EXHIBIT B

DEVELOPMENT PLAN



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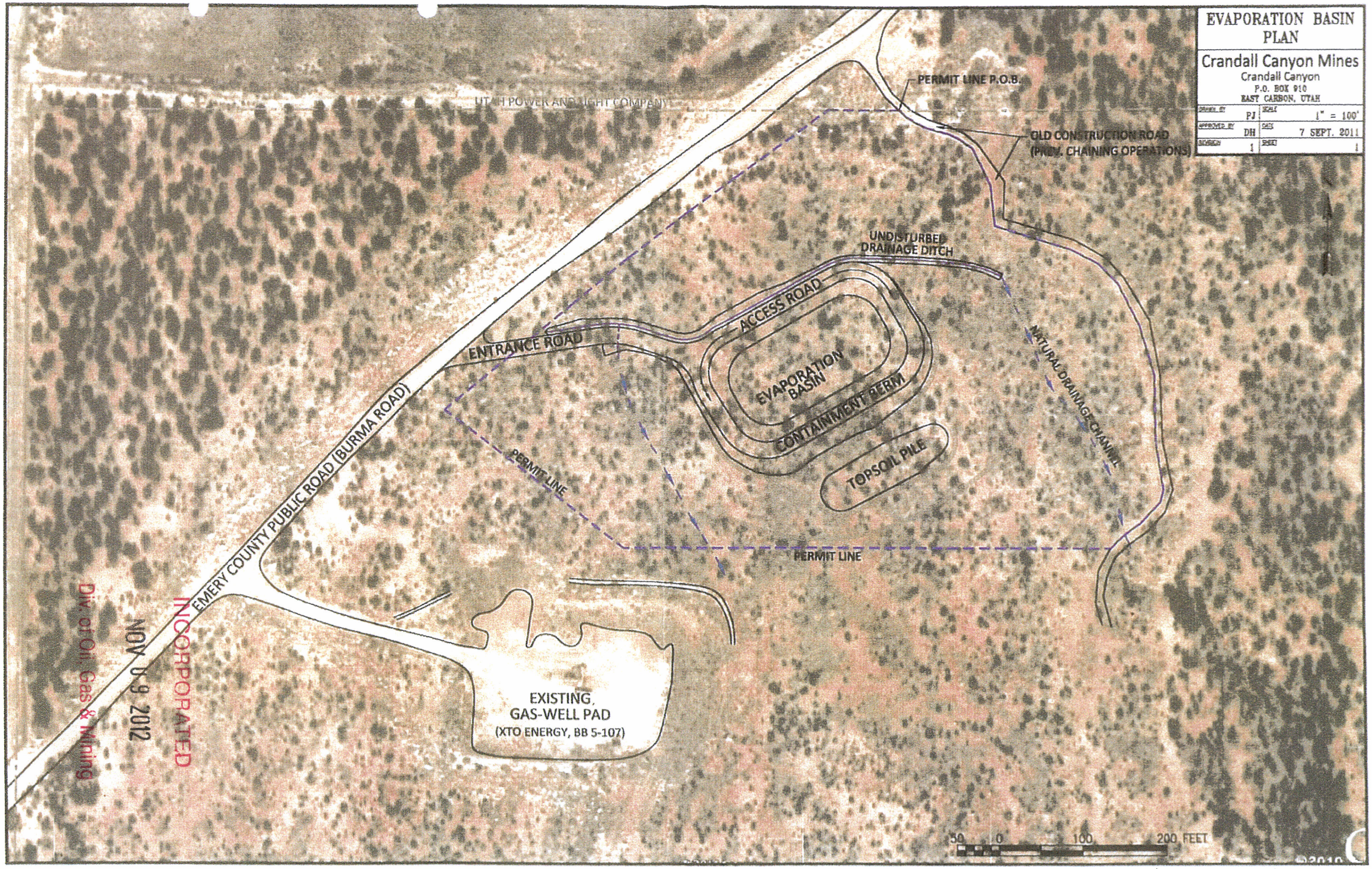
G:\Current Drawings\Buildings & Construction\Crandall Canyon\Crandall Canyon Water Project\Evap Ponds\Working\1-1A Permit Areas.dwg, Layout1, 8/31/2011 1:12:12 PM



INCORPORATED
NOV 0 9 2012
Div. of Oil, Gas & Mining

G:\Current Drawings\Buildings & Construction\Crandall Canyon\Crandall Canyon Water Project\Evap Ponds\Working\Support\Pond Plan Presentation.dwg, Plan View, 9/7/2011 1:51:47 PM

NOTES:
1. ALL DIMENSIONS ARE APPROXIMATE. FINAL LOCATIONS AND CONFIGURATIONS OF THE FACILITY STRUCTURES MAY VARY DEPENDING UPON CONDITIONS ENCOUNTERED DURING CONSTRUCTION.
2. ALL INTERIOR EVAPORATION BASIN SLOPES SHALL BE A MAXIMUM OF 3:1. ALL OTHER CUT/FILL SLOPES SHALL BE A MAXIMUM OF 2:1 UNLESS OTHERWISE NOTED.
3. MINIMUM INTERIOR RADII OF PERIMETER ACCESS ROAD SHALL BE 40'.
4. BOTTOM OF EVAPORATION BASIN ELEVATION = 6514.5'

KEY

- EXISTING MAJOR CONTOURS (10' INTERVALS)
- EXISTING MINOR CONTOURS (2' INTERVALS)
- EXISTING DISTURBED MAJOR CONTOURS (10' INTERVALS)
- EXISTING DISTURBED MINOR CONTOURS (2' INTERVALS)
- NEW MAJOR CONSTRUCTION CONTOURS (5' INTERVALS)
- NEW MINOR CONSTRUCTION CONTOURS (1' INTERVALS)

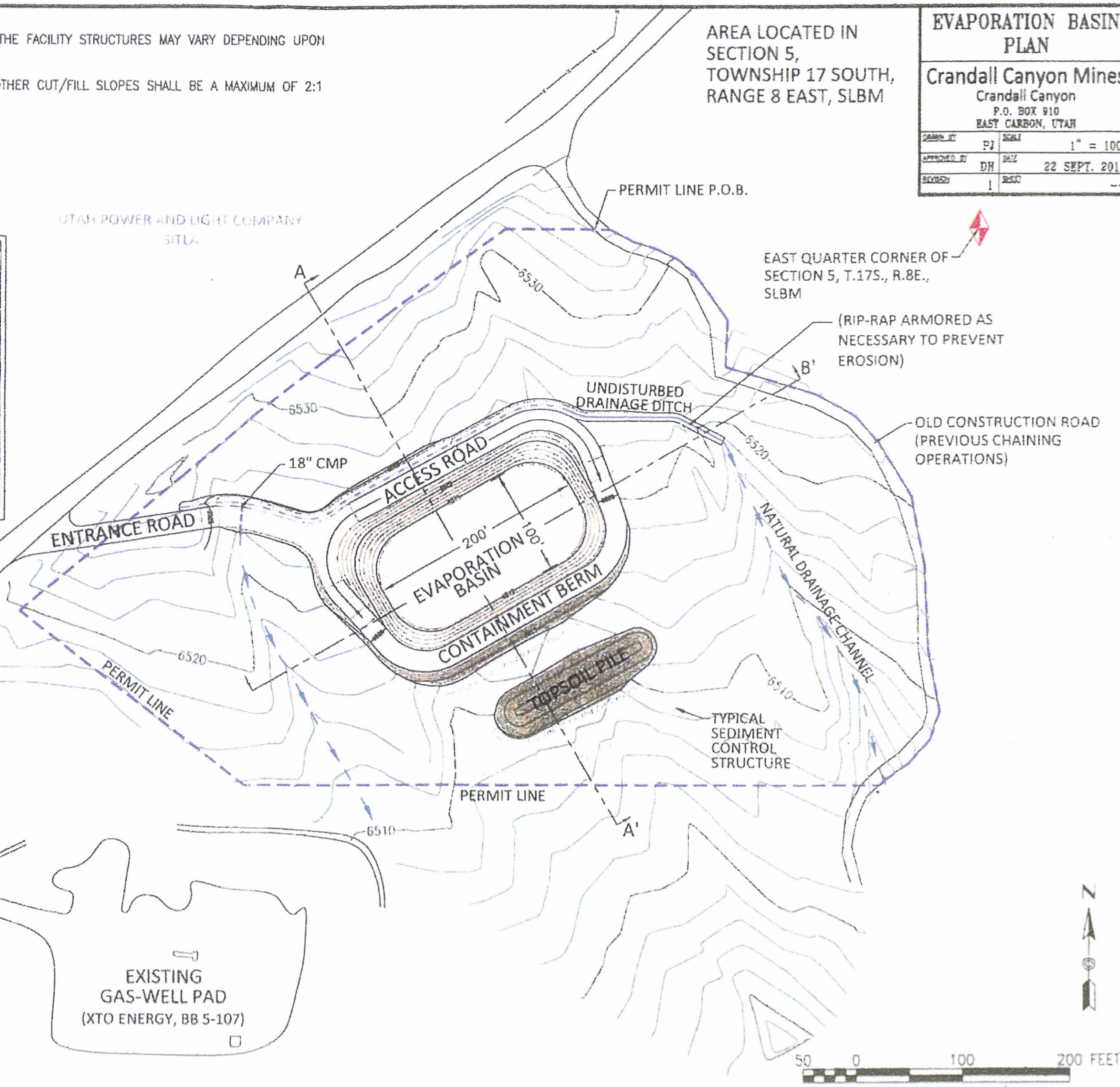
CUT/FILL VOLUME: APPROX. 3,500 c.y.

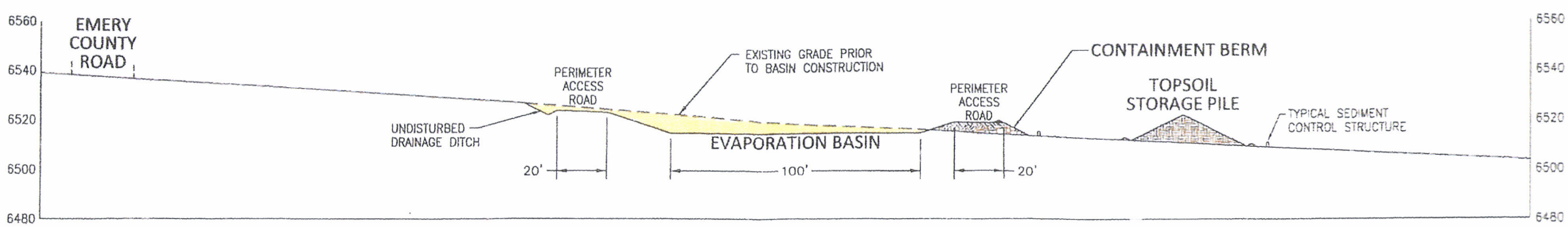
AREA LOCATED IN SECTION 5, TOWNSHIP 17 SOUTH, RANGE 8 EAST, SLBM

EVAPORATION BASIN PLAN

Crandall Canyon Mines
Crandall Canyon
P.O. BOX 910
EAST CARBON, UTAH

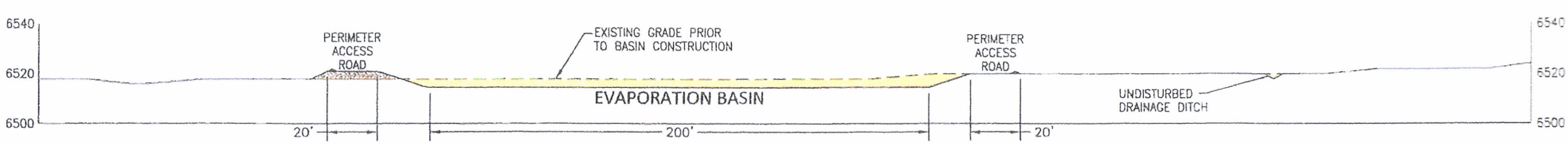
DRAWN BY	PJ	SCALE	1" = 100'
APPROVED BY	DH	DATE	22 SEPT. 2011
REVISION	1	SHEET	--



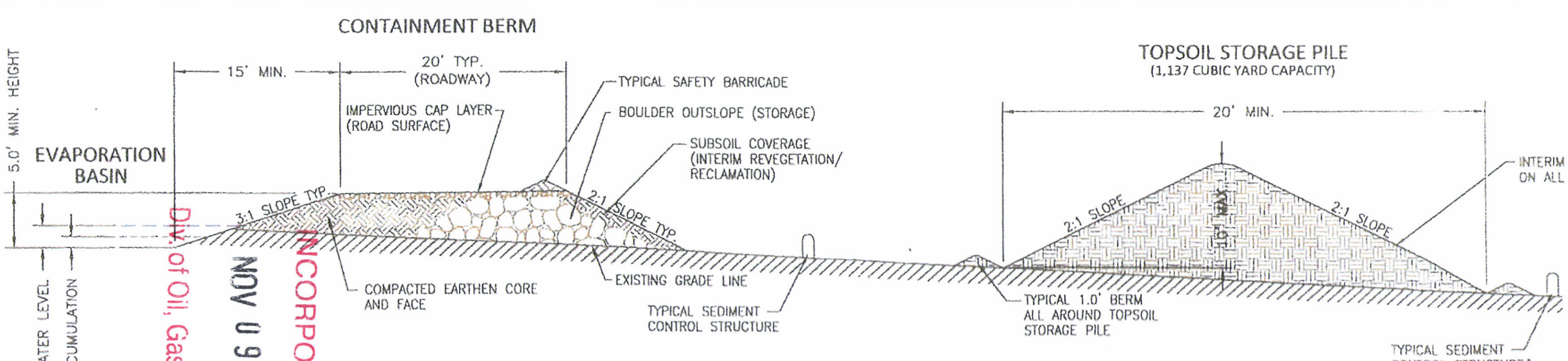


SECTION A-A'
NORTH-TO-SOUTH SECTION
SCALE: 1" = 40'

GENERAL NOTE:
SOLID HATCH DENOTES CUT AREAS. CROSS-HATCH DENOTES FILL AREAS.



SECTION B-B'
WEST-TO-EAST SECTION
SCALE: 1" = 40'



TYPICAL CONTAINMENT BERM / TOPSOIL STORAGE PILE DETAIL
SCALE: 1" = 10'

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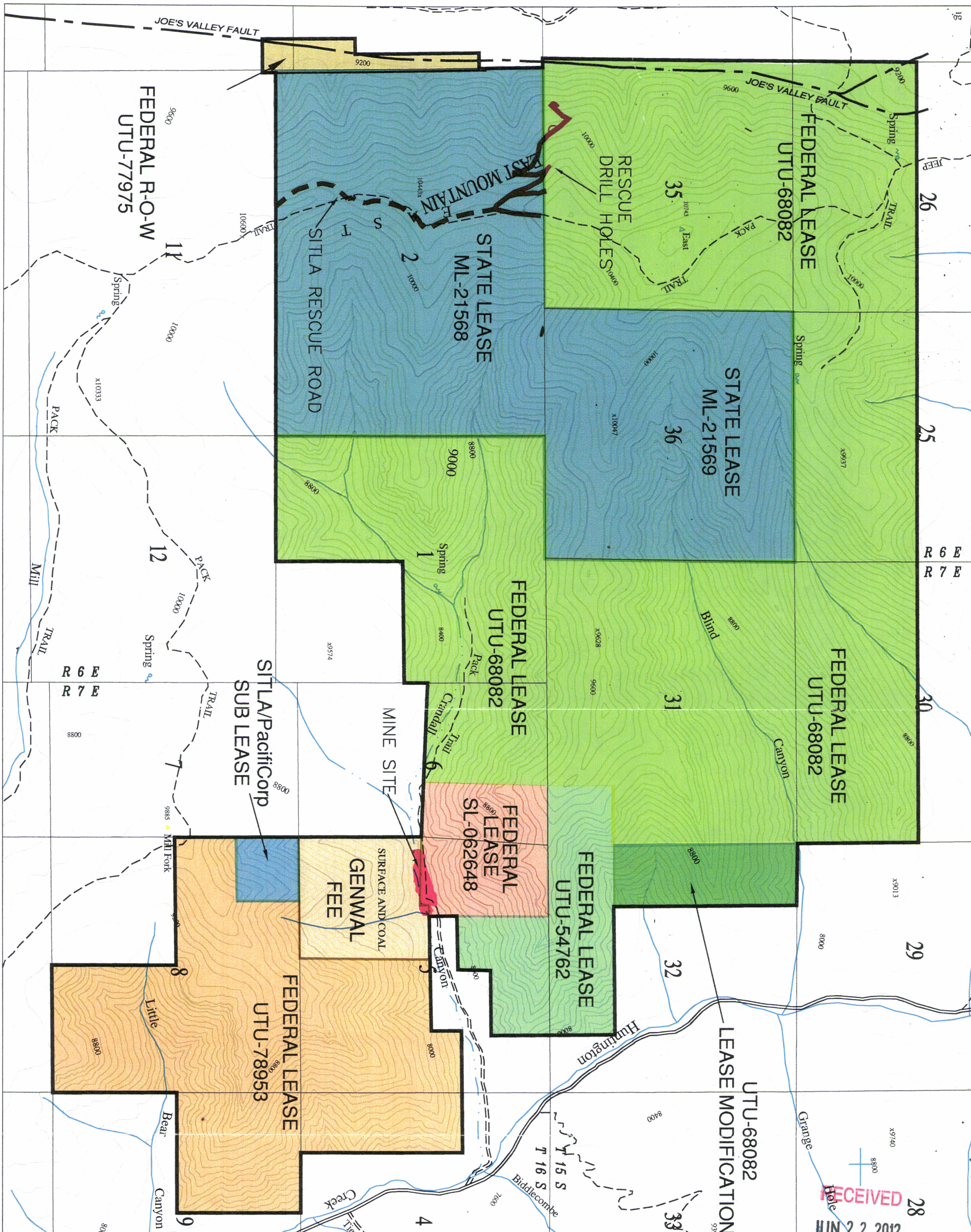
Div. of Oil, Gas & Mining

EVAPORATION BASIN SECTIONS AND DETAILS
Crandall Canyon Mines
Crandall Canyon
P.O. BOX 910
EAST CARBON, UTAH

DRAWN BY	PJ	SCALE	AS SHOWN
APPROVED BY	DH	DATE	19 SEPT. 2011
REVISION	1	SHEET	--

G:\Current Drawings\Buildings & Construction\Crandall Canyon\Crandall Canyon Water Project\Evap Ponds\Working\Pond Plan.dwg, Sections, 9/19/2011 9:32:14 AM

\Current Drawings\MRP Maps\Crandall Canyon\1-1 LEASE MAP REV11.dwg, Layout4, 8/1/2011 3:36:54 PM



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NOTE:
SEE PLATE 1-1A FOR
LOCATION OF BURMA
EVAPORATION POND
(PERMIT AREA).

Div. of Oil, Gas & Mining

NOV 0 9 2012

INCORPORATED

LEGEND

UDOGM PERMIT BOUNDARY

MINE SURFACE FACILITIES

THE PERMIT AREA IS ENTIRELY WITHIN
THE MANTI - LA SAL NATIONAL FOREST

N

UTAH REGISTERED PROFESSIONAL ENGINEER
#6449561
David W. Hibbs

GENWAL™
RESOURCES, INC.
P.O. Box 1077, 794 North "C" Canyon Rd, Price Utah
Telephone: (435) 888-4000

CRANDALL CANYON MINE
LEASE / PERMIT AREA MAP

REV: 11	ACAD: LEASE SOCRAN9
DATE: 8-01-11	BY: JDS
SCALE: 1"=2000'	PLATE #: 1-1

CHAPTER 7 .... REPLACEMENT PAGES

Note: Bold number plates and appendices are included with this submittal.

CHAPTER 7
LIST OF PLATES

Surface Water

Streams

1	Upper Flume Crandall Creek	Flow, field parameters, and Table 7-8 parameters quarterly
2	Lower Flume Crandall Creek	Flow, field parameters, and Table 7-8 parameters quarterly
3	Horse Canyon Creek	Flow, field parameters, and Table 7-8 parameters quarterly
4	Blind Canyon Creek	Flow, field parameters, and Table 7-8 parameters quarterly
5	Indian Creek	Flow, field parameters, and Table 7-8 parameters quarterly
6	IBC-1	Flow, field parameters, and Table 7-8 parameters quarterly
7	Section 4 Creek	Flow, field parameters, and Table 7-8 parameters quarterly
8	Section 5 Creek (lower)	Flow, field parameters, and Table 7-8 parameters quarterly
9	Section 5 Creek (Upper Right Fork)	Flow and field parameters quarterly
10	Section 5 Creek (Upper Left Fork)	Flow and field parameters quarterly
11	Little Bear Creek	Flow, field parameters, and Table 7-8 parameters quarterly
12	Shingle Creek	Flow, Field parameters quarterly.

UPDES

1	001	Sediment Pond Discharge	Flow, field parameters, and UPDES parameters per occurrence
2	002	Mine Water Discharge	Flow, field parameters, and UPDES parameters monthly

Mine Discharge

1	Pre-002 Pre-treated Mine Water	Flow, field parameters and Table 7-4(A) parameters monthly

Ledge seep water flow:

The treatment area is separated from the portal bench above by a massive sandstone ledge of bare sandstone rock. There are several seeps emanating from this ledge and this seep water drains down the ledge toward the area of the settling basin. Based on previous measurements, the flow is minimal (approximately 2-5 gpm), but constant. A concrete trough has been poured behind the existing retaining wall (between the ledge rock and the back of the wall) to collect this seepage water and route it through a 4" PVC pipe to the settling basin overflow culvert inlet. In this manner the seepage water is contained, can be monitored, and is also subject to treatment thru dilution. The flow data collected from monitoring this seep will be provided to the Division and will assist in determining the most appropriate geotechnical method for future reclamation of this area, i.e., final reclamation. Monitoring will be conducted monthly, although freeze/thaw conditions in winter months will have to be factored into interpreting the data. The monitoring information will be provided to the Division (via the electronic water monitoring data base) on a monthly basis and will continue until the Division determines that it is no longer necessary, and at a minimum, until such time as the revised final reclamation plan has been approved, since this information will be needed in order to properly design the approximate-original-contour requirements for the "old loadout area".

At the lower end of the treatment facility, the treated minewater water is collected into a buried pipeline which crosses underneath the road and connects to the existing discharge line. In this manner the treated water ends up reporting to the Crandall Canyon drainage (by way of the main bypass culvert) at the existing approved UPDES outfall point.

There is every reason to believe that water will permanently discharge from the Crandall Mine portals. The iron level of the mine water historically was very low, and began rising only after the water began to build up and impound within the mine workings following the mine collapse of 2007. At the present time (January, 2012) it is uncertain whether or not long-term treatment of the mine discharge water will be required, because naturally-occurring chemical processes within the mine could potentially bring the iron content of the water to within compliance limits at some time in the future . This scenario is currently being addressed under Division Order DO-10 and is a matter of on-going legal negotiations between the company and the Division, as mandated by the Board of Oil, Gas and Mining. Until such time as the final terms of these on-going negotiations have been fully implemented, the company commits to collecting additional hydrologic baseline data. This data includes:

a) flow quantities from the seep in the sandstone ledge above the treatment facility,.

b) measurement of the discharge rate from the sealed portals; either continuously (e.g., using a data logger) or at a minimum, daily.

c). monthly whole water chemical analysis and field measurements of the untreated mine discharge as specified on Table 7-4(A).

7.42.22 Sedimentation Pond

Design

The sedimentation pond located in Crandall Canyon has been redesigned to control the additional storm runoff from the pad extension and from the designated undisturbed drainage areas above the pad extension associated with the proposed culvert expansion. The topography and watershed boundaries are shown on Plate 7-5 and 7-5C. Cross sections of the pond design are shown on Plate 7-3.

7.52.25 Normal Water Flow

Refrain from significantly altering the normal flow of water in streambeds or drainage channels.

7.53 Impoundments and Discharge Structures

Impoundments and discharge structures will be located, maintained, constructed and reclaimed to comply with R645-301-733, R645-301-734, R645-301-743 and R645-301-745 and R645-301-760. Refer to sections 7.33, 7.34, 7.43, 7.45 and 7.60 in this plan.

7.54 Disposal of Excess Spoil, Coal Mine Waste and Noncoal Mine Waste

Disposal areas for excess spoil, coal mine waste and noncoal mine waste will be located, maintained, constructed and reclaimed to comply with R645-301-735, R645-301-736, R645-301-745, R645-301-746, R645-301-747 and R645-301-760. Refer to sections 7.35, 7.36, 7.45, 7.46 7.47 and 7.60 in this plan.

7.55 Casing and Sealing of Wells

All wells will be managed to comply with R645-301-748 and R645-301-765. Water monitoring wells will be managed on a temporary basis according to R645-301-738. Refer to sections 7.38, 7.48, and 7.65 in this plan.

Iron sludge material from the minewater treatment facility (described in Appendix 7-65) will be hauled off-site and disposed of at the Burma evaporation basin facility as described in Appendix 7-66.

7.60 Reclamation

Sealing of Mine Openings

The Applicant has drilled from the Hiawatha seam upwards to the Blind Canyon seam as described in Chapter 6. The drilling occurred in areas that pillar extraction will occur and no provisions were made to seal the bore hole.

Temporary sealing of the portals, if needed, will be accomplished by the construction of protective barricades or other covering devices, fenced and posted with signs indicating the hazardous nature of the opening. Permanent closure plans will include sealing the portals as per the request of the U.S.G.S. (See Section 5.29).

Upon cessation of mining operations all drift openings to the surface from underground will be backfilled, regraded and reseed as per Section 5.40 of this plan. Prior to final sealing of any openings, the U.S.G.S. will require an on site inspection and a submission of formal sealing methods for approval. The formal sealing methods will be presented as a plan including cross

APPENDIX 7-66

BURMA EVAPORATION BASIN

APPENDIX 7-66
BURMA EVAPORATION BASIN

Description and Narrative

Attachments:

Attachment 1....Construction Drawings

Drawing 1	Location Map
Drawing 2	Surface Ownership
Drawing 3	Plan View with Photo Background
Drawing 4	Plan View
Drawing 5	Cross Section, Typical
Drawing 6	Undisturbed Drainage

Attachment 2.....Pond Liner Information

Attachment 3.....Legal Description of Lease/Permit Area

Attachment 4.....Archeology Report, Senco-Phenix Archeological Consultants

Attachment 5.....Vegetation, Wildlife Habitat & Sensitive Species Report, Mt. Nebo Scientific

Attachment 6.....Order 2 Soils Survey, Long Resource Consultants

Attachment 7.....Hydrology Study, Blackhawk Engineering

Attachment 8.....BLM Recommended Reclamation Seed Mix

Attachment 9......Emery County Road Encroachment Permit

Attachment 10....Laboratory Analysis of Sludge Material

Attachment 11....Stability Analysis, Blackhawk Engineering

Attachment 12....MSDS Sheets for Coagulant and Flocculent

Attachment 13....Water Rights Summary

Attachment 14....PHC

Attachment 15 . . Raptor Report

Attachment 16 . . Air Quality Information

DESCRIPTION AND NARRATIVE

Introduction: At present (January, 2012), the Crandall Mine is discharging water into nearby Crandall Creek, a tributary to Huntington Creek. This water is above the UPDES compliance limit for iron. Therefore, the company has constructed a water treatment facility at the minesite to reduce the iron concentration to within acceptable legal discharge levels. This facility utilizes an aeration unit (to change the iron compound chemistry), a chemical injection system to coagulate and flocculate the precipitated iron, and a settling basin to allow the precipitated iron to accumulate. At regular intervals the iron sludge material is cleaned from the bottom of the basin and disposed of off-site. This settled sludge material has been laboratory tested for RCRA metals and has been determined to be non-toxic, non-hazardous, and non-acid-forming. When dried it forms a fine-grain orange colored inert material.

Previously, the sludge material was hauled to the company-owned Wildcat Loadout, which is a SMCRA permitted facility (UDOGM permit C/007/033), and was disposed of in one of the larger sediment ponds at the site. However, in the summer of 2011, the company transferred ownership of the Wildcat Loadout facility to the Intermountain Power Agency (IPA). Therefore the site was no longer available for disposal of the Crandall iron sludge material, and the company sought an alternate disposal site.

The newly selected site is located in Emery County in lower Huntington Canyon, near the Utah Power and Light Huntington power plant, and is adjacent to the Emery County Road #303, known locally as the "Burma Road". Therefore, the new facility is called the Burma Evaporation Basin site. The site is located approximately 10 miles down-canyon from the Crandall Canyon Mine.

The Burma disposal facility will consist of a shallow evaporation basin. It is located on land owned by Utah School and Institutional Trust Lands Administration (SITLA). It is located in an industrial area, proximate to the coal-fired power plant, coal storage piles, fly-ash disposal ponds, commercial gravel pits, and numerous gas wells. The waste-rock disposal area for the Deer Creek Mine is also located nearby.

Chapter 1, Legal: The Burma evaporation basin site is located on a 7.32 acre parcel of SITLA land within Lot 6, Section 5, T17S, R8E, SLBM, as shown on the drawings in Attachment 1. Construction and operation of the site is authorized under Special Use Lease 1708 issued by SITLA on January 5, 2011 (see Appendix 1-16 of the approved MRP). A legal description of the lease area/permit area is included in Attachment 3.

The Emery County Road Department has approved an Encroachment Permit #201139 to allow an access road into the site from Emery County Road #303, a.k.a., the Burma Road. See Attachment 9.

Chapter 2, Soils: An Order 2 soils survey was completed at the site by Long Resource Consultants (see Attachment 6). The area contains a preponderance of large boulders and gravels. In fact, several large-scale commercial gravel pits are presently operating in the area within a quarter-mile of the site. Nearby earthwork associated with road-building and construction of gas-well pads clearly show evidence of the significant number of large boulders encountered in surface excavation. The soils report concludes, *"The presence of large amounts of rock fragments will make topsoil salvage difficult, but not impossible. Boulders and large stones should be removed during the topsoil salvage process to the extent that is reasonable."* The report also recommends that an average of 30 cm (1 foot) of surface material be salvaged for topsoil. However, due to the preponderance of large boulders within the surface material, estimated at about 50% of the surface exposure, the average depth of topsoil material can be approximated at 6" averaged over the entire area. No prime farmland exists within the project area.

The company proposes to initially remove the larger boulders and either place them within the outslope of what will become the basin berm, or if necessary (depending on total quantity encountered) also store them in separate storage piles, prior to topsoil salvage. The site has a gradual and fairly consistent gradient of about 5%, sloping to the southeast, as shown on Drawing 4, Attachment 1. The basin will be constructed about 100' wide by 200' long, generally following the contour, with the long axis trending in a northeast-southwest direction, as shown on Drawing 1. The basin will be constructed by cutting (excavating) the upper portion of the site and filling the lower portion. This is similar to the method used to construct the gas-well pad located immediately to the south of the site, which can be clearly seen in the aerial photograph in Drawing 3, Attachment 1. Therefore the boulder storage will be located on the lower (southern) part of the site. After the large boulders have been removed and stockpiled, the topsoil material will be salvaged. As with the boulders, to facilitate construction, the topsoil will be collected and stockpiled at the lower end of the site. The topsoil storage pile will be constructed in a long linear configuration, measuring approximately 10' high, 40' wide and 170' long. This will allow the pile to remain relatively low, thereby minimizing densification. Based on the proposed design of the evaporation basin, the actual area of disturbance associated with construction will be approximately 1.41 acres. This will include construction of the entrance road, access road, evaporation basin and containment berm. The area under and around the topsoil pile location is not included in this disturbed area calculation since no topsoil removal will occur in this area. Assuming a 6" average depth of topsoil salvage (averaged over the entire 1.41 acre disturbed area), the pile will contain a volume of about 1,137 cubic yards of material. A more complete description of the construction sequence of the basin and associated structures is presented in the Chapter 5-Engineering discussion below.

Upon completion of topsoil salvage, the topsoil pile will be pocked (roughened) and re-seeded. The BLM has provided a seed mix specifically designed for this area, based on reclamation standards for other projects in the area. This seed mix is listed in Attachment 8. After topsoil salvaging is complete, the topsoil pile will be re-seeded using this prescribed mix. A 1 T/ac straw mulch will be incorporated into the surface soil. The pocking, re-seeding and wood straw are all measures to help minimize erosion, and promote a healthy interim re-vegetation until the time of final reclamation. A containment berm made of sub-soil material, and a siltation control structure (such as excelsior logs) will be installed around the perimeter of the pile to prevent erosional loss of topsoil material from the pile. A topsoil identification sign will be installed on the pile upon completion. After construction, an as-built drawing of the pile will be prepared and supplied to the Division, and a final assessment of the volume of salvaged material will be updated in the MRP.

During topsoil salvaging and stockpiling operations the Company commits to having a professional soils monitor on site. The purpose of this person will be to make sure that all topsoil resources are properly salvaged, to maintain accurate inventory of the material, take photos, and generally make sure that the salvage and stockpiling operations are done according to the plan. The monitor will be someone familiar with topsoil salvaging and pre-approved by the Division. After the soil salvaging is completed, a final report will be prepared and submitted to the Division.

Chapter 3, Biology:

The evaporation basin site is located at an elevation of 6400' on the broad pediment outslope extending from the base of the surrounding cliffs. The area was surveyed for vegetation, wildlife habitat and sensitive species by Dr. Patrick Collins of Mt. Nebo Scientific. The report of findings is located in Attachment 5. The area is primarily a Pinyon-Juniper community. As clearly visible in the aerial photos, the area has been chained by the federal government in the past, presumably for range enhancement and habitat improvement.

The report concludes that construction of the facility is not expected to impact any threatened, endangered or candidate species.

The Dominant vegetative community over the entire project area is pinyon -juniper. Map 1 of the Vegetation, Wildlife Habitat & sensitive Species report is an aerial photo showing the total area as being chained pinyon –juniper.

As is discussed on page 12 of the Vegetation, Wildlife Habitat & Sensitive Species report, the entire area (shown on Map 1) is considered crucial winter range for Rocky Mountain elk and Mule deer. The entire study area (shown on Map 1) is considered year-long substantial habitat for Black bear. Finally, the entire area (pinyon-juniper) could be used by Ferruginous hawks because they often nest in this community.

Reclamation of the project area will be according to and along with the approved reclamation time line found in Section 3.41.100 of the approved MRP. In the event that discharged mine water no longer requires treatment and/or the basin is no longer receiving sludge, the reclamation time line for the Burma basin will be adjusted as follows: Reclamation will begin after three years without receiving sludge, and reclamation will be completed within one year of commencement.

Upon final reclamation the area will be re-seeded with a seed mix recommended by the BLM. This seed mix is based on the agency's familiarity with other reclamation projects in the area, and the specific findings of the Mt. Nebo Scientific vegetation survey. Refer to Attachment 5 for the recommended seed mix.

On final reclamation, the evaporation basin area will be backfilled and graded to approximate original contour (AOC), and topsoil will be re-applied to the reclaimed area. (See Map #7)

a) To ensure that the lined pond will not continue to hold water after reclamation, the pond liner will be breached prior to reclamation (see Chapter 7).

b) A minimum of 48" of fill will be placed over the dried-out contents of the excavated basin. Backfill will be placed in 18" compacted lifts until approximate original contour is achieved. The first 18" lift will be incorporated into the mine waste by ripping or other tillage. Because the area is relatively flat, and because the dried out iron precipitate material left in place is not expected to accumulate to a total depth of more than 18", the basin can be backfilled with at least 48" of material and still resemble the approximate original contour. The fill will be obtained from the adjacent road pad fill, which is the original material initially excavated from the basin.

A certified noxious weed-free straw mulch will be incorporated into the replaced soil with surface roughening at a rate of 2,000 pounds per acre and held to the surface with 1,000 pounds per acre of a wood fiber mulch and tackifier applied to the surface at a rate of 500 pounds per acre. Fertilizer, if determined necessary by soil testing, will also be applied at this time.

c) Large boulder, which had been stored in separate stockpiles, will be scattered within and on top of the backfilled material in a random arrangement during the backfilling operations in an effort to replicate the original geomorphology.

d) Topsoil will then be spread out over the area at an application rate of approximately 6" thick.

e) The surface will be gouged with irregular depressions approximately 24" x 36" x 18" deep. This will also mix the hay into the upper portion of the soil surface.

f) The appropriate seed mix (Attachment 8) will be either broadcast by hand or hydroseeded on the area at the rate specified on the table.

Chapter 4, Land Use/Air Quality:

The site is located in a well-developed industrial area. And is situated less than1.5 miles from the Huntington Power Plant and its associated coal storage piles and fly-ash disposal ponds. Within a mile from the site are located several commercial gravel pits, and numerous operating gas wells. The waste-rock disposal area for the Deer Creek Mine is also located less than a mile away.

As mention ed previously, the site has been "chained" in the past by the federal government (BLM), a practice whereby the native juniper-pinyon trees were ripped out by bulldozers. Evidence of this previous disturbance is clearly visible in the aerial photo background on Drawing 3, Attachment 1.

There will be no change in the current land use of the area following reclamation of the site. The present land use supports wildlife and livestock grazing, and no change in grazing activity will occur after reclamation. However, during operation of the evaporation basin, which is tied to the permit term of the Crandall Canyon Mine, approximately 1.4 acres of the site will be temporarily incapable of supporting wildlife or domestic grazing.

Mitigation of the 1.4 acer surface disturbance of the Burma evaporation pond UEI will partner with the Division of Wildlife resources, DWR, in a Utah Partners in Conservation Development, UPCD, project , Pinyon Juniper treatment for deer and elk crucial winter range, in locations at or near the Burma pond or as designated by DWR. Funding will be provided by UEI for approximately 5.6 acres of habitat improvement based on a cost per acre provided by DWR.

The site is located adjacent to the Emery County Road #303, also known locally as the Burma Road. The County has issued an encroachment permit (201139) from this road for access to the evaporation basin. (See Attachment 9).

A Class 3 (intensive) cultural resource survey has been completed at the site by Senco-Phenix Archeological Consultants, with negative findings (see Attachment 4).

There are no public parks or historic places within the proposed disturbed area.

Utah Division of Air Quality was contacted and the Burma pond project was explained in detail to determine if an Air Quality Permit or modification was required. It was determined by Utah Division of Air Quality that the emissions turned out to be insignificant and that the permit for Crandall Canyon did not need to be modified. See Attachment #16 of the application for email correspondence between UEI and DAQ.

Chapter 5, Engineering:

As depicted on the drawings in Attachment 1, the facility will consist of a large, shallow evaporation pond, measuring approximately 100' wide by 200' long. It will be constructed about five feet (60") deep, although only the bottom 36" will be utilized for sludge storage/water retention, leaving the top 24" as freeboard. Based on past experience, it is anticipated that cleanout sludge-water from the Crandall water treatment facility will be hauled to the site about 10 each eight-hour days (two working weeks) every two months, at two truckloads per day, and 4000 gallons per truckload. This works out to be about 64,200 cu. ft. per year hauled to the site for disposal. The iron cleanout "sludge" material has typically been analyzed at about 5% solids and 95% water by weight, and even less by volume, perhaps 2-3% solids. Therefore, after evaporation of the water, which is estimated to be 1.4 acre feet per year, the actual volume of solids left to accumulate in the basin is expected to average about 2400 cu ft. per year. Spread out to dry over the 20,000 square foot bottom of the evaporation basin, the rate of solids accumulation in the basin is expected to be less than 1.5 inches per year or less. It is anticipated that the material will not accumulate more than 24" deep in the bottom of the basin during the operational life of the facility, which will take more than 16 years to accumulate to this level. This will then allow the material to be covered with the necessary 48" of backfill at the time of final reclamation.

Consumption calculation show that the mine currently discharges approximately 400 GPM which equates to 644.3 acre feet per year. The evaporation pond will consume approximately 1.4 acre feet per year for a net gain of 642.9 acre feet per year.

It should be noted that the preceding volume accumulation estimate is based on rough assumptions, and will vary significantly upon actual practice. However, prior experience with sludge disposal at the Wildcat Loadout site has demonstrated that the amount of solid material remaining after evaporation is actually quite small, and will indicate that the above assumptions are reasonable.

At present, there is some uncertainty as to the future treatment requirements for the Crandall Mine discharge water, in terms of the longevity of treatment and the degree of treatment. With the approval of the application of the Crandall water treatment, it is assumed that the following scenarios will ultimately unfold:

1) The dried sludge material will be left in place and buried on-site as part of the final reclamation process. The material will be buried under 48" of inert earthen material during reclamation, topsoiled and re-vegetated. As noted previously, the material has been analyzed as is neither toxic, hazardous nor acid-forming, and contains no RCRA metals, as shown by the laboratory result presented in Appendix10.

2) The accumulated depth of sludge will be monitored and reported in the annual report and that grab samples of the dried material will be taken every five years or

with 7.5 inches of solid waste deposited. Grab samples of the waste will be shipped using chain of custody forms, and will be prepared at the laboratory using TCLP Method 1311, and will be analyzed for all RCRA metals using EPA Method 200.7 or 200.8 and will be monitored for hazardous concentrations in accordance with 40 CFR 264.13.

Grab samples of the accumulated sludge will be taken for analysis of the following metals of agronomic concern: aluminum by Synthetic Precipitation Leaching Procedure (SPLP, SW846 Method 1312) , and plant available iron, zinc, and nickle analyzed by DTPA extractable, and by the methods described for all parameters listed in the Division's Guidelines for Topsoil and Overburden, Tables 3 & 7.

Excess dried material will be removed from the basin if needed and taken to an approved disposal site, such as ECDC.

3) The basin will be enlarged if needed to accommodate additional future accumulation needs. This would be accomplished by extending the length of the basin either to the east or the west within the existing site. The site will easily accommodate an enlargement of the basin of over three times the currently proposed size. The company acknowledges that any future modification of the facility will require additional SMCRA permitting amendments.

3) There is a possibility that the iron content of the Crandall mine discharge water may naturally drop down to within compliance levels such that future treatment is no longer required, and hence, sludge disposal at the Burma evaporation facility will no longer be required.

4) There is a possibility that if the iron levels remain high and treatment is required in perpetuity then a more permanent, long-term treatment facility will be constructed, and an alternate sludge disposal system could be incorporated into that facility.

5) The status of the need for treatment at the mine and subsequent disposal at the evaporation basin will be evaluated on an ongoing basis as part of the five-year permit renewal process.

6) In the event of temporary cassation at the Berma Pond site, the sludge will be covered with six inches of subsoil and an interim seeding of crested wheatgrass (Agropyron cristatum) . Notice will be given as required by R645-301-515.321.

7) The waste will be routinely compacted and covered to prevent combustion and wind-borne waste.

It should be noted that the iron sludge material has been tested in the lab using the EPA 200.7 method for RCRA metals, and has been found to be non-toxic, non-hazardous and non-acid forming. (See Attachment 10). Also, the chemicals used in the water treatment (coagulant and flocculant) are all NSF-60 certified. (See Attachment 12).

For comparison purposes, the evaporation basin will be approximately the same size as the nearby gas-well pad located immediately to the south of the site. The basin will be ringed by an access road which will allow the trucks to dump the sludge at any point around the perimeter of the basin. The perimeter access road will also allow trucks to enter the site, dump their load and exit the site without needing to back up and turn around.

As shown in plan view and cross-section view of Drawings 4 and 5 (Attachment 1), the basin will be constructed generally in the following sequence:

1) Prior to any construction-related disturbance at the site, a sediment control structure will be installed around the lower (down-drainage) part of the site. This will consist of a double row of over-lapping excelsior logs staked firmly into the ground. These excelsior logs will provide the primary sediment control during construction, but will be left in place to provide long-term permanent sediment control for the site as well.

2) Perimeter markers will be installed around the boundary of the site to delineate the maximum extent of surface disturbance. Permit signs will also be installed specifying the DOGM permit number and legally-required permittee contact information.

3) The entrance road will then be established into the site. This short (200' long) road segment will exit the Emery County "Burma" Road as per the county-issued encroachment permit (see Attachment 9), and will enter the site along grade from the west side of the property.

4) Included as part of the entrance road construction will be the establishment of an upper drainage ditch. The purpose of this ditch is to permanently divert undisturbed surface drainage around the facility site, both during construction and thereafter throughout the operational life if the facility. It will parallel the entrance road and head east around the top of the site, and discharge into the predominant natural drainage structure located in the eastern part of the site.

5) Grubbing and clearing the area of vegetation, primarily small-growth juniper-pinyon trees, will then commence. The grubbed trees will be stockpiled at the lower end of the site, and will serve as micro-habitat for small animals.

6) The larger surface boulders will then be removed and stockpiled. Many of these boulders are quite large and may require to be broken up using a hoe-ram. These boulders will be relocated to the lower side of the basin and placed in a linear pile which will ultimately become the out slope of the containment berm of the evaporation basin.

Depending on the volume of boulders encountered, excess boulders beyond those that can be incorporated into the berm may be stockpiled separately out of the way at the lower end of the site until final reclamation. Areas that are disturbed by boulder removal, where the topsoil has not been removed, will be seeded with the approved seed mix, if necessary.

7) Removal of available topsoil material will follow. According to the topsoil survey (see Attachment 6) there is approximately 12" of suitable topsoil material available for salvage, in those areas where topsoil exists. However, due to the preponderance of large boulders occurring on and within the surface material, estimated at about 50% of the surface exposure, the average depth of topsoil material averaged over the entire area can be mathematically approximated at 6". The topsoil will be gathered and placed in a topsoil pile located at the lower end of the site. It is estimated that approximately 1,137 cubic yards of topsoil will be collected, and stored in low-lying linear shaped piles as described in Chapter 2, Topsoil above. It should be noted that much of the boulder salvage and topsoil salvage may be done at the same time due to the natural occurrence of the boulders as part of the pre-existing surface material.

8) After the boulders and topsoil have been salvaged, construction of the evaporation basin will begin. The basin will be constructed using dozers starting at the upper part of the site, and simultaneously excavating the top portion of the basin and filling in the lower portion. Cut and fill will be balanced to provide the finished basin above with the containment berm below. Granular material excavated from the basin will be used to construct the structural core of the berm. This granular material, forming the upslope section of the containment berm will be compacted to 90% using vibratory equipment and/or wheel rolling. It should be noted that this earthen material in its native condition is a well-suited construction medium, as evidenced by the fact that there are several large-scale commercial gravel operations in the immediate area extracting this same material for local highway projects and other civil engineering projects.

9) The containment berm will be made wide enough (at least 20' wide) to serve as the perimeter access road for the tanker disposal trucks. As noted above, the outslope of the berm will be constructed of the large boulders salvaged from the surface, while the core of the berm (and the upslope section which will be subject to contact with the impounded sludge-water), will be constructed from the smaller-sized gravel material excavated from the basin area, and compacted in-place within the berm. The top of the berm will be capped with a 12" thick layer of gravel which will form an impervious layer over the boulders, and also as a suitable running surface (roadway) for the sludge delivery trucks. The berm outslope boulders will be covered with a 6"-12" layer of subsoil material which will serve as a medium for interim contemporaneous reclamation. A stability analysis for the construction of this earthen berm is included in Attachment 11.

10) A continuation of the perimeter access road will be constructed (20' wide) around the upper side of the basin. Rather than being constructed on fill, this upper road will be

constructed as a shallow cut in the native ground. In final design, this upper access road will be a continuation of the entrance road.

11) To protect groundwater from potential exposure to leachate, an engineered liner will be installed in the interior of the pond. The proposed liner is described in Attachment #2 of Appendix 7-66 of the approved MRP and is the same as that used for the cells in the treatment plant at Crandall.

12). It should be emphasized that this basin is not expected to normally impound much if any water, only temporarily after cleaning disposal. At an average of 80,000 gallons of diluted sludge material per two-month cleaning cycle (as explained above), coming primarily during the concentrated two-week cleaning periods, the maximum depth of standing water at any given time is not anticipated to exceed 5 inches. In between the anticipated two-month cleaning cycles, the evapo-transpiration process is expected to quickly eliminate any standing water to a damp, thin concentrated filter-cake, or dry out completely. This assumption has been verified through previous experience when the material was disposed of at the Wildcat Loadout facility. The basin will be constructed 5' deep, primarily to provide ample excavated fill material to be replaced to a depth of 48" at time of final reclamation. With a 5' basin depth, the cleaning water could actually fill to a standing depth of 36" and still allow 24" of freeboard to the top of the containment berm.

The basin is not designed to ever discharge and all of-site drainage is diverted around the pond. However, at DOGM requirements, a single small 5' x 6" emergency spillway has been designed into the structure as shown on Drawing #4. This will allow the release, in a controlled fashion, of any flows in the highly improbable chance that water filled the pond. Other than the watery material disposed of from the Crandall treatment, the only water entering the basin will be from natural rainfall or snowfall. The 10-year, 24-hour event in this area is 2.00 inches and the 100-year, 24-hour event is 2.59 inches. As discussed in Chapter 7, the anticipated rise in water level from the 10yr event will be about 4 inches and for the 100yr event will be about 4.5 inches. Hence, there is no statistical probability that the basin will ever fill with water above the 18" freeboard level to the spillway elevation in the berm, given the fact that no undisturbed drainage reports to the basin. The basin can better be envisioned as a large depressed evaporation area rather than an impoundment structure.

13) The in-slopes to the basin will be constructed to a shallow slope of 3 vertical to 1 horizontal. With these gentle in-slopes, and the shallow depth of containment, there will be no necessity for any perimeter barricade or fence for wildlife protection, or public safety. Also, as mentioned previously, the basin contents (dried iron precipitate material) has been tested as non-toxic, non-hazardous and non-acid forming, posing no public health threat.

14) Based on the design shown on Drawings 4 and 5 of Attachment 1, the computer-generated volume of excavation is 3,500 cubic yards. Of this volume, 1,137 cubic yards

will be removed as topsoil and stockpiled separately. The remaining 2,363 cubic yards of excavation (cut) will be used to construct the berm of the basin.

Chapter 6, Geology:

An Order 2 Soils Survey was performed at the site by Bob Long of Long Resource Consultants (see Attachment 5). According to this report, the geology of the area is described as follows:

"The project area is situated on an alluvial fan that is on top of a terrace pediment mantle. The terrace consists of alluvium and colluvium derived from the nearby sandstone of the North Horn, Blackhawk, Castlegate and Mancos formations (Witkind, et. al., 2006). The pediment mantle is underlain by sandstone and shale of the Mancos formation (Witkind, et. al., 2006). The thickness of the pediment mantle is variable, but neither sandstone nor shale parent material was observed in the soil test pits."

The report includes numerous photographs which clearly show the geologic nature of the site.

This geologic description of the site area is in accord with the studies of the USGS for the San Rafael drainage basin. Once the Wasatch Plateau meets the San Rafael Valley, the area is a alluvial/colluvial terrace pediment that has incised ephemeral drainages that have dissected the terrace pediments into the underlying Mancos Shale Formation. This formation consists of mainly shale deposits with some interbedded sandstone tounges. According to Hintze (1988), in this area the Mancos Shale is approximately 3,200 feet thick. The sandstone tounges tend to thin to the north. Typically, the Mancos Shale is not considered an aquifer, though to the south of the site area, there have been some wells that have been completed in the sandstone tounges of the formation.

The shale layers of the Mancos Shale are considered to quite tight. Based on published data, the hydraulic conductivity for these strata are estimated to be $1x10^{-8}$ cm/sec (Freeze and Cherry, 1979).

To the northeast and southwest of the site, the Fish Creek and Huntington Creek drainages, respectively, have cut through the terrace pediments into the underlying Mancos Shale. The Fish Creek drainage is an ephemeral drainage that is about 100 to 200 feet vertically below the proposed site area. The Huntington Creek drainage is a perennial stream that is about 200 feet vertically below the site area. Thus, the proposed site area is located on a higher ridge, elevated above the surrounding drainages.

Chapter 7, Hydrology:

Climatic Conditions

The proposed site is located in Section 5, T 17S, R 8E SLBM. Representative site climatic conditions including average monthly temperature, average seasonal precipitation, average evaporation rates, and average wind direction and velocity are presented in the following tables. Temperature and precipitation data were from the Castledale Station. Evaporation data were from the Ferron Station. Wind direction and velocity data were from the Price Airport. These are the closest data gathering points for these data. Given the site elevation and location, they are fairly representative of the site.

Average Monthly Temperature - F°

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MAX	35.2	41.9	53.2	62.5	72.1	82.7	88.5	85.8	77.6	65.2	50.1	37.9
MIN	6.7	14.3	23.5	30.7	38.6	46.5	53.4	51.3	42.1	31.5	20.4	10.7

Average Monthly Precipitation - inches

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Precip	0.60	0.56	0.52	0.54	0.65	0.47	0.77	1.06	0.87	0.84	0.51	0.53
SF	5.9	3.2	1.3	0.3	0.2	0	0	0	0	0.1	1.0	4.0
SD	2	1	0	0	0	0	0	0	0	0	0	0

Average Monthly Evaporation - inches

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AVG	0.00	0.00	0.00	5.20	5.66	8.06	6.58	6.39	5.49	3.53	0.00	0.00

Average Monthly Wind Direction and Velocity

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DIR	N	N	N	N	N	N	N	N	N	N	N	N
VEL	5.1	5.8	7.9	8.5	8.4	8.2	7.0	6.6	6.9	6.7	5.8	5.2

Baseline Information

A records search was conducted to determine the existing water rights in the area of the site. Figure 7-1 shows the location of all surface and groundwater rights and points of rediversion within one mile of the center of Section 5, T 17S, R8E. These records are also summarized in Attachment #13 with a listing of the sites which includes the water rights number, location, quantity, and beneficial use.

As can be seen in the figure, there are no groundwater sources within ½ mile of the site area. The groundwater resources are limited to the alluvial aquifer of Huntington Creek. The remaining rights are surface water rights for either stockwatering or irrigation rediversion. A number of underground records are identified beyond the ½ mile area; however, according to State Engineer records these points were either dry holes or were 2-inch wells that were subsequently abandoned.

Based on the area depicted in Figure 7-1, no active ground water wells, springs, or other expressions have been identified within the search area. Thus, no ground water data are available for either quality or quantity.

A search of the area of the site was conducted to determine any surface or ground water sources. First, a records search for water rights was conducted one mile from the center of section 5. Then, a field survey was conducted to identify any springs or seeps within the area. This evaluation just found surface water expression in Huntington Creek and in isolated sections of the Fish Creek channel. No ground water occurrences were identified.

The only other surface water body that exists within the one mile radius is the PacificCorp pond located about 3/4 mile west of the site. This pond is a make-up water pond for the Huntington Power Plant. The pond is located in the adjacent southwestern drainage from the proposed site.

Based on the water rights search, only two surface water rights were identified within ½ mile of the site. These are for stock watering on Fish Creek. Additionally, the DOGM water database records were searched and the Co-op Mining, Lower Fish Creek monitoring station, located off the road just above the proposed site, was identified. According to the records, this site only had two flow events during the period of record from August 1977 through November 1985. This supports the ephemeral nature of the stream flow. Given this flow condition and the vertical and horizontal isolation of the proposed site from the creek, there is no significant potential for impact from the proposed site.

Additionally, because of the installation of the engineered liner in the pond as described in Chapter 5, there is very little possibility of leakage or infiltration from the pond would reach either the surface water and groundwater in the area of the pond.

If the liner were to leak and the leachate were to be released to the groundwater system, based on the hydraulic conductivity of the underlying Mancos Shale, there is little possibility of significant movement of the released water. The pond is located about 150 feet above the Fish Creek drainage and about 1320 feet horizontally away. The porosity of the shale strata will be

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approximately 0.1. Using the hydraulic conductivity reported in Chapter 6, an evaluation of the average linear velocity of groundwater flow for the leachate shows that the time for movement from the pond area to the nearest surface water body will be in excess of 100,000 years. Therefore, the likelihood of any significant impacts to surface or groundwater sources is very small.

As mentioned in previous sections of this narrative, the site is located on a terrace pediment, a relatively flat (planar) surface, which is gently sloping to the east at about 5%. This can be seen in the aerial photos (Drawing 3, Attachment 1), the photos in the vegetation report (Attachment 5) and the soils report (Attachment 6), as well as the contours shown on Drawing 4 , Attachment 1. As described in the Geology Section, the site is located, on the high point, between the Fish Creek and Huntington Creek drainages. There are two minor (shallow) ephemeral drainage channels (actually, more like drainage depressions) located within the site, as shown on the site plan (Attachment 1). The layout of the proposed evaporation pond is such that the pond structure is located essentially in between these two small drainages.

An evaluation of the probable hydrologic consequences of the evaporation pond portion of the permit area was conducted. This report is included with Attachment 14. Based on the projected impacts, UEI has attempted to minimize the impacts from the operation. The undisturbed areas are being diverted around the facilities and the disturbed areas are being collected in the pond. Therefore, there is likely no impact from this portion of the operation.

Due to these limited impacts and the ephemeral nature of the site, it is likely that there will be very little runoff from the site and no leakage for the pond. Any attempt at surface water sampling will generally result in no flow. As such, due to the total containment of the pond, it is proposed that no additional ground water or surface water monitoring be conducted for this site.

Drainage Control

Enclosed in this Appendix is a hydrologic report prepared by Blackhawk Engineering (see Attachment 7). This report analyses the some of the factors addressed below, such as the direct precipitation reporting to the basin and the sizing of the undisturbed drainage structures. This report references the Drawings in Attachment 1 and utilizes the area delineations shown on Drawing 6.

As shown on Drawings 4 and 6 (Attachment 1), an undisturbed drainage ditch will be constructed along the upper (northern) side of the facility. This will serve to route all undisturbed drainage around the site and direct it into one of the existing natural drainage channels in the immediate area.. Because the undisturbed drainage area above the facility is relatively small (2.3 acres) the undisturbed drainage ditch can be sized accordingly. This ditch will be armored with rip-rap as needed to prevent erosion.

Prior to release of diverted flows into the natural drainage channel, all water from the ditch will be passed through a sediment control structure, such as a double row of excelsior logs. Runoff from the perimeter access road/containment berm will be directed back into the evaporation pond. The out slopes of the containment berm, as well as the topsoil pile, will be roughened and revegetated to prevent erosion. A sediment control structure (i.e., a double row of excelsior logs) will be installed around the lower perimeter of both the containment berm outslope and the topsoil pile as an additional means of sediment control. And finally, a third row of excelsior logs will be installed at the lower end of the site prior to construction to provide sediment control during construction. This sediment control structure will be left in place after construction, and will provide a final line of control while the interim reclamation vegetation is being established.

Attachment 7 contains a hydrology report prepared by Blackhawk Engineering which describes the methodology for determining the direct precipitation into the basin, the sizing of the undisturbed drainage ditch, and the sizing of the culvert under the access road. This report relies on area determinations presented on Drawing 6 of Attachment 1.

Even though the facility is referred to as an evaporation pond, in reality it is not envisioned to ever contain more than a few inches of standing water at any one time. This will be after the regular cleaning cycles, as described above in the Chapter 5, Engineering section. The entire purpose of the pond is to provide a means for full evaporation of the watery sludge material, hence it is anticipated that there will never be any discharge from the pond, which will be totally contradictory to the designed intent of the facility. The only water entering the pond in an uncontrolled manner will be from direct precipitation to the pond itself. Based on climatological information for the area, the precipitation from a 10 year/24 hour event is projected at 2.00 inches and the 100 year/24 hour event is estimated to be 2.59 inches. Given the small area of the facility subject to direct precipitation (1.16 acres), the anticipated water volume to the pond is 0.172 ac-ft for the 10 year/24hour event and 0.223 ac-ft for the 100 year/24 hour event. Based on the proposed stage capacity curve for the proposed pond, at the top of the design sludge storage level (3 ft from the bottom of the pond) the calculated depth of water reporting to the pond for the 10 year/24 hour event will be about 4.26 inches, while the 100 year/24 hour event will be about 4.44 inches. Supporting calculations are presented in Attachment 7. Therefore, direct precipitation can easily be contained within the capacity of the evaporation basin. This amount of water will quickly evaporate and not be a difficulty to handle.

As discussed in the Chapter 5 discussion, at the requirement of DOGM, an emergency spillway has been included in the design of the evaporation pond. This structure will be able to pass in a controlled fashion a flow up to 5.84 cfs (see Attachment 7). The pond is designed to be a total containment pond and to evaporate the waters that are collected.

Additionally, to ensure that the 100-year, 24-hour event can be stored in the pond at any point, a marker will be installed at an elevation 4.44 inches below the spillway elevation. This will allow a field determination to be made that there is sufficient storage for the 100-year event available in the pond.

Reclamation

Once the evaporation pond is no longer required for the drying of the sludge, the pond will be reclaimed as described in Chapters 3 and 5. Following completion of the regrading, the stockpiled soils will be spread and the site reseeded with the appropriate seed mix in Attachment 8.

Some concerns have been raised regarding the potential for the pond to collect water in the subsurface following reclamation due the presence of the buried liner. This will not be a problem. During the reclamation activities, it is planned that the liner will be breached in at least one location to ensure that it no longer holds water. Therefore, this concern is addressed.

The site area will be regraded as discussed in Chapters 3 and 5. The access road and culvert will be removed and the pond covered an regraded. Also the undisturbed diversion channel will be removed . The regraded surface will closely approximate the pre-existing surface (see Drawing 7). As there were no significant drainages within the proposed site area, it is proposed that two gentle swales be constructed in the reclaimed surface to convey the runoff across the reclaimed surface and back to the natural surface downstream. Based on the evaluation of the site, the reclaimed hydrology will consist of broad swales with channel slopes to match the existing configuration. The width of the swales will be about 4 to 5 feet wide with a depth of between 6 to 12 inches. Riprap will be installed on an as needed basis based on field monitoring of the reclaimed surface.

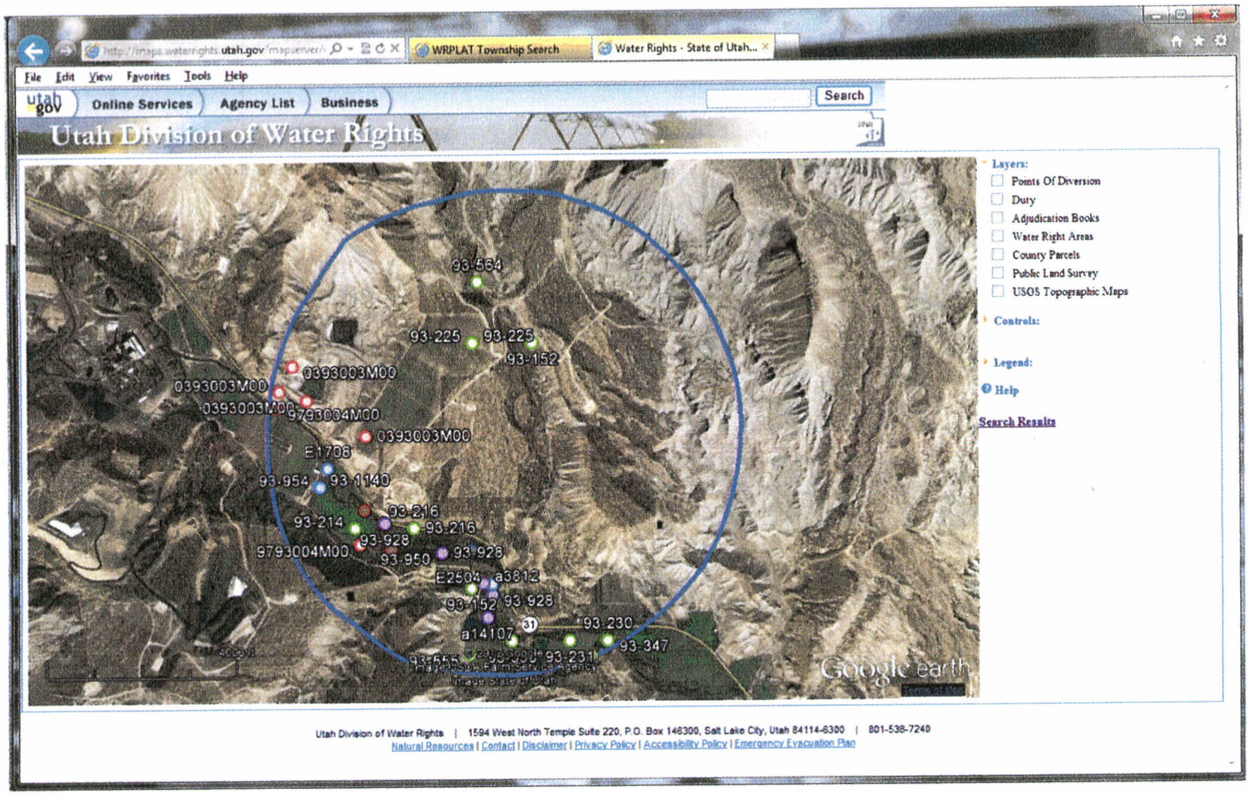

Figure 7-1. Water Rights Locations

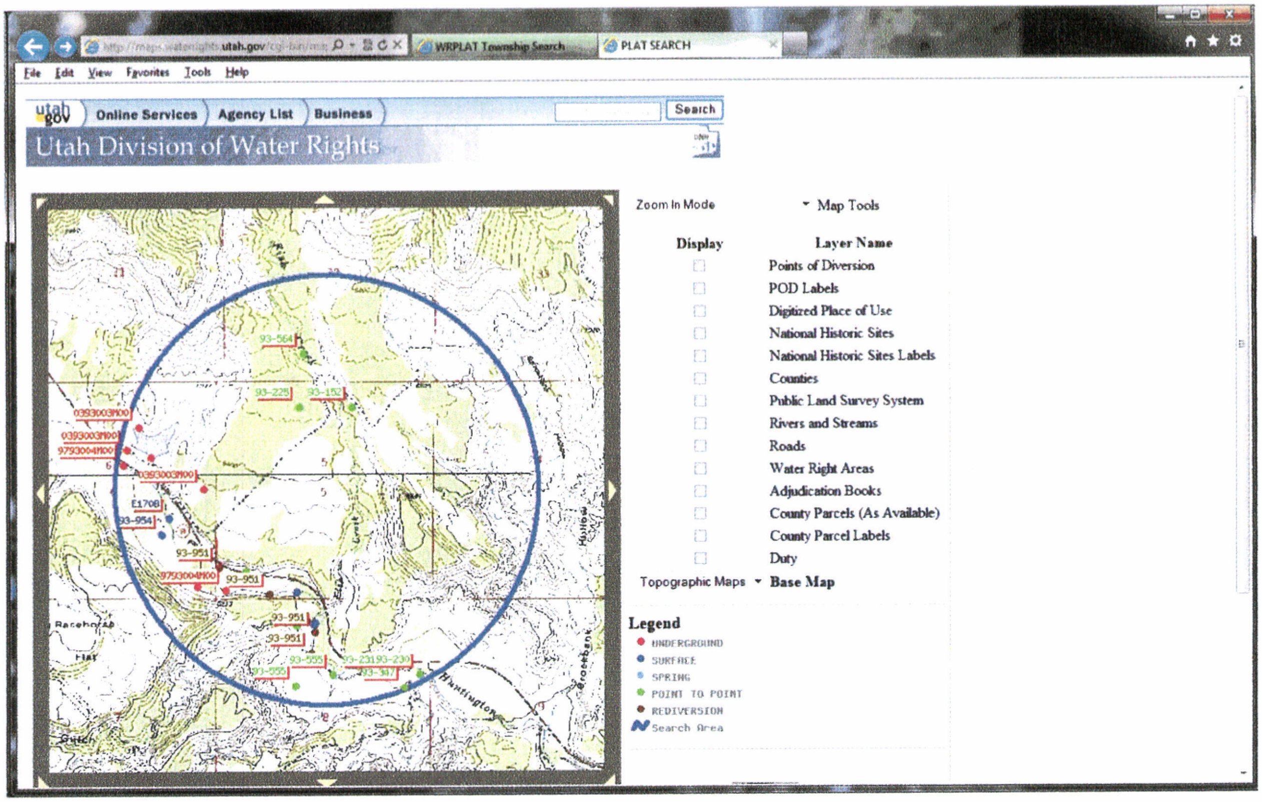

Figure 7-2. Topographic Map of Search Area

Chapter 8, Bonding:

All unit costs herein presented are taken from the format of the presently (October, 2011) approved Crandall Canyon Mine bonding calculations. The calculations below are a summary of the Burma bond revisions. A complete copy of all bond calculation sheets can be found in Appendix 5-20 of the approved MRP.

1) Demolition

The only structure to be removed is a 20' long 18" diameter culvert crossing the access road.

a) Demolition of one culvert = $198.67

2) Earthwork

b) backfill and grading of the basin (of 2,363 cubic yards)

According to the presently approved Crandall reclamation costs the cost of backfill on-site is $173,310 for 70,192 yds = $2.46 per yd.

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2,363 yd x \$2.46/ yd = \$5,812.98

c) topsoil replacement (of 1137 cubic yards)

According to the presently approved Crandall reclamation costs (Feb, 2006) the cost of topsoil redistribution is \$43,170 for 10,737 yds = \$4.02 per yd.

1,137 yd x \$4.02/yd = \$4,570.74

3) Revegetation (of 1.41 acres)

d) revegetation of 1.41 acres

The cost of revegetation is \$7,279 for 1.41 acres.

Total direct reclamation costs are therefore calculated to be

Demolition	\$ 198.67
Earthwork	\$10,383.72
Revegetation	\$ 7,279.00
Sub-total	\$17,861.39

Indirect costs and escalation costs are presently \$1,697,800 / \$1,236,798 = 1.3727 or 37.27% of the direct costs. Therefore, the estimated total reclamation bonding cost for the Burma evaporation facility is \$17,861.39 x 1.3727 = \$24,518.33

ATTACHMENT 1

CONSTRUCTION DRAWINGS

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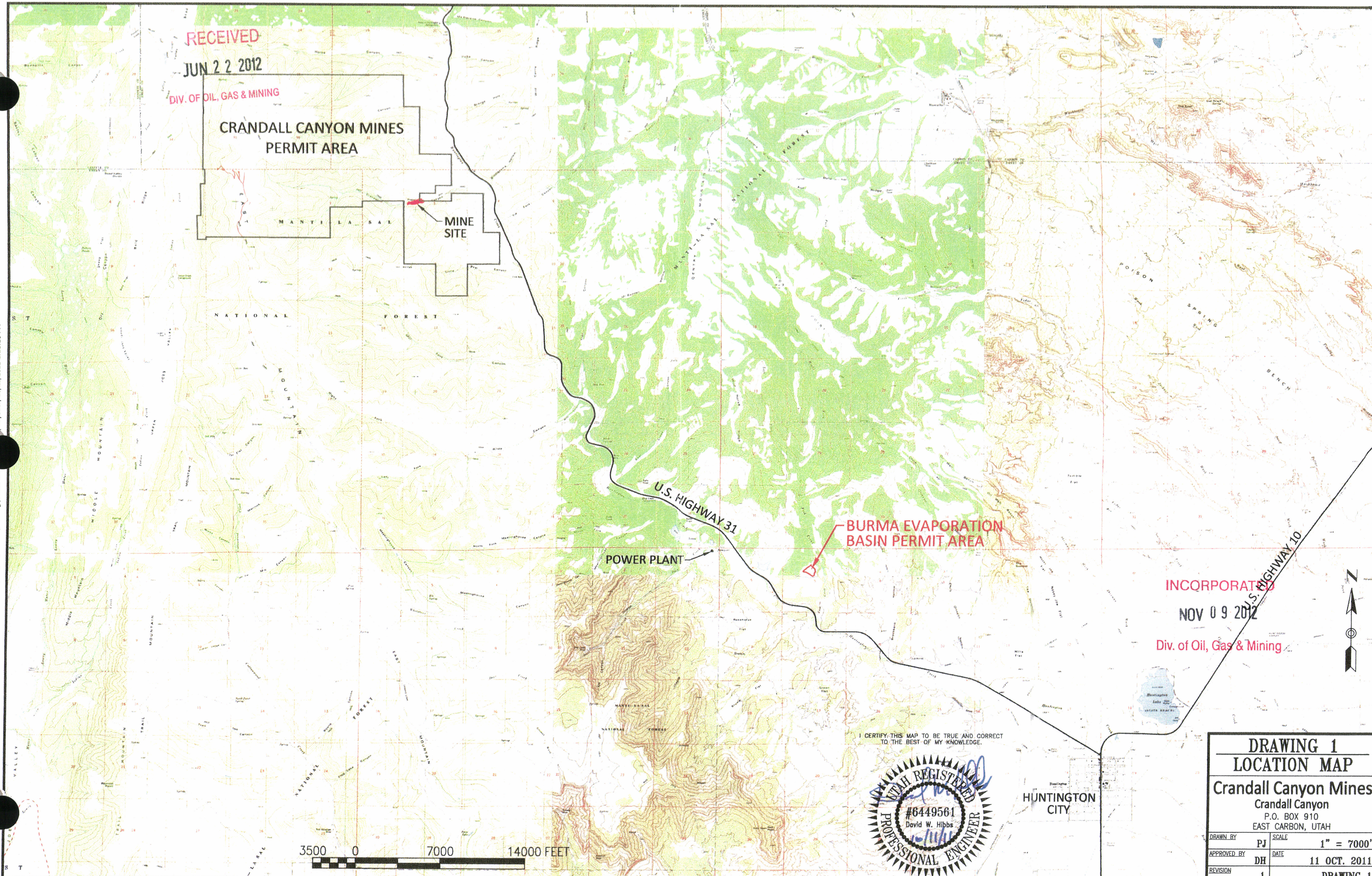

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I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

UTAH REGISTERED PROFESSIONAL ENGINEER
#6449561
David W. Hibbs

DRAWING 1
LOCATION MAP

Crandall Canyon Mines
Crandall Canyon
P.O. BOX 910
EAST CARBON, UTAH

DRAWN BY	PJ	SCALE	1" = 7000'
APPROVED BY	DH	DATE	11 OCT. 2011
REVISION	1		DRAWING 1

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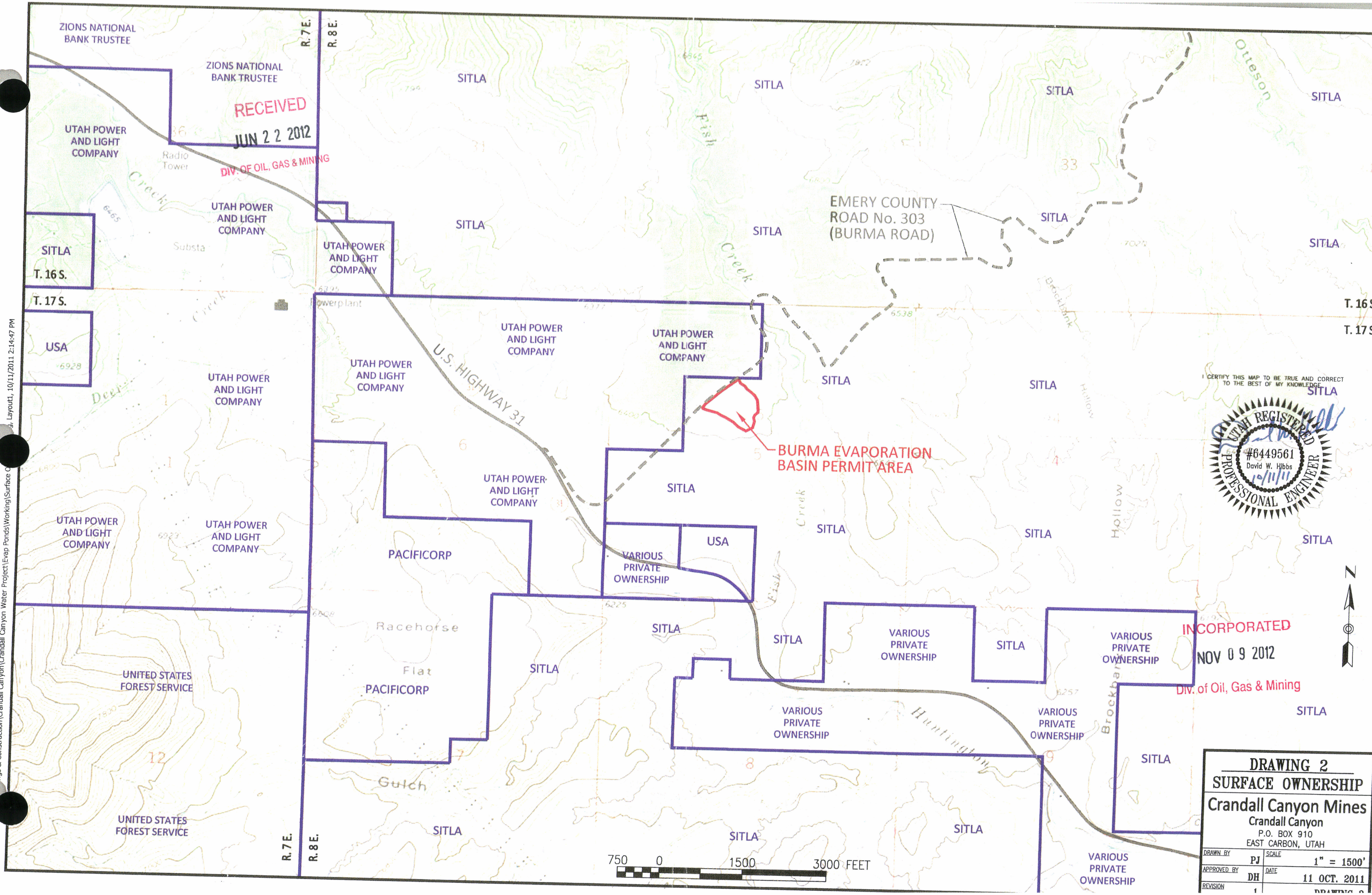

PHOTO OBTAINED FROM GOOGLE EARTH.

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DRAWING 3 EVAPORATION BASIN PLAN VIEW WITH PHOTO BACKGROUND	
Crandall Canyon Mines Crandall Canyon P.O. BOX 910 EAST CARBON, UTAH	
DRAWN BY PJ	SCALE 1" = 100
APPROVED BY DH	DATE 11 OCT. 2011
REVISION 1	SHEET DRAWING 3

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NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE. FINAL LOCATIONS AND CONFIGURATIONS OF THE FACILITY STRUCTURES MAY VARY DEPENDING UPON CONDITIONS ENCOUNTERED DURING CONSTRUCTION.
2. ALL INTERIOR EVAPORATION BASIN SLOPES SHALL BE A MAXIMUM OF 3:1. ALL OTHER CUT/FILL SLOPES SHALL BE A MAXIMUM OF 2:1 UNLESS OTHERWISE NOTED.
3. MINIMUM INTERIOR RADII OF PERIMETER ACCESS ROAD SHALL BE 40'.
4. BOTTOM OF EVAPORATION BASIN ELEVATION = 6514.5'
5. VEGETATION GRUB PILES TO BE LOCATED AS CONVENIENT.
6. LINE BOTTOM OF POND WITH ENGINEERED POND LINER.

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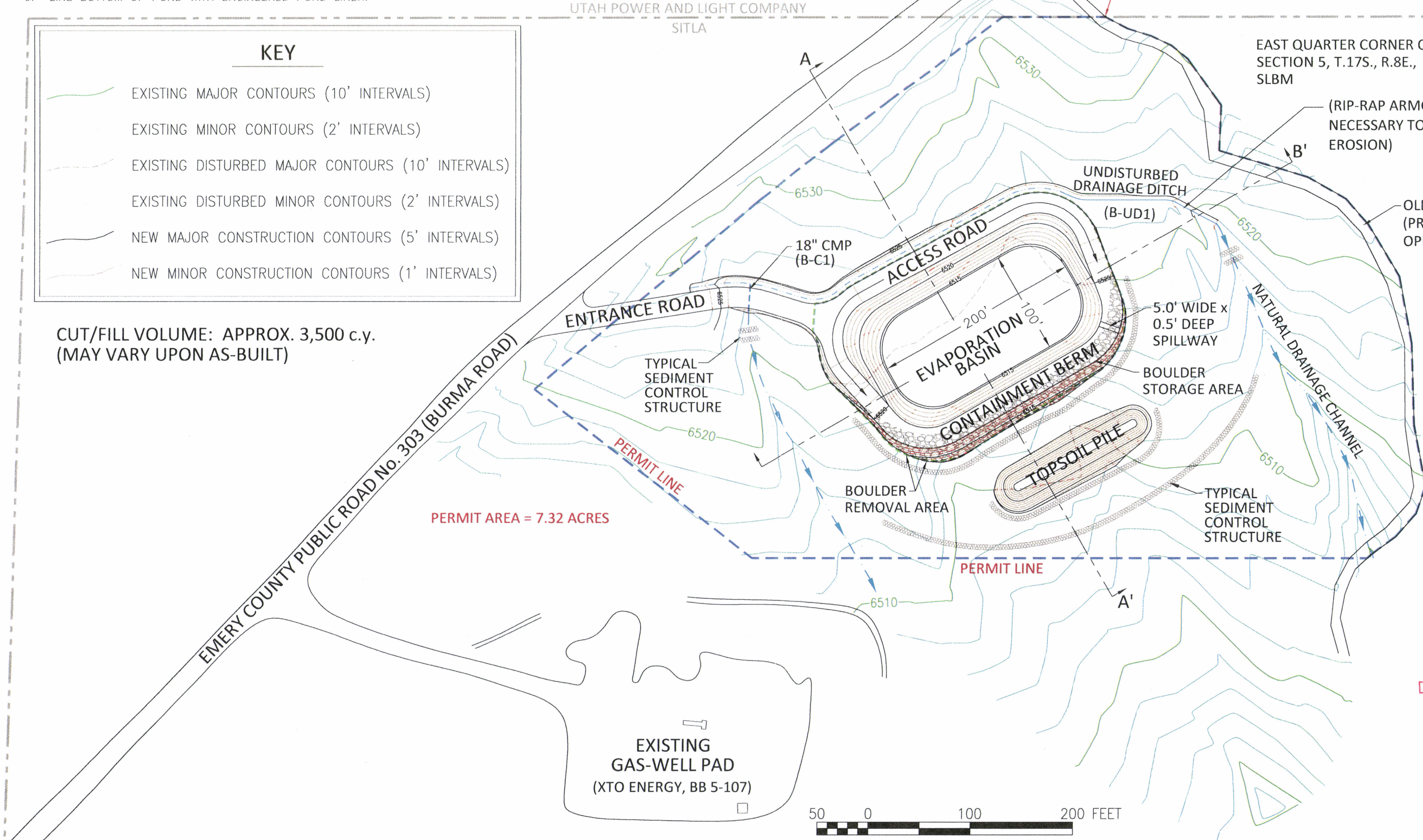
AREA LOCATED IN SECTION 5, TOWNSHIP 17 SOUTH, RANGE 8 EAST, SLBM



DRAWING 4 EVAPORATION BASIN PLAN VIEW	
Crandall Canyon Mines Crandall Canyon P.O. BOX 910 EAST CARBON, UTAH	
DRAWN BY: PJ	SCALE: 1" = 100'
APPROVED BY: DH	DATE: 11 OCT. 2011
REVISION: 2	SHEET: DRAWING 4

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UTAH REGISTERED PROFESSIONAL ENGINEER
#152606
R. Jay Marshall
6/1/11

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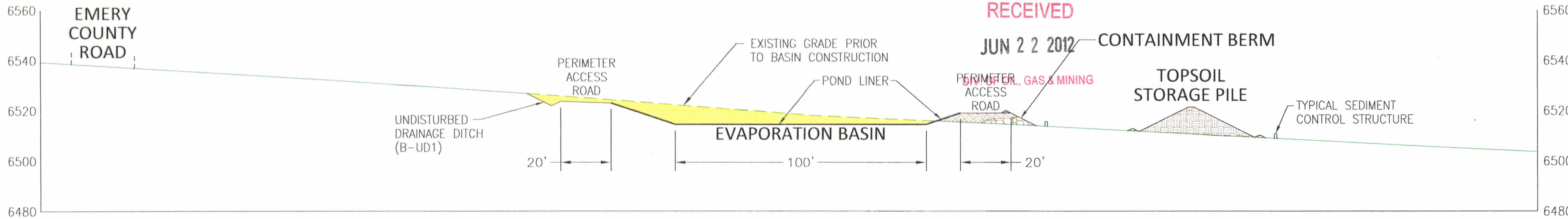
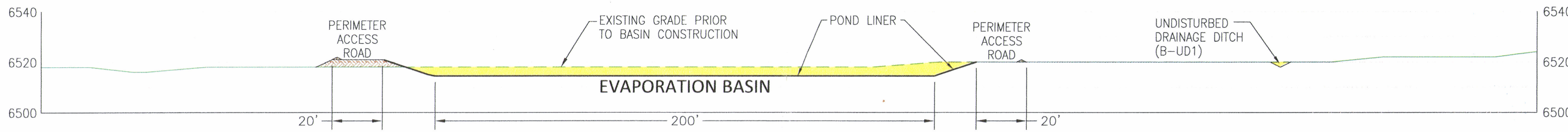


SECTION A-A'

NORTH-TO-SOUTH SECTION

SCALE: 1" = 40'

GENERAL NOTE:
SOLID HATCH DENOTES CUT AREAS. CROSS-HATCH DENOTES FILL AREAS.

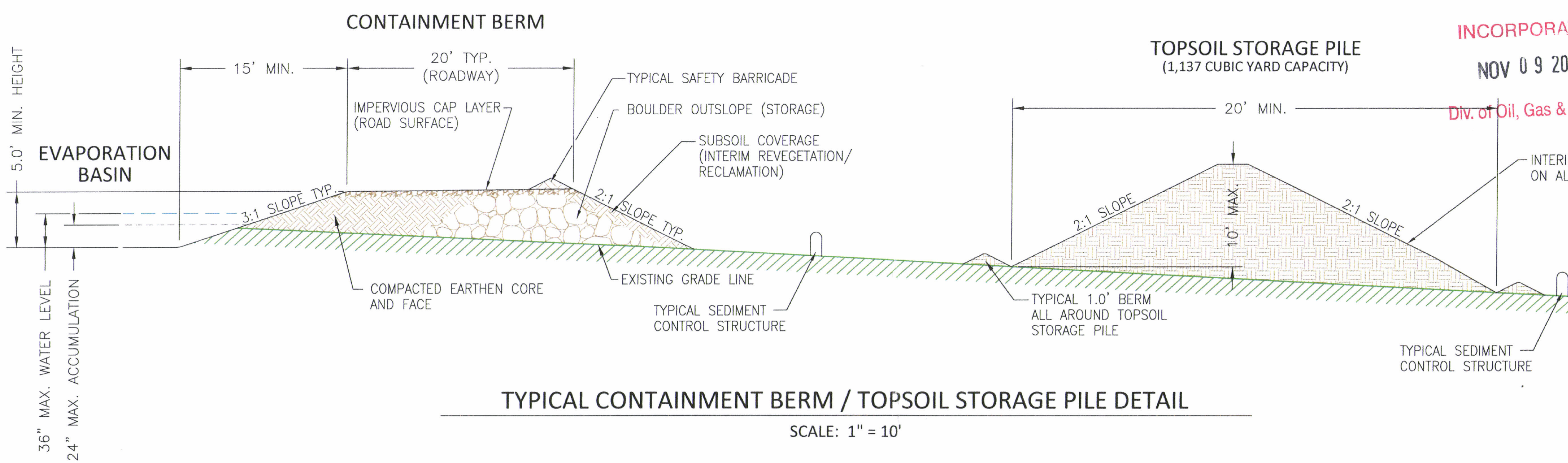


SECTION B-B'

WEST-TO-EAST SECTION

SCALE: 1" = 40'

I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.



TYPICAL CONTAINMENT BERM / TOPSOIL STORAGE PILE DETAIL

SCALE: 1" = 10'

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#152606
R. Jay Marshall
6/5/11

DRAWING 5

EVAPORATION BASIN CROSS SECTION, TYPICAL

Crandall Canyon Mines

Crandall Canyon
P.O. BOX 910
EAST CARBON, UTAH

DRAWN BY	PJ	SCALE	AS SHOWN
APPROVED BY	DH	DATE	11 OCT. 2011
REVISION	2	SHEET	DRAWING 5

G:\Current Drawings\Buildings & Construction\Crandall Canyon\Crandall Canyon Water Project\Evap Ponds\Working\Pond Plan.dwg, Drainage, 5/31/2012 1:36:08 PM

NOTES:
1. ALL DIMENSIONS ARE APPROXIMATE. FINAL LOCATIONS AND CONFIGURATIONS OF THE FACILITY STRUCTURES MAY VARY DEPENDING UPON CONDITIONS ENCOUNTERED DURING CONSTRUCTION.
2. ALL INTERIOR EVAPORATION BASIN SLOPES SHALL BE A MAXIMUM OF 3:1. ALL OTHER CUT/FILL SLOPES SHALL BE A MAXIMUM OF 2:1 UNLESS OTHERWISE NOTED.
3. MINIMUM INTERIOR RADII OF PERIMETER ACCESS ROAD SHALL BE 40'.
4. BOTTOM OF EVAPORATION BASIN ELEVATION = 6514.5'
5. VEGETATION GRUB PILES TO BE LOCATED AS CONVENIENT.

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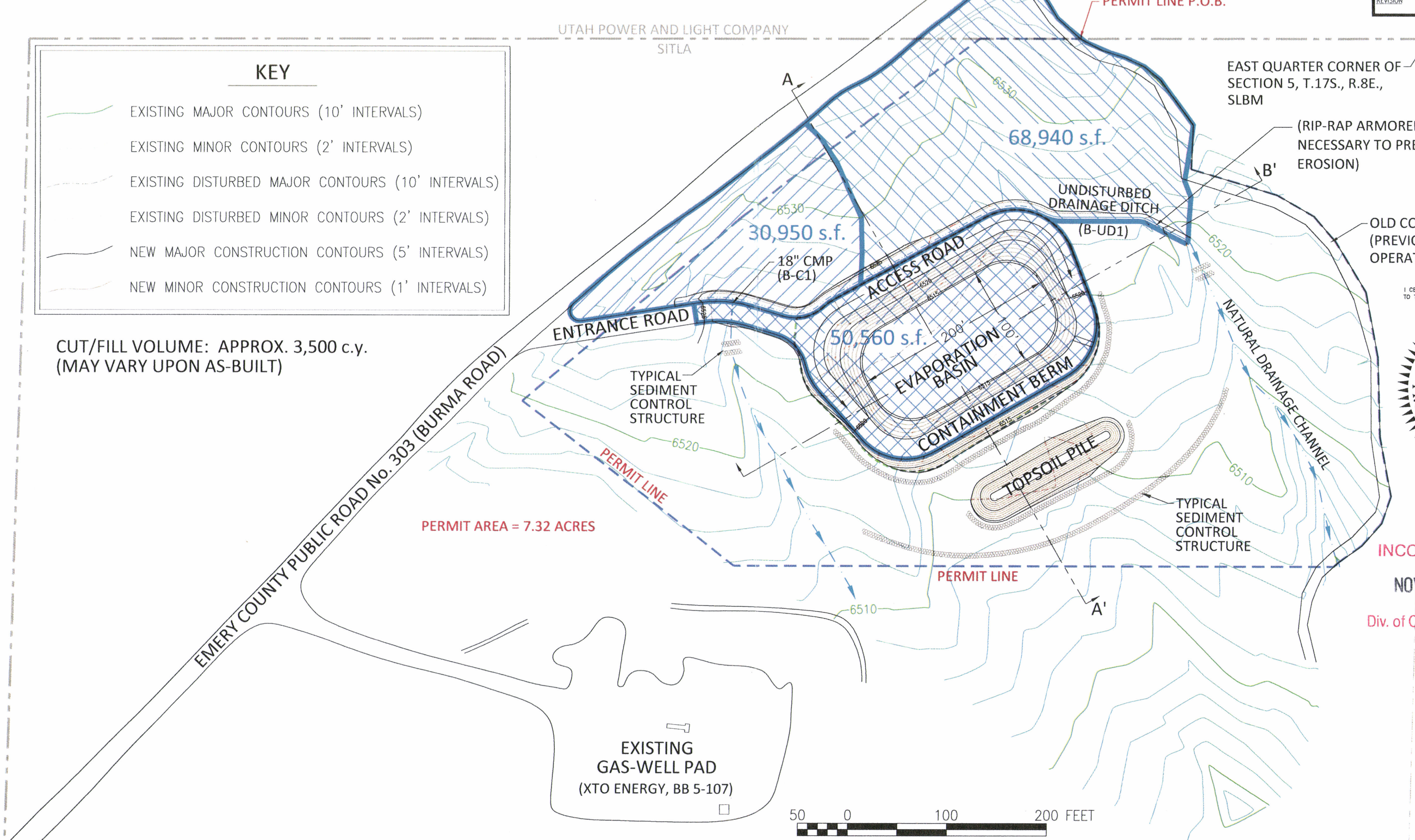
AREA LOCATED IN
SECTION 5,
TOWNSHIP 17 SOUTH,
RANGE 8 EAST, SLBM



I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

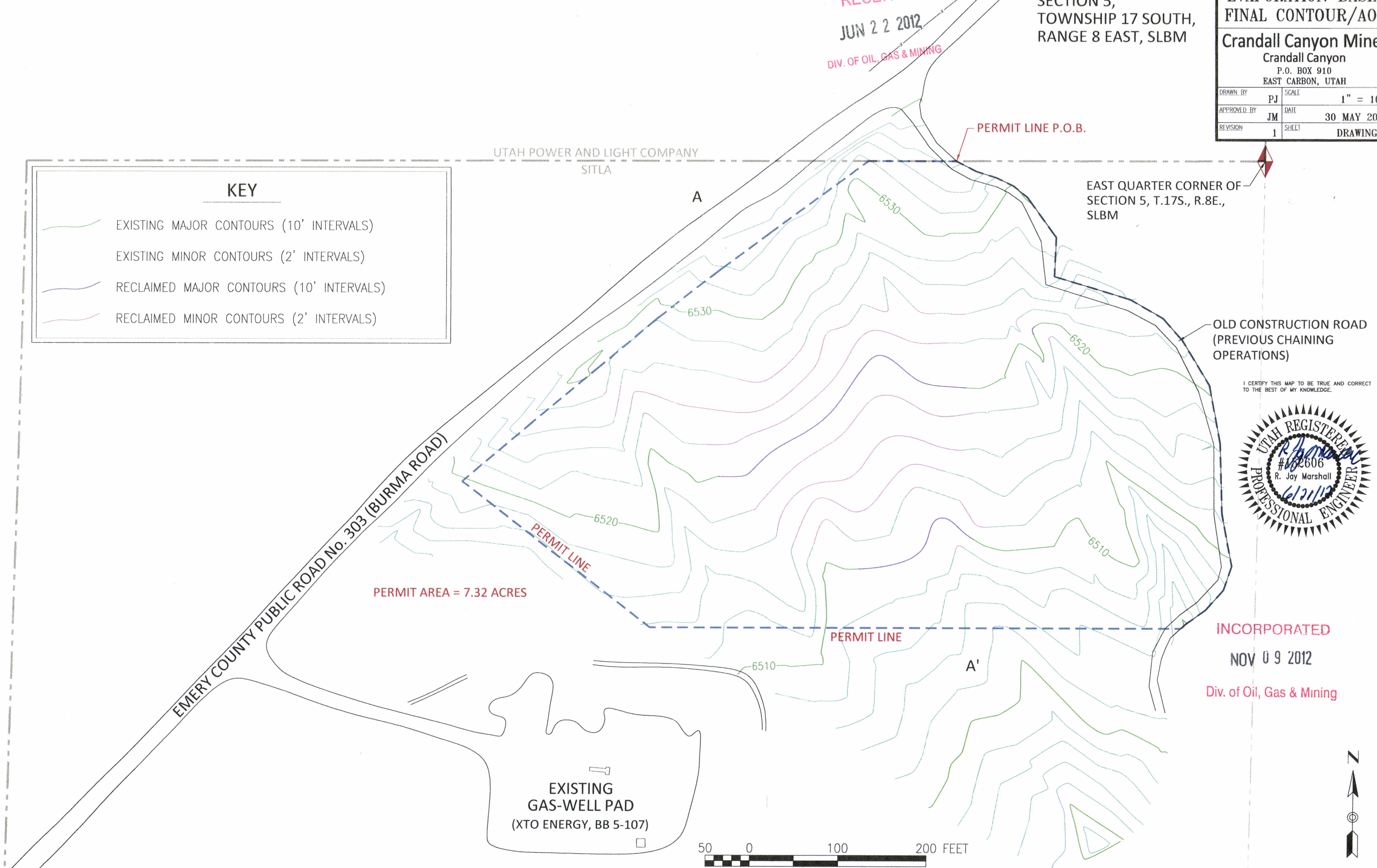
UTAH REGISTERED PROFESSIONAL ENGINEER
#152606
R. Jay Marshall
6/20/12

INCORPORATED
NOV 0 9 2012
Div. of Oil, Gas & Mining

DRAWING 6	
EVAPORATION BASIN UNDISTURBED DRAINAGE	
Crandall Canyon Mines Crandall Canyon P.O. BOX 910 EAST CARBON, UTAH	
DRAWN BY PJ	SCALE 1" = 100'
APPROVED BY DH	DATE 11 OCT. 2011
REVISION 2	SHEET DRAWING 6

G:\Current Drawings\Buildings & Construction\Crandall Canyon\Crandall Canyon Water Project\Evap Ponds\Working\Pond Plan.dwg, Reclamation, 5/30/2012 2:57:47 PM

NOTES:
1. FINAL RECLAMATION CONTOURS WILL CONFORM TO THE APPROXIMATE ORIGINAL CONTOURS.



DRAWING 7	
EVAPORATION BASIN FINAL CONTOUR/AOC	
Crandall Canyon Mines	
Crandall Canyon P.O. BOX 910 EAST CARBON, UTAH	
DRAWN BY: PJ	SCALE: 1" = 100'
APPROVED BY: JM	DATE: 30 MAY 2012
REVISION: 1	SHEET: DRAWING 7

ATTACHMENT 2

Pond Liner Information

NOVA-THENE®

WOVEN POLYOLEFIN FABRICS

RB8-6

DATA SHEET

A heavy duty fabric designed for protective covers, haystack covers, pit and pond liners and pool covers.

FABRIC SPECIFICATIONS

WEAVE	Woven black HDPE scrim using 1600 denier tapes
COATING	1.75 mil average, two sides (41 g/m², two sides)
COLOUR	Black or coloured coatings available silver/black available from stock
WEIGHT	6.0 oz/yd² (203 g/m²) +/- 10%

PERFORMANCE

GRAB TENSILE	Warp 210 lb 933 N	Weft 180 lb 801 N	ASTM D5034
TONGUE TEAR	Warp 70 lb 311 N	Weft 70 lb 311 N	ASTM D2261
MULLEN BURST	370 psi 2553 kPa		ASTM D3786
ACCELERATED UV WEATHERING[1]	> 80 % strength after 2000 hrs		ASTM G53

[1] Q.U.V. [A-340 Lamps]: 8 hrs UV @ 60° C, 4 hrs condensation @ 50° C

ROLL SPECIFICATIONS

CORES	4 inch (101.6 mm) or 5 inch (127 mm) I.D.
WIDTH	Up to 150 inches (-0 , +0.5) as ordered, 3.81 m (-0, +12 mm), 144" (3.66 m) available from stock
LENGTH	Minimum 500 yds/roll (457 m); up to 1000 yds/roll (914 m)

These values are typical data and are not intended as limiting specifications.

INCORPORATED

NOV 0 9 2012

Div. of Oil, Gas & Mining

DM2005(RB8-6)
Rev-5-01/01/05

INCORPORATED
EFFECTIVE:
JAN 19 2010
UTAH DIVISION OIL, GAS AND MINING
PRICE FIELD OFFICE

Intertape polymer group
P.O. Box 868, 50 Abbey Avenue, Truro, Nova Scotia, Canada B2N 5G6 Tel: 800-565-2000 Fax: 902 893-0220

ATTACHMENT 3

LEGAL DESCRIPTION OF LEASE/PERMIT AREA

Crandall Canyon Evaporation Basin Permit Area Legal Description

September 22, 2011

Beginning at a point located S 89°55'W a distance of 348.68' from the East Quarter Corner of Section 5, Township 17 South, Range 8 East of the SLBM to the East edge of the Old Construction Road; thence S 61°55'04" E a distance of 24.47'; thence S 72°25'21" E a distance of 23.90'; thence S 64°24'35" E a distance of 21.03'; thence S 50°52'27" E a distance of 20.76'; thence S 35°44'44" E a distance of 55.91'; thence S 02°28'53" W a distance of 44.51'; thence S 73°13'55" E a distance of 89.66'; thence S 60°15'20" E a distance of 43.41'; thence S 41°13'26" E a distance of 32.53'; thence S 31°03'49" E a distance of 59.87'; thence S 10°41'32" E a distance of 66.67'; thence S 01°55'27" E a distance of 79.97'; thence S 11°15'16" E a distance of 60.90'; thence S 18°48'58" W a distance of 28.67'; thence S 41°35'52" W a distance of 29.99'; thence S 53°54'34" W a distance of 28.12'; thence S 47°10'44" W a distance of 6.91'; thence West a distance of 601.02'; thence N 52°12'01" W a distance of 270.05'; thence N 49°44'24" E a distance of 101.47'; thence N 50°04'42" E a distance of 95.86'; thence N 49°46'07" E a distance of 88.53'; thence N 52°15'08" E a distance of 91.68'; thence N 53°24'39" E a distance of 73.72'; thence N 53°38'00" E a distance of 134.79'; thence East a distance of 99.89' to the point of beginning.

Permit area equals approximately 7.32 acres.

ATTACHMENT 4

ARCHEOLOGY REPORT
SENCO-PHENIX ARCHEOLOGICAL CONSULTANTS

An Intensive Cultural Resource Survey and Inventory of the Proposed Iron Evaporation Pond for the Crandall Canyon Mine
(SULA 1708)

Emery County, Utah

(SITLA Land)

PERFORMED FOR

Crandall Canyon Mine of Genwal Resources Inc.

In Accordance with SITLA and
Utah State Guidelines
Antiquities Permit #U11SC099s

SPUT-609
March 17, 2011

John A. Senulis

Principal Investigator

Abstract

SENCO-PHENIX performed an intensive cultural resource survey on the proposed **Iron Evaporation Pond for the Crandall Canyon Mine.** The proposed pond is located on land managed by the School and Institutional Trust Lands Administration (SITLA). The purpose of the survey was to identify and evaluate cultural resources that may exist within the project area.

No cultural resources were located and the potential for undetected remains is remote. A finding of **No Effect** is appropriate and **Archeological Clearance** is **recommended.**

Project Location

The survey area for proposed ca. 10 acre pond is in the SE/NW ¼ of Section 5, Township 17 South, Range 8 East, Emery County, Utah. The access to the proposed pond will be an existing, upgraded oilfield road. The project area is shown on the enclosed copy of U.S.G.S. 7.5' Composite Quad: Hiawatha, Utah (1978) & Red Point, Utah (1979). The proposed pond area was not staked but GIS measurements were taken prior to the fieldwork and the previously chained area easily delineated the project area.

Specific Environment

The project is within the rising foothills of the Wasatch Plateau to the west. The project is on the west bench of the perennial Fish Creek drainage of Huntington Creek. The Huntington Creek Valley has been deeply cut out of Mancos shale resulting in low benches above the perennial Creek. The project area has been chained in the somewhat distant past. The vegetation in the project area is regrowth Pinyon-juniper with sparse understory grading into Pinyon-juniper with medium sagebrush and various grasses and forbs. There is a riparian community along the banks of Huntington and Fish Creeks with cottonwood, Russian olive and tamarisk. Lower Huntington Creek near the current project area is a meandering stream with many old channels evident. Soils on the benches are tan clay gravelly loams mixed, in some areas, with shallow residual sandy loams. The foothills of the Wasatch Plateau are extremely rugged with isolated benches separated by deep, intermittent drainages.

Previous Research

A file search of the SENCO-PHENIX reports and online at the UDSH site on March 14, 2011, indicated that the following projects had been performed:

- 1980-1984, Several seismic line projects were performed in the general project area. No cultural resources were located in the current project area.
- 2002, Montgomery Archaeological Consultants performed several archeological surveys in Section 5. No significant cultural resources were located in proximity to the current project. (02-236)
- 2004, Montgomery Archeological Consultants surveyed a block for a gravel pit extending into Section 5. No cultural resources were located. (04-132)
- 2002, SENCO-PHENIX surveyed 30 well pads and access corridors in the vicinity of the current project, including the original Utah 32-559 and alternate. No significant cultural resource was located near the current project area. (02-332)
- 2005, Montgomery Archeological Consultants surveyed two pipeline corridors near the current project area. No cultural resources were located. (05-573)
- 2007, SENCO-PHENIX surveyed a pipeline corridor, partially in Section 5. No cultural resources were located. (07-924)

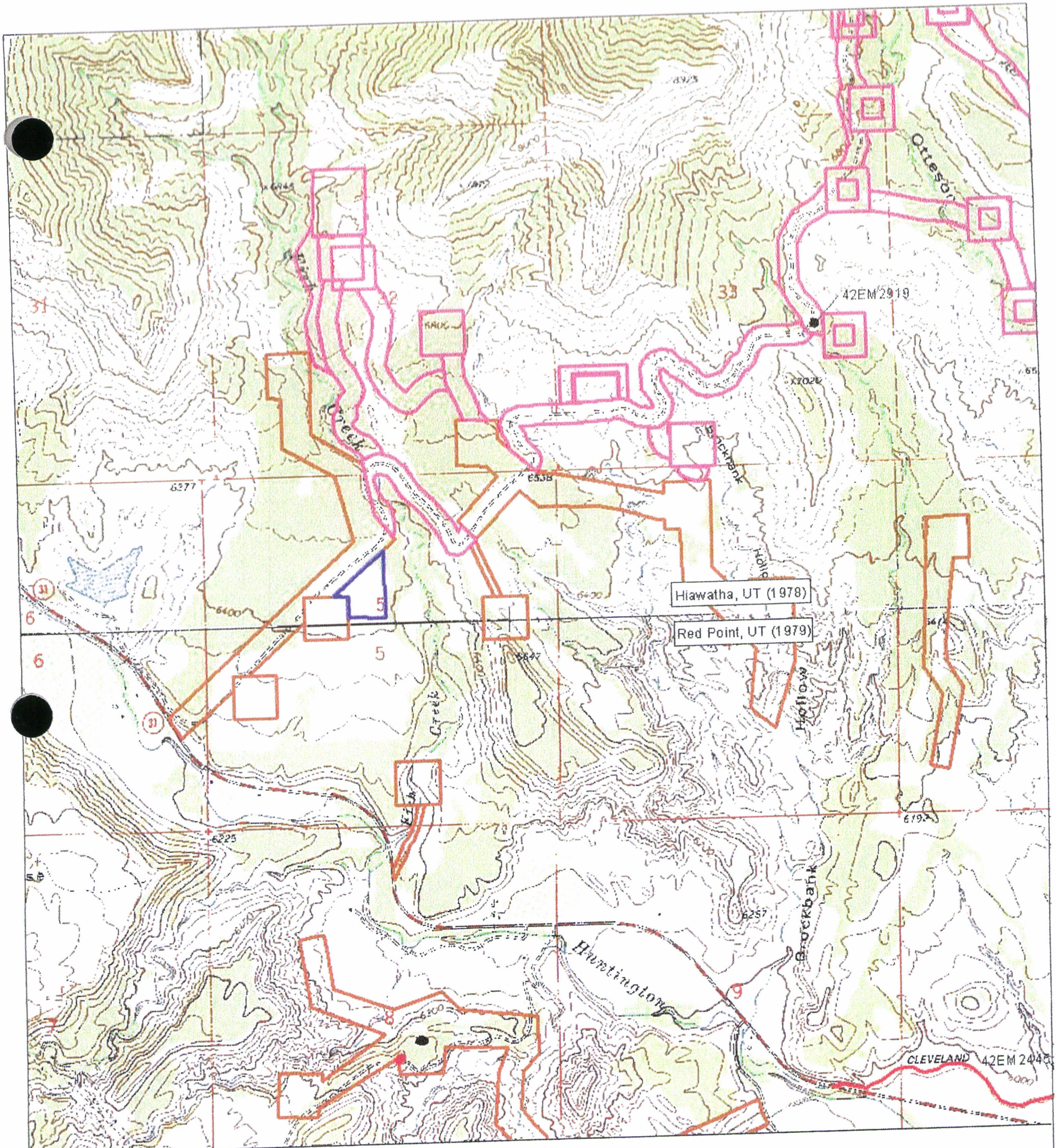
Methodology

John & Jeanne Senulis of SENCO-PHENIX performed a Class III intensive walkover survey of the proposed ca. 10 acre, pond area on March 15, 2011. Meandering parallel transects no further spaced than 15 meters were employed. Special attention was given to areas of subsurface soil exposure from animal burrowing, chaining, and erosion. All field notes are on file at the offices of SENCO-PHENIX in Price, Utah.

Findings and Recommendations

No cultural resources were located and the potential for undetected remains is remote. A finding of **no effect** is appropriate and **archeological clearance is recommended**.

These recommendations are subject to approval by the SITLA Land Manager and the Utah SHPO.



SENCO-PHENIX

N

Scale 1:24,000
1"= 2,000'

Current Survey
Previous Survey
Montgomery Survey
Eligible Sites
Ineligible Sites

Evaporation Ponds
Crandall Canyon Mine
Genwal Resources, Inc.
Section 5, T17S, R8E
Emery County, Utah
March 2011
SPUT-609
SULA 1708

INCORPORATED
NOV 0 9 2012
Div. of Oil, Gas & Mining

ATTACHMENT 5

VEGETATION AND WILDLIFE REPORT
MT. NEBO SCIENTIFIC

Vegetation, Wildlife Habitat
& Sensitive Species
at the
Evaporation Pond Area

for the
Crandall Canyon Mine

in
Emery County, Utah

Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
P.O. Box 337
Springville, Utah 84663
(801) 489-6937

Patrick D. Collins, Ph.D.

for

UTAH AMERICAN ENERGY
West Ridge Mine
P.O. Box 902
Price, UT 84501

July 2011

Table of Contents

Introduction

Utah American Energy (UAE) has proposed to create evaporation ponds to dry slurry material brought in from a nearby mine called the Crandall Canyon Mine. The Crandall Canyon Mine is located in Huntington Canyon of the Wasatch Plateau in Emery County, Utah, about 16 miles northwest of the town of Huntington. The evaporation pond site is roughly 12 acres in size and is located approximately 10 miles from the mine site (Map 1).

Disturbance to the Existing Plant Communities

Construction of the evaporation ponds will necessitate disturbance to the resident plant community of the area. Although the native Pinyon-Juniper plant community here has been chained in the past, presumably as a rangeland enhancement technique, the trees have returned and the area supports many native plant species as well as some that were probably seeded following the chaining operations. This document provides baseline information from the current existing plant community including vegetative structure, species presence, total cover, cover by species and woody species density. The data were recorded by quantitatively sampling the area in the growing season and prior to commencement of any construction activities.

Revegetation Success Standards

A Pinyon-Juniper Reference Area was also chosen and sampled during the same time period mentioned above. The reference area was chosen with respect to its similarities in geology, soils, slope, aspect, plant community composition and historical range treatments (i.e. the aforementioned chaining operations) as the area that has been proposed for new disturbance. The reference area could be used to represent future standards for final revegetation success for the evaporation pond area once it is reclaimed and re-seeded.

Methods

Methodologies used for this study were performed in accordance with the guidelines supplied by the State of Utah, Division of Oil, Gas and Mining (DOGM). Quantitative and qualitative data were recorded within the plant communities proposed for disturbance and reference area June 8-9, 2011.

The proposed Evaporation Pond Area was mapped by representatives of UAE prior to the vegetation sampling. The reference area chosen is approximately one acre in size and was marked in the field using a GPS instrument. The coordinates for the proposed disturbed Pinyon-Juniper Community in the Evaporation Pond Area and the Pinyon-Juniper Reference Area are provided below.

GPS Coordinates for Crandall Canyon Mine Evaporation Pond & Reference Areas (UTM, ZONE 12S, NAD 27)

Waypoint Name	Coordinates (m)	Area
AndCCEvap	0495718 E 4358370 N	Approx. center of the Proposed Disturbed Pinyon-Juniper Community in the Evaporation Pond Area
AndCCEvRef	0495707 E 4358171 N	Approx. center of the Pinyon-Juniper Reference Area

Sampling Design and Transect/Quadrat Placement

Transect lines for vegetation sampling in the study sites were placed randomly within the boundaries of the proposed disturbed and reference areas (see Map 1). The transect placement technique was employed with the goal to adequately sample a representative subset of the entire site. Once the transects were established, quadrat locations for sampling were chosen using random numbers from the transect lines with the objective to record data without preconceived bias.

Cover and Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition, cover by species, and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were notes such as: slope, exposure, grazing use, disturbance and/or other appropriate notes. Plant nomenclature follows *A Utah Flora* (Welsh et al., 2008).

Woody Species Density

Density of woody plant species for the proposed disturbed and reference areas were estimated using the point-quarter method. In this method, random points were placed on the sample sites and measured into four quarters. The distances to the nearest woody plant species were then recorded in each quarter. The average point-to-individual distance was equal to the square root of the mean area per individual. The number of individuals per acre was the end results of the calculations.

Sample Size & Adequacy

Sampling adequacy for cover and density was attempted by using the formula given below.

$$nMIN = \frac{t^2 s^2}{(dx)^2}$$

where,

$nMIN$	= minimum adequate sample
t	= appropriate confidence t-value
s	= standard deviation
x	= sample mean
d	= desired change from mean

With the values used for "t" and "d"above, the goal was to meet sample adequacy with 80% confidence within a 10% deviation from the true mean.

Statistical Analyses

Student's t-tests were employed to compare the total living cover and total woody species density of the proposed disturbed area with the reference area.

Photographs

Color photographs of the sample areas were taken at the time of sampling and have been submitted with this report.

Wildlife Habitat

The State of Utah, Division of Wildlife Resources (DWR), Utah Conservation Data Center (UCDC), Geographic Information System (GIS) maps and databases were consulted to review sensitive species as well as important wildlife habitat in and adjacent to the study areas.

Threatened, Endangered & Sensitive Species

In May 2011, and prior to recording quantitative data on the plant communities, a sensitive plant species survey was conducted. To initiate the studies in the area, appropriate resources were consulted (i.e. *State of Utah, Division of Wildlife Resources, Utah Conservation Data Center)* and other sources reviewed (sensitive species files at *Mt. Nebo Scientific, Inc.*) for potential species that are known to be rare, endemic, threatened, endangered or otherwise sensitive in the study area. Additionally, current lists of federally protected species – plant and animal – for Carbon County, Utah were reviewed and potential habitats for these species in the areas proposed for disturbance were addressed.

Raw Data

The raw data have been summarized on spreadsheets which are available upon request by UAE or DOGM.

Results

Proposed Disturbed Pinyon-Juniper Community

As mentioned earlier in this report, the native pinyon-juniper community that once existed here had been previously chained as a rangeland improvement technique. This activity must have been conducted several years ago because the trees have re-established themselves and are once again fairly sizable (see Figure 1).

The most common understory and overstory species in the study area was pinyon-pine (*Pinus edulis*). The only other overstory species present in the sample quadrats was Utah juniper (*Juniperus osteosperma*). Most of the plant species in the understory cover were native plants, but the most common plant was probably seeded following the chaining activities. This introduced grass species, crested wheatgrass (*Agropyron cristatum*), had a cover and frequency of 6.36% and 60.00%, respectively (Table 1). Other grasses present in the quadrats included Russian wildrye (*Elymus junceus*), galleta (*Hilaria jamesii*) and Indian ricegrass (*Stipa hymenoides*). Common species by cover and frequency in the proposed disturbed area were the woody plants, Utah juniper and fourwing saltbush (*Atriplex canescens*). The most common forbs were yellow cryptanth (*Cryptantha flava*) and gumweed aster (*Machaeranthera grindelioides*).

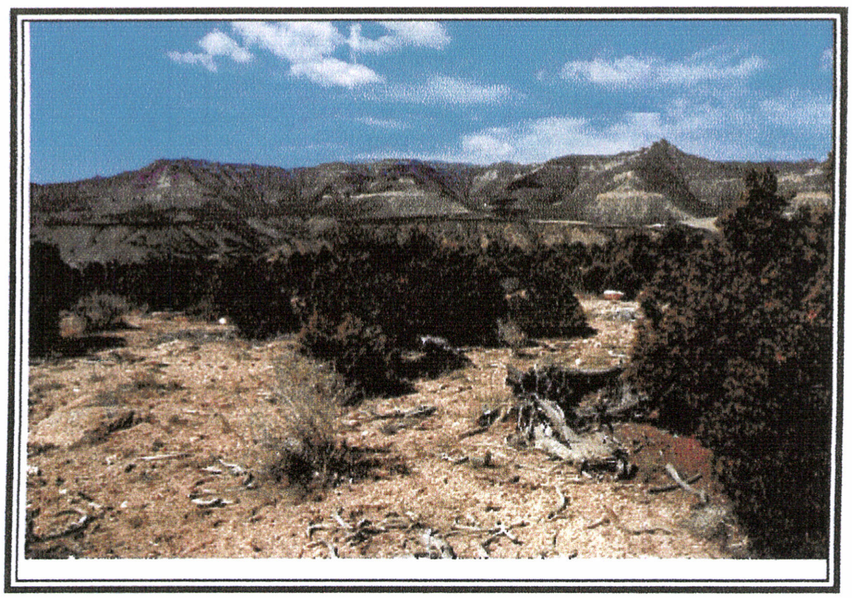


Figure 1: Proposed Disturbed Evaporation Pond Area

The total overstory in the study area was 5.40%, whereas the total living understory was estimated at 29.30% (Table 2-A). Woody plant species dominated the lifeform composition comprising 46.40%; forbs and grasses were nearly equally represented at 28.33% and 25.26%, respectively (Table 2-B).

The total woody species density in the proposed disturbed evaporation pond area was 1,095 plants per acre (Table 3). The dominate species here were pinyon-pine, Utah juniper, fourwing saltbush and rubber rabbitbrush (*Chrysothamnus nauseosus*). As can also be noted in Table 3, however, woody species density was represented by several plants.

Pinyon-Juniper Reference Area

Like the proposed disturbed area, pinyon-pine dominated the overstory cover in the Pinyon-Juniper Reference Area (Figure 2); the understory cover was dominated by pinyon-pine and crested wheatgrass (Table 4). Other more common understory species were Utah juniper, gumweed aster and pinnate tansy-mustard (*Descurainia pinnata*).

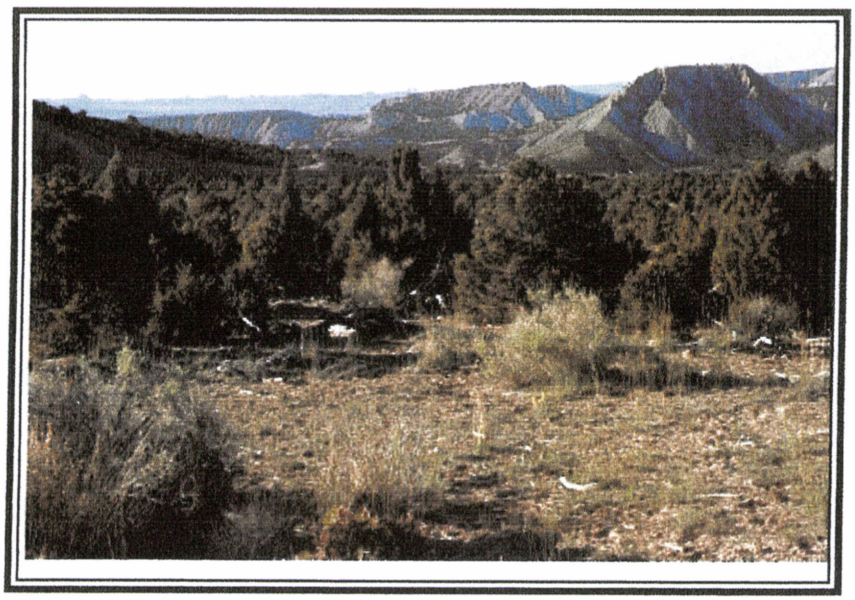


Figure 2: Pinyon-Juniper Reference Area

Understory cover in this area was estimated at 23.45%, whereas overstory cover was estimated at 3.50% (Table 5-A). Trees and shrubs at 43.79% of the composition in this area were nearly equally represented as the grass species at 30.71%; forbs were not far behind them at

25.50% (Table 5-B).

For the density measurements, the total number of woody plants per acre was estimated at 957 with the dominants here comprised of pinyon-pine, Utah juniper and fourwing saltbush (Table 6).

Table 1: Crandall Canyon Mine Evaporation Pond Area. Total cover, standard deviation and frequency by species (2011).

n=50

Proposed Disturbed Pinyon-Juniper (chained)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
Juniperus osteosperma	0.90	4.44	4.00
Pinus edulis	4.50	9.18	24.00
UNDERSTORY			
TREES & SHRUBS			
Artemisia nova	0.10	0.70	2.00
Atriplex canescens	2.50	7.37	14.00
Chrysothamnus nauseosus	1.40	4.80	8.00
Ephedra viridis	0.50	3.50	2.00
Gutierrezia sarothrae	0.20	0.98	4.00
Juniperus osteosperma	2.80	6.94	18.00
Pinus edulis	6.50	10.16	38.00
Yucca harmonize	0.70	3.00	8.00
FORBS			
Antennaria dimorpha	0.10	0.70	2.00
Cryptantha flava	2.80	5.41	32.00
Cryptantha paradoxa	0.10	0.70	2.00
Descurainia pinnata	0.60	1.55	14.00
Eriogonum ovalifolium	0.10	0.70	2.00
Euphorbia fendleri	0.20	0.98	4.00
Lappula occidentalis	0.20	1.40	2.00
Machaeranthera grindelioides	2.76	4.70	38.00
Malcomia africana	0.30	1.55	4.00
Penstemon sp.	0.04	0.28	2.00
Sisymbrium altissimum	0.24	1.01	6.00
GRASSES			
Agropyron cristatum	6.36	8.34	60.00
Elymus junceus	0.40	1.69	6.00
Hilaria jamesii	0.20	0.98	4.00
Stipa hymenoides	0.20	1.40	2.00

Table 2: Crandall Canyon Mine Evaporation Pond Area. Total Cover and composition (2011).		
		n=50
Proposed Disturbed Pinyon-Juniper (chained)	Mean Percent	Standard Deviation
A. TOTAL COVER		
Overstory (O)	5.40	9.79
Understory (U)	29.30	10.44
Litter	18.60	12.49
Bareground	32.20	14.87
Rock	19.90	12.47
O + U	34.70	14.91
B. % COMPOSITION		
Trees & Shrubs	46.40	31.51
Forbs	28.33	25.57
Grasses	25.26	27.35

Table 3: Crandall Canyon Mine Evaporation Pond Area. Woody Species Density (2011).	
Proposed Disturbed Pinyon-Juniper (chained)	n=50
SPECIES	**Number/Acre**
Atriplex canescens	131.42
Cercocarpus montanus	21.90
Chrysothamnus nauseosus	131.42
Ephedra viridis	5.48
Gutierrezia sarothrae	21.90
Juniperus osteosperma	284.74
Opuntia sp.	16.43
Pinus edulis	399.73
Rhus aromatica	5.48
Yucca harrimaniae	76.66
TOTAL	**1095.15**

Table 4: Crandall Canyon Mine Reference Area. Total cover, standard deviation and frequency by species (2011).

n=40

Pinyon-Juniper (chained) Reference Area	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
Juniperus osteosperma	0.88	4.17	5.00
Pinus edulis	2.63	6.61	15.00
UNDERSTORY			
TREES & SHRUBS			
Artemisia tridentata wyomingensis	0.25	1.56	2.50
Atriplex canescens	0.88	4.17	5.00
Chrysothamnus nauseosus	0.75	4.68	2.50
Juniperus osteosperma	3.53	7.43	22.50
Pinus edulis	6.38	11.11	35.00
Yucca harrimaniae	0.25	1.56	2.50
FORBS			
Cryptantha flava	0.98	3.10	10.00
Descurainia pinnata	1.20	2.63	20.00
Eriogonum ovalifolium	0.25	1.56	2.50
Euphorbia fendleri	0.88	2.71	10.00
Machaeranthera grindelioides	1.68	3.76	22.50
Penstemon sp.	0.13	0.78	2.50
Sisymbrium altissimum	0.13	0.78	2.50
GRASSES			
Agropyron cristatum	5.95	6.92	57.50
Stipa hymenoides	0.25	1.09	5.00

Table 5: Crandall Canyon Mine Reference Area. Total Cover and composition (2011).		
		n=40
Pinyon-Juniper (chained) Reference Area	**Mean Percent**	**Standard Deviation**
A. TOTAL COVER		
Overstory (O)	3.50	7.52
Understory (U)	23.45	10.05
Litter	23.88	19.54
Bareground	33.18	15.57
Rock	19.50	14.61
O + U	26.96	13.45
B. % COMPOSITION		
Trees & Shrubs	43.79	36.52
Forbs	25.50	28.63
Grasses	30.71	33.31

Table 6: Crandall Canyon Mine Reference Area. Woody Species Density (2011).	
Pinyon-Juniper (chained) Reference Area	n=40
SPECIES	**Number/Acre**
Artemisia nova	5.98
Artemisia tridentata wyomingensis	5.98
Atriplex canescens	113.64
Cercocarpus montanus	23.92
Chrysothamnus nauseosus	23.92
Ephedra viridis	23.92
Gutierrezia sarothrae	5.98
Juniperus osteosperma	263.17
Opuntia sp.	17.94
Pinus edulis	406.71
Yucca harrimaniae	65.79
TOTAL	**956.97**

High Value Wildlife Habitat

The DWR's UCDC database and GIS maps were consulted for high-value wildlife habitats. Of the species maintained on the database, important habitat of four species have been mapped by biologists from DWR within or adjacent to the study area. The species and habitat values are described below.

First, Rocky Mountain elk (*Cervus canadensis*) habitat was located in the area; "crucial" winter range was mapped throughout the entire area.

Next, mule deer (*Odocoileus hemionus*) habitat has also been mapped in the area by DWR. The habitat was also classified as "crucial" winter range throughout the study area.

Also, black bear (*Ursus americanus*) habitat was present in the study area. This habitat was listed as year-long and classified as "substantial" habitat by DWR.

Finally, the pinyon-juniper zone in the area could be used by ferruginous hawk (*Buteo regalis*) because they often nest in the trees of this community.

Threatened, Endangered & Sensitive Species

A table of federally listed threatened, endangered and candidate species for Carbon County is provided below (Table 7). The table shows the status of the species, along with site-specific notes about the area proposed for disturbance and the probabilities of their occurrences in the study area.

Table 7: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding potential impacts to them as a result of the proposed Evaporation Pond Study Area.

NOTE: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS). This list includes both current and historic records. (Last updated on March 29, 2011).

Scientific Name	Common Name	Status*	Site-Specific Notes
PLANTS			
Pediocactus winkleri	Winkler Footcactus	T	A field survey was conducted for this species in May 2011. Neither the plant nor its habitat were found in the Evaporation Pond Area. Therefore, construction of the ponds is not expected to impact this species.
Pediocactus despainii	Despain Footcactus	E	A field survey was conducted for this species in May 2011. Neither the plant nor its habitat were found in the Evaporation Pond Area. Therefore, construction of the ponds is not expected to impact this species
Schoencrambe barnebyi	Barneby's Schoencrambe	E	This plant is usually found within the Chinle Formation, which is not found in the evaporation pond area. A field survey was conducted for this species in May 2011. Neither the plant nor its habitat were found in the Evaporation Pond Area. Therefore, construction of the ponds is not expected to impact this species
Sclerocactus wrightiae	Wright Fishhook Cactus	E	A field survey was conducted for this species in May 2011. Neither the plant nor its habitat were found in the Evaporation Pond Area. Therefore, construction of the ponds is not expected to impact this species
Townsendia aprica	Last Chance Townsendia	T	A field survey was conducted for this species in May 2011. Neither the plant nor its habitat were found in the Evaporation Pond Area. Therefore, construction of the ponds is not expected to impact this species

Table 7: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding potential impacts to them as a result of the proposed Evaporation Pond Study Area.

NOTE: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS). This list includes both current and historic records. (Last updated on March 29, 2011).

Cycladenia humilis var. jonesii	Jones Cycladenia	T	A field survey was conducted for this species in May 2011. Neither the plant nor its habitat were found in the Evaporation Pond Area. Therefore, construction of the ponds is not expected to impact this species
WILDLIFE			
Gila cypha	Humpback Chub	E	Humpback chub in Utah are now confined to a few white-water areas in the Colorado, Green, and White Rivers. These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. Therefore, construction of the ponds is not expected to impact this species.
Gila elegans	Bonytail	E	The bonytail is a very rare minnow originally native to the Colorado River system. These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. Therefore, construction of the ponds is not expected to impact this species.
Mustela nigripes	Black-footed Ferret	Ex	Black-footed ferret habitat is primarily prairie grasslands. The ferret has a diet consisting of almost 90% prairie dogs. Prairie dog populations do not occur in the proposed evaporation pond area. It is very unlikely that ferrets occur in the immediate area. Therefore, construction of the ponds is not expected to impact this species.
Ptychocheilus lucius	Colorado Pikeminnow	E	The Colorado pikeminnow is a fish that prefers medium to large rivers. With the loss of habitat they are now restricted to the upper Colorado River system. These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. Therefore, construction of the ponds is not expected to impact this species.

Table 7: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding potential impacts to them as a result of the proposed Evaporation Pond Study Area.

NOTE: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS). This list includes both current and historic records. (Last updated on March 29, 2011).

Xyrauchen texanus	Razorback Sucker	E	This species prefers slow backwater habitats and impoundments in the Colorado River system. Utah Division of Wildlife Resources distribution maps of this species for Carbon County shows to occur near the Green River in extreme eastern portion of the county. These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. Therefore, construction of the ponds is not expected to impact this species.
Coccyzus americanus	Yellow-billed Cuckoo	C	DWR database information states that historically, cuckoos were probably common to uncommon summer residents in Utah and across the Great Basin. The current distribution of yellow-billed cuckoos in Utah is poorly understood, though they appear to be an extremely rare breeder in lowland riparian habitats statewide. DWR information also states that currently, the range of the cuckoo is limited to disjunct fragments of riparian habitats from northern Utah, western Colorado, southwestern Wyoming, and southeastern Idaho southward into northwestern Mexico and westward into southern Nevada and California. Although the possibility exists that historically this species could be seen in Emery County, it is highly unlikely that it occurs within the evaporation pond area due to the limited habitat for this species. Therefore, construction of the ponds is not expected to impact this species or its habitat.
Strix occidentalis lucida	Mexican Spotted Owl	T	In Utah the Mexican spotted owl is rare, but when it occurs it is sometimes in various forest types, but more commonly in steep rocky canyons, nesting in caves or cliffs of steep walled canyons. This habitat does not exist in the immediate evaporation pond area. DWR distribution maps do not show the owl in the study area. Therefore, construction of the ponds is not expected to impact this species.

Table 7: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding potential impacts to them as a result of the proposed Evaporation Pond Study Area.

NOTE: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS). This list includes both current and historic records. (Last updated on March 29, 2011).

Centrocercus urophasianus	Greater Sage-Grouse	C	Greater sage-grouse inhabit sagebrush zone in Utah's mountain valleys and foothills. No brooding or winter habitat for this species is shown on the DWR database. The sagebrush zone is not present in the study area. There should be no impacts to this species as a result of construction and operation of the evaporation pond area.
Canus lupus	Gray Wolf	E	Although once common in Utah, the gray wolf was extirpated (exterminated) from the state by early settlers. Although they have been reintroduced in adjacent states, and may move into the state, reintroduction to Utah has been planned to-date. The gray wolf can live in many habitats, but there will be no impacts to this species as a result of construction and operation of the Settling Pond Area.
Lynx canadensis	Canada Lynx	T	Lynx usually occur in mature forests having dense undergrowth. They can also be found in more open forests, rocky areas or tundra. This habitat in not found within the Emery Mine permit area. Therefore, subsidence caused by underground mining is not expected to impact this species.

* Status

C = Candidate

E = Endangered

T = Threatened

Ex = Extirpated

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Discussion & Conclusions

Statistical Comparisons

When the **total living cover** of the proposed disturbed area was compared with the reference area, the differences were statistically significant (Figure 3). The proposed disturbed cover was somewhat greater than that of the reference area.

Figure 3. A statistical comparison (Student's t-tests) of the **total living cover** between the proposed disturbed Evaporation Pond Area and Reference Area.

	$\bar{x}$	s	n	t	df	SL
Evaporation Pond						
Proposed Disturbed:	34.70	14.91	50			
Reference Area (P-J)	26.95	13.45	40			
t-test				2.5581	88	$p<0.05$

$\bar{x}$ = mean
s = standard deviation
n = sample size
t = Student's t-value
df = degrees of freedom
n/a = not applicable
p = probability
SL= Significance Level
N.S.=Non-Significant
P-J = Pinyon-Juniper

When, however, the proposed disturbed **woody species density** was compared to the reference area, the differences were not statistically significant (Figure 4).

Figure 4. A statistical comparison (Student's t-tests) of the **woody species density** between the proposed disturbed Evaporation Pond Area and Reference Area.

	$\bar{x}$	s	n	t	df	SL
Evaporation Pond						
Proposed Disturbed	1095.15	580.32	50			
Reference Area (P-J)	956.97	437.07	40			
t-test				1.2486	88	N.S.

$\bar{x}$ = mean
s = standard deviation
n = sample size
t = Student's t-value
df = degrees of freedom
n/a = not applicable
p = probability
SL= Significance Level
N.S.=Non-Significant
P-J = Pinyon-Juniper

Obviously, there is no way of knowing whether or not the differences between two population means will be statistically significant until the researcher summarizes the datasets. In this case, the living covers were dissimilar enough to be statistically significant, but the woody species density were not enough dissimilar for that result. Nonetheless, reasons for accepting the reference area for revegetation success standards include: 1) both areas, the proposed disturbed area and the reference area, are very close in proximity and have nearly identical slope, exposure, soils and other environmental variables, 2) neither area exist in their native or natural condition – both areas have been disturbed in the past by chaining operations; the fact that one area has more cover than the other area may be merely because it may have received more seed when the areas were re-seeded following the chaining operations, and 3) the areas had very similar dominant plant species and 4) there was no significant difference in the woody species densities of the two areas.

If accepting the proposed Pinyon-Juniper Reference Area for use of future revegetation success standards is unacceptable to the regulatory agency biologists, the issue could be resolved by one of several ways. First, a new reference area could be chosen and sampled anytime (this should not delay the project). Next, agreement could be made to use the current total living cover value (34.70%) for the success standard at the time of final reclamation, rather than the cover value of the reference area when it is sampled at the time of final reclamation. Finally, at the time of final revegetation sampling, the standard could be set that the reclaimed land would be 29% more than the Pinyon-Juniper Reference Area (in 2011, the total living cover of this reference area was 29% greater than the proposed disturbed area).

In conclusion, it is the opinion of this author that the Pinyon-Juniper Reference Area sampled and described in this report could be used for future revegetation success standards.

Map 1: Crandall Canyon Evaporation Pond Area

Date: 7/1/2011

Scale: 1:7,000

Map by: P.D. Collins and J. Magrath

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ATTACHMENT 6

ORDER 2 SOILS SURVEY
LONG RESOURCE CONSULTANTS

Order 2 Soil Survey

of

Crandall Ponds Project

for

Crandall Canyon Mine

Prepared by

Robert E. Long, CPSS

Long Resource Consultants, Inc.

1960 W Deep Creek Road
Morgan, Utah 84050
(801) 791-3447

for

Utah American Energy.

Crandall Canyon Mine
794 "C" Canyon Road
East Carbon, Utah 84520

July 25, 2011

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Project Purpose
The purpose of this soil survey was to determine the suitability of soil in the proposed Crandall Ponds project area for reclamation suitability. The purpose of the proposed ponds is to dry sediment taken from water treatment ponds located at the Crandall Canyon mine. This order 2 soil survey of the proposed project area was 12.23 acres.

General Site Description
The proposed Crandall Ponds project area is located near the mouth of Huntington Canyon in Emery County, Utah, figure 1. The proposed project area is approximately 5.4 miles northwest (302°) of Huntington, Emery County, Utah and approximately 1.4 miles east southeast of the Huntington power plant.

The project area is located in Lot 6, Section 5, Township 17 South, Range 8 East, Salt Lake base meridian.

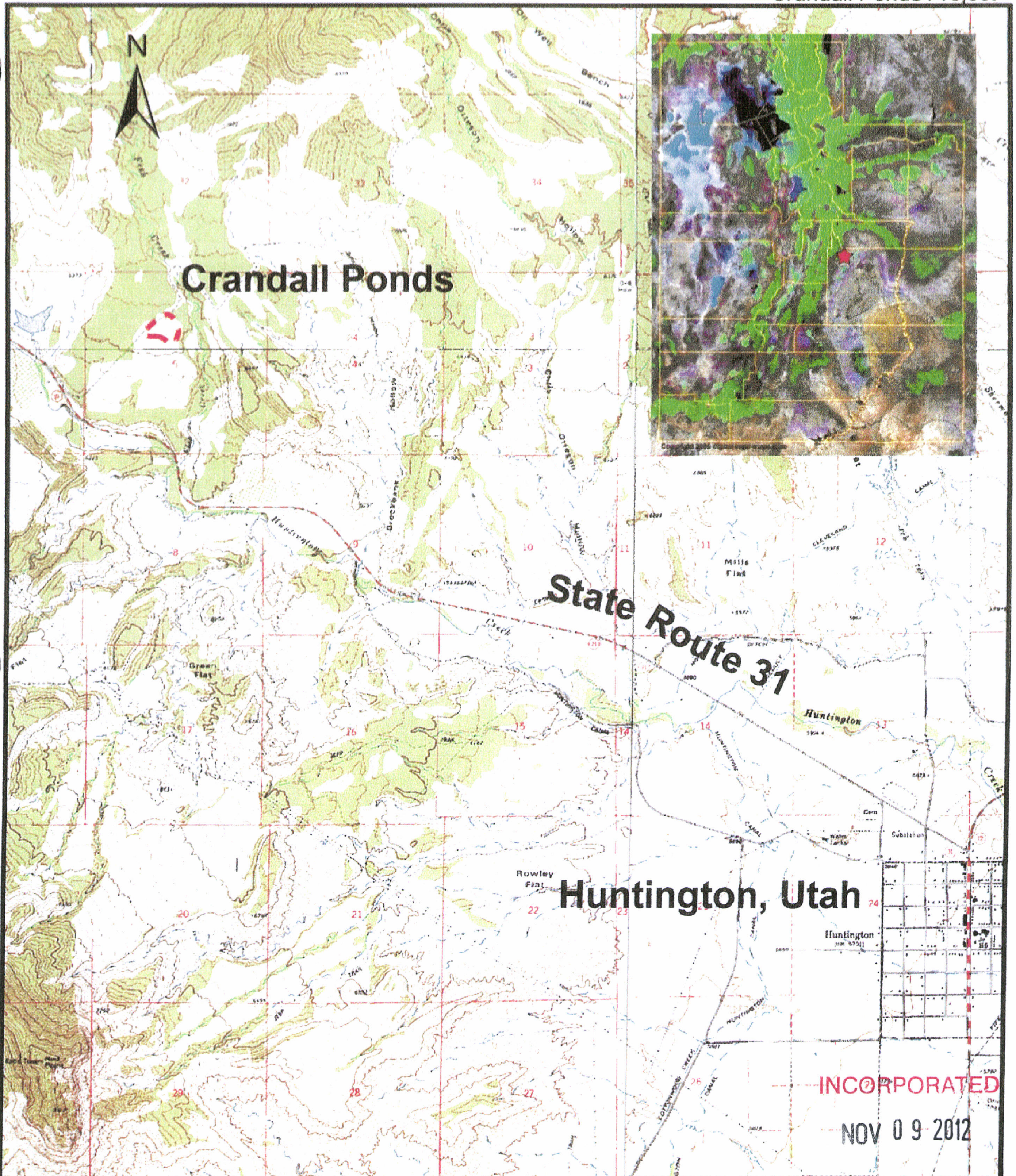
The project area is situated on an alluvial fan that is on top of a terrace pediment mantle. The terrace consists of alluvium and colluvium derived from the nearby sandstone of the North Horn, Blackhawk, Castlegate, and Mancus formations (Witkind, et. al., 2006). The pediment mantle is underlain by sandstone and shale of the Mancos formation (Witkind, et. al., 2006). The thickness of the pediment mantle is variable, but neither sandstone nor shale parent material was observed in the soil test pits.

Shallow ephemeral drainages flow across the proposed project area from northwest to southeast.

Climate
The Emery Area Soil Survey, Parts of Emery, Carbon, Grand, and Sevier Counties, Utah (UT623) published by the Natural Resource Conservation Service (NRCS, 2007) determined that the project area has an aridic moisture regime and a mesic temperature regime. The soil survey indicates that average annual precipitation for proposed project location ranges from 9 to 12 inches, based on the BMD soil map unit.

The average annual precipitation GIS layer for Utah (Daly and Taylor, 1998) indicates that the estimated average annual precipitation for the proposed Crandall Ponds project location is 12 to 13 inches.

The closest weather station of record with similar climatic conditions is at Hiawatha, Utah. Average annual precipitation at Hiawatha, Utah is 13.71 inches (Western Regional Climate Center, 2011). Table 1 contains the monthly average precipitation data for Hiawatha, Utah. The period of record is 1916 to 1992.



Crandall Ponds - Order 2 Soil Survey

Figure 1. Location of Crandall Ponds Study Area in Emery County, Utah. Inset shows gerneral location in state of Utah.

July 25, 2011

1 inch = 4,000 feet

Crandall Ponds Project

Crandall Ponds - Soil Survey

Figure 2.
Soil Profile Locations &
NRCS Soil Map Units

N

July 25, 2011 1 inch = 200 feet

Soil Profile Locations

Evap Ponds Perimeter

Emery Area Soil Survey

Table 1. Climate data for Hiawatha, Utah.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	32.7	36.8	43.9	54.5	64.2	74.8	81.4	78.7	71.0	58.8	43.3	34.7	56.2
Average Min. Temperature (F)	13.6	17.5	22.8	31.2	39.5	48.5	55.6	54.1	46.3	36.2	23.8	16.3	33.8
Average Total Precipitation (in.)	0.94	1.04	1.10	0.95	1.18	0.97	1.31	1.80	1.37	1.20	0.84	1.01	13.71
Average Total Snowfall (in.)	14.1	12.8	9.8	2.9	1.6	0.0	0.0	0.0	0.2	1.0	6.3	12.1	60.7
Average Snow Depth (in.)	4	4	1	0	0	0	0	0	0	0	1	2	1

NRCS Soil Map Units

The proposed project area is within the Emery Area, Utah, Parts of Emery, Carbon, Grand, and Sevier Counties (NRCS 2007). Figure 2 shows the relationship between the proposed project area and the NRCS soil survey.

Soil map unit BMD, Strych very stony very fine sandy loam, 3 to 30 percent slopes, covers the entire proposed project area.

Strych soils are "very deep" (greater than 60 inches to bedrock), well drained, moderately permeable soils that formed in mixed alluvium and colluvium derived from sandstone, shale and conglomerate (NRCS 2011). They contain 35 to 75 percent rock fragments and have clay content ranging from 8 to 17 percent. They have an aridic moisture regime that borders on ustic. Strych soil profiles have cambic and calcic horizons.

The Emery Area, Utah, Parts of Emery, Carbon, Grand, and Sevier Counties (NRCS 2007) rates the potential of using Strych soils in map unit BMD for impoundments as "Very Limited." The primary limiting features are listed as slope and seepage.

Emery Area soil map units closely adjacent to the proposed project area include:

C 37 Zigzag-Yatne-Badland complex, 25 to 70 percent slopes
C113 Yatne very stony loam, 3 to 20 percent slopes
NGG2 Gerst-Strych-Badland complex, 30 to 70 percent slopes

Gerst soils are shallow to weathered shale (NRCS 2011).

Yatne soils are similar to Strych soils but they have an ustic moisture regime that borders on aridic and contain 18 to 27 percent clay (NRCS 2011).

Zigzag soils are moderately deep to weathered shale and contain greater than 35 percent rock fragments (NRCS 2011).

Soil Survey Methods

This soil survey was conducted by traversing the proposed project area. Representative soil profile descriptions were collected using the protocols outlined in the *Field Book for Describing and Sampling Soils* (Schoeneberger et. al., 2002). Three soil profiles were dug with a backhoe at the general locations where drying ponds may be constructed. Profile descriptions collected by Robert Long, Certified Professional Soil Scientist (ARPACS certification number 02346) are in appendix A. Field data sheets for the soil profiles are in appendix B.

Rock fragments were visually estimated during examination of the soil profiles. Estimated values are on a percent by weight basis.

Samples were collected from horizons in the three soil profiles and submitted for laboratory analysis. Table 2 lists the soil properties that were analyzed.

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

Topsoil Suitability Parameters	
Paste pH	Available Phosphorus
Saturation percent	Particle Size Analysis (% very fine sand, sand, silt, and clay)
Electrical Conductivity (ECe)	Organic Matter Percent
Soluble Na, K, Mg, and Ca	$CaCo_3$ Percent
Sodium Adsorption Ratio	Extractable Potassium

Results of the laboratory analysis are contained in appendix E.

Suitability of the soil material for use as topsoil was determined using the evaluation parameters established by the Utah Division of Oil, Gas and Mining in *Guidelines for Management of Topsoil and Overburden* (Utah DOGM, 2005), Table 3.

Table 3. Soil suitability and unsuitability criteria (Utah DOGM, 2005).

Criteria	Good	Fair	Poor	Unacceptable
Saturation %	25 to 55	≥56 to 80	<25 or >80	
pH	6.5 to 8.2	6.0 to 6.4 8.2 to 8.5	5.5 to 6.0 8.6 to 9.0	<5.5 >9.0
EC (mS/cm 25°C)	0 to 4	4 to 8	8 to 15	>15
SAR	0 to 4	5 to 10	10 to 14	>14
$CaCO_3$ %	<15	15 to 30	>30	
Texture	sl, l, sil, scl, vfsl, fsl	cl, sicl, sc, ls, lfs	sic, s, sc, c, cos, fs, vfs	g, vcos
Total Organic Carbon	<10%			≤10%
Available Water Capacity (in/in)	>0.10 moderate	0.05 to 0.10 low	<0.05 very low	
K factor	<0.37	0.37	>0.37	

Soil Profiles

Locations of the three soil profiles examined, described, and sampled are shown in figure 2. The classification of each soil profile was determined using the *Keys to Soil Taxonomy, Eleventh Edition* (NRCS, 2010). Table 4 contains the taxonomic classification of the soil profiles.

Table 4. Taxonomic classification of soil profiles examined in the Crandall Ponds project area.

Soil Profile	Series	Taxonomic Classification
11UTCR01	Strych	Ustic Haplocalcid, loamy-skeletal, mixed, superactive, mesic
11UTCR02	Strych	Ustic Haplocalcid, loamy-skeletal, mixed, superactive, mesic
11UTCR03	Strych Taxadjunct	Ustic Haplocalcid, loamy-skeletal, carbonatic, superactive, mesic

Soil profiles 11UTCR01 and 11UTCR02 fit within the range of characteristics for the Strych series. Profile 11UTCR03 is similar to the Strych series except for the carbonates in the control section (weighted average 48 percent), which is high enough to make the mineralogy class carbonatic.

There is a significant amount of rock fragments ranging from gravels to boulders at each of the soil profile locations. The average amount and size of rock fragments was evaluated by conducting a twenty pace transect near each of the soil profile locations. The average amount of rock fragments from the three transects was 12 percent gravels, 7 percent cobbles, 4 percent stones, and 24 percent boulders. The boulders ranged in size from two feet to ten feet or greater.

Soil profile descriptions are in appendix A and the field description sheets are in appendix B. Photos of the soil profile boxes are in appendix C. Photos of the soil profiles and project area are in appendix D.

Order 2 Soil Survey Map Units

Since the proposed project area is small and the soils appeared uniform, no special soil map units were set up for this investigation. NRCS soil map unit BMD, Strych very stony very fine sandy loam, 3 to 30 percent slopes, is representative of soils in the project area.

Laboratory Analysis

Results of the laboratory analysis of soil samples from the three soil profiles in the proposed project area are in appendix E. None of the test results were in the "Unacceptable" category based on the *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005).

Soil pH was in the "Poor" category (8.6 to 9.0) for 9 of the 20 soil horizons, based on the *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005). These elevated pH values are primarily the result of "Poor" calcium carbonate levels.

SAR values were in the "Fair" category (5 to 10) for four of the soil horizons, based on the *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005). These soil horizons are at the bottom of the soil profiles at depths of 120 to 170 cm (below 47 to 67 inches). This material should not be salvaged for use as topsoil, but will be suitable for use as subsoil.

Soil textures are generally sandy loam, sandy clay loam, and loam. The texture in one horizon near the bottom of 11UTCR03 (140 to 170 cm) is loamy sand which is in the "Fair" category, based on the *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005).

Calcium carbonate percentages are in either the "Fair" or "Poor" category for all of the soil horizons, based on the *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005). These values can be expected for soils classified as Haplocalcids in soil taxonomy. Soils with elevated calcium carbonate levels can be limiting to soil reclamation, but successful revegetation can be achieved by limiting topsoil to materials with lower calcium carbonate values and using seed mixtures with native species that are adapted to calcareous soils.

Available Water Capacity (AWC) was calculated for each soil horizon using an empirical equation using laboratory data for sand, silt, clay, organic matter, electrical conductivity, and estimated rock fragments (Saxton and Willey, 2011). Calculated AWC values ranged from 0.02 to 0.10 inches of water per inch of soil. These values were all in the "Fair" category, except for

11UTCR03 (140 to 170 cm) which was "Poor." The calculated 0.02 value for 11UTCR03 (140 to 170 cm) corresponds with the loamy sand soil texture and an estimated 70 percent rock fragments. The calculated AWC values are in appendix E.

Soil K factors were calculated using the nomograph outlined in *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005). This method uses laboratory values for percent silt, sand, very fine sand, and organic matter along with values for soil structure and permenability to derive the soil erodibility (K) factor. All of the calculated K factors were in the "Good" category (less than 0.37) based on the *Guidelines for Management of Topsoil and Overburden* (Utah DOGM 2005). The calculated K factors are in appendix E.

Topsoil Salvage

The main limiting soil features in the proposed Crandall Ponds project area are calcareous soils and large amounts of rock fragments.

The presence of large amounts of rock fragments will make topsoil salvage difficult, but not impossible. Boulders and large stones should be removed during the topsoil salvage process to the extent that is reasonable.

Highly calcareous soils (calcium carbonate percent greater than 30) will be limiting to revegetation success, so it is recommended that these materials not be included with the salvaged topsoil, as much as possible.

It is recommended that an average 30 cm (1 foot) be salvaged for use as topsoil during the reclamation process. This depth is based on the depth of "Good" soil pH. The estimated salvage depth will vary across the project area and should be monitored to limit the amount of large stones, boulders, and highly calcareous soil that is incorporated into the topsoil stockpile.

Literature Cited

Daly, C. and Taylor, G.. 1998. Western U.S. Average Monthly or Annual Precipitation for the State of Utah, 1961-1990. Climatic Service at Oregon State University. Portland, Oregon.

Natural Resource Conservation Service. 2007. Soil Survey of Emery Area, Parts of Emery, Carbon, Grand, and Sevier Counties. Data downloaded March 11, 2011.

Natural Resource Conservation Service. 2010. Keys to Soil Taxonomy, Eleventh Edition. National Soil Survey Center, Lincoln, NE.

Natural Resource Conservation Service. 2011. Official Soil Series Descriptions. National Soil Survey Staff. Available online at http://soils.usda.gov/technical/classification/osd/. Data downloaded March 28, 2011.

Saxton, K.E. and Willey, P.. 2011. Soil Water Characteristics, Version 6.02.74. USDA Agricultural Research Service. Pullman, WA.

Schoeneberger, P.J., Wysocki, D.A., Benham, E.C., and Broderson, W.D. (editors). 2002. Field book for describing and sampling soils, Version 2.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Utah Department of Natural Resources, Division of Oil Gas and Mining. 2005. Guidelines for Management of Topsoil and Overburden. Salt Lake City, Utah.

Western Regional Climate Center. 2011. Climatological Data Summary for Hiawatha, Utah (423896). www.wrcc.dri.edu/cgi-bin/cliRECtM.pl?ut3896. Data downloaded June 4, 2011.

Witkind, I.J., Weiss, M.P., and Brown, T.L. 2006. Geologic Map of the Manti 30' X 60' Quadrangle, Carbon, Emery, Juag, Sanpete, and Sevier Counties, Utah. Utah Department of natural Resources, Utah Geologic Survey.

Appendix A

Soil Profile Descriptions

PEDON 11UTCR01 DESCRIPTION

Pedon ID: 11UTCR01
Description Date: 5/4/2011 12:23:26 PM
Describer: Robert Long

Site Notes: 1. Climate estimates based on vegetation are informational purposes. 2. Pinyon pine and Utah juniper were removed from area about 30 to 40 years ago. Both species have re-established with heights of 6 to 12 feet.
Pedon Notes: Soil classification was completed using eleventh edition of Keys to Soil Taxonomy.
Soil Name As Described/Sampled: Strych
Soil Name As Correlated: Strych
Classification: Loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcids
Pedon Type: Within range of series
Pedon Purpose: Full pedon description
Taxon Kind: Series

SSURGO MU: BMD
MLRA: 34B - Warm Central Desertic Basins and Plateaus
County or Parish: UT015 - Emery
State or Territory: UT - Utah
7.5' Quad: 39111-D1 - Hiawatha, Utah

Lat/Long: 39°22'37" north, 111°3'2" west
UTM: 495651.12E, 4358611.98N -- Datum NAD83, Zone 12
Legal Description: Lot 6 of Section 5, Township 17 South, Range 8 East of the Salt Lake Meridian

Landscape: tableland
Landform: alluvial fan and pediment
Geomorphic Component: Tread
Profile Pos: Backslope
Slope: 4 percent
Elevation: 1971 meters (6466.5 feet)
Aspect: 224°

Shape: up/down: Convex; **across:** Linear
Complexity: Simple
Flooding: None
Ponding: None
Drainage: Well drained

Runoff: Low
Permeability: Moderate
Erosion: Class 2

Primary Earth Cover: Tree cover; **Secondary Earth Cover:** Native shrubs
Existing Vegetation: PIED - twoneedle pinyon (*Pinus edulis*); JUOS - Utah juniper (*Juniperus osteosperma*); ATCA2 - fourwing saltbush (*Atriplex canescens*); LESAS - Salina wildrye (*Leymus salinus ssp. salinus*); AGCR - crested wheatgrass (*Agropyron cristatum*); YUCCA - yucca (*Yucca*); CHRYS9 - rabbitbrush (*Chrysothamnus*)

Parent Materials: moderately weathered, gravelly alluvium derived from calcareous sandstone over loamy alluvium derived from calcareous shale

Particle Size Control Section: 25 to 100 centimeters (9.8 to 39.4 inches)
Diagnostic Features: Cambic horizon: 12 to 26 centimeters (4.7 to 10.2 inches) and Calcic horizon: 26 to 212 centimeters (10.2 to 83.5 inches)

Slope	Elevation	Aspect	MAAT	MSAT	MWAT	MAP	Frost-Free Days	Drainage Class	Slope Length	Upslope Length
4 percent	1971 meters (6466.5 feet)	224°	8.4° C (47° F)			254 millimeters (10 inches)	125 days	well		

A --- 0 to 12 centimeters (0 to 4.7 inches); pale brown (10YR 6/3) dry, very cobbly sandy loam; brown (10YR 5/3) moist; 53 percent sand; 29 percent silt; 18 percent clay; weak medium subangular blocky parting to moderate fine granular structure; very friable, slightly hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and many very fine roots throughout; common very fine interstitial pores; 5 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.35 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.16; strongly effervescent by HCl, 1 normal; pH meter, saturated paste pH method; clear smooth boundary; $CaCO_3$ 34 Percent.

Bw --- 12 to 26 centimeters (4.7 to 10.2 inches); pale brown (10YR 6/3) dry, very cobbly sandy loam; brown (10YR 5/3) moist; 53 percent sand; 29 percent silt; 18 percent clay; moderate fine subangular blocky and moderate medium subangular blocky structure; friable, hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and many very fine roots throughout; common very fine interstitial and common very fine tubular pores; 30 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.35 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.24; strongly effervescent by HCl, 1 normal; pH meter, saturated paste pH method; clear smooth boundary; CaCO3 (33.1 Percent.

Bk1 --- 26 to 50 centimeters (10.2 to 19.7 inches); pale yellow (2.5Y 7/3) dry, very cobbly sandy loam; brown (10YR 5/3) moist; 60 percent sand; 28 percent silt; 12 percent clay; moderate medium subangular blocky structure; friable, hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and many very fine roots throughout; common very fine interstitial and common very fine tubular pores; 3 percent (common) fine spherical masses of carbonate in matrix and 3 percent (common) fine carbonate concretions on bottom of rock fragments; 2 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.32 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.28; strongly effervescent by HCl, 1 normal; pH meter, saturated paste pH method; clear wavy boundary; CaCO3 28.9 Percent.

Bk2 --- 50 to 94 centimeters (19.7 to 37 inches); very pale brown (10YR 7/3) dry, extremely stony sandy loam; yellowish brown (10YR 5/4) moist; 64 percent sand; 24 percent silt; 12 percent clay; moderate fine subangular blocky structure; very friable, hard, slightly sticky, slightly plastic; common fine roots throughout and common very fine roots throughout; common very fine interstitial pores; 3 percent (common) fine spherical masses of carbonate in matrix and 3 percent (common) fine carbonate concretions on bottom of rock fragments; 8 percent nonflat subrounded strongly cemented 600 to 2000 millimeters (24 to 79 inches) calcareous sandstone fragments, 16 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 20 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.38 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.39; strongly effervescent by HCl, 1 normal; pH meter, saturated paste pH method; violent effervescence on concretions in matrix; clear wavy boundary; CaCO3 31.9 Percent.

2Bk1 --- 94 to 120 centimeters (37 to 47.2 inches); very pale brown (10YR 7/4) dry, gravelly sandy clay loam; light yellowish brown (10YR 6/4) moist; 58 percent sand; 21 percent silt; 21 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; common very fine interstitial pores; 5 percent (common) medium spherical masses of carbonate in matrix and 5 percent (common) fine carbonate concretions on bottom of rock fragments; 20 percent nonflat subangular strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 1.07 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 4.3; violently effervescent by HCl, 1 normal; pH meter, saturated paste pH method; gradual smooth boundary; $CaCO_3$ 22.1 Percent.

2Bk2 --- 120 to 165 centimeters (47.2 to 65 inches); pale yellow (2.5Y 8/2) dry, gravelly loam; pale brown (10YR 6/3) moist; 51 percent sand; 28 percent silt; 21 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; common very fine interstitial pores; 10 percent (common) medium spherical masses of carbonate in matrix and 5 percent (common) fine carbonate concretions on bottom of rock fragments; 15 percent nonflat subangular strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 2.44 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 8.52; violently effervescent by HCl, 1 normal; pH meter, saturated paste pH method; clear smooth boundary; $CaCO_3$ 36.4 Percent.

2Bk3 --- 165 to 216 centimeters (65 to 85 inches); very pale brown (10YR 7/3) dry, gravelly sandy loam; brown (10YR 5/3) moist; 56 percent sand; 26 percent silt; 18 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; common very fine interstitial pores; 12 percent (common) medium spherical masses of carbonate in matrix and 5 percent (common) fine carbonate concretions on bottom of rock fragments; 15 percent nonflat subangular strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 2.74 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 8.56; violently effervescent by HCl, 1 normal; pH meter, saturated paste pH method; $CaCO_3$ 33.1 Percent.

PEDON 11UTCR02 DESCRIPTION

Pedon ID: 11UTCR02
Description Date: 5/4/2011 12:55:24 PM
Describer: Robert Long

Site Notes: 1. Climate estimates based on vegetation are informational purposes.
2. Pinyon pine and Utah juniper were removed 30 to 40 years ago. Both Species have become re-established with heights of 6 to 12 feet.
Pedon Notes: Soil classification accomplished by using Keys to Soil Taxonomy, eleventh edition.

Soil Name As Described/Sampled: Strych
Soil Name As Correlated: Strych
Classification: Loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcids
Pedon Type: Within range of series
Pedon Purpose: Full pedon description
Taxon Kind: Series

SSURGO MU: BMD
MLRA: 34B - Warm Central Desertic Basins and Plateaus
County or Parish: UT015 - Emery
State or Territory: UT - Utah
7.5' Quad: 39111-D1 - Hiawatha, Utah

Lat/Long: 39°22’35” north, 111°3’0” west
UTM: 495693.62E, 4358536.13N -- Datum NAD83, Zone 12
Legal Description: Lot 6 of Section 5, Township 17 South, Range 8 East of the Salt Lake Meridian

Landscape: tableland
Landform: alluvial fan and pediment
Geomorphic Component: Tread
Profile Pos: Backslope
Slope: 3 percent
Elevation: 1968 meters (6456.7 feet)
Aspect: 153°

Shape: up/down: Linear; **across:** Convex
Complexity: Simple

Flooding: None
Ponding: None
Drainage: Well drained
Runoff: Medium
Permeability: Moderate
Erosion: Class 2

Primary Earth Cover: Tree cover; **Secondary Earth Cover:** Other shrub cover
Existing Vegetation: PIED - twoneedle pinyon (*Pinus edulis*); JUOS - Utah juniper (*Juniperus osteosperma*); ATCA2 - fourwing saltbush (*Atriplex canescens*); LESAS - Salina wildrye (*Leymus salinus ssp. salinus*); OPUNT - pricklypear (*Opuntia*)

Parent Materials: alluvium derived from calcareous sandstone and/or alluvium derived from calcareous shale

Particle Size Control Section: 25 to 100 centimeters (9.8 to 39.4 inches)
Diagnostic Features: Calcic horizon: 10 to 90 centimeters (3.9 to 35.4 inches)

Slope	Elevation	Aspect	MAAT	MSAT	MWAT	MAP	Frost-Free Days	Drainage Class	Slope Length	Upslope Length
3 percent	1968 meters (6456.7 feet)	153°	8.4° C (47° F)			254 millimeters (10 inches)	125 days	well		

A --- 0 to 10 centimeters (0 to 3.9 inches); pale brown (10YR 6/3) dry, very cobbly sandy loam; yellowish brown (10YR 5/4) moist; 66 percent sand; 16 percent silt; 18 percent clay; moderate medium subangular blocky parting to moderate fine granular structure; very friable, slightly hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and many very fine roots throughout; common very fine interstitial and common very fine tubular pores; 5 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 20 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) unspecified fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) unspecified fragments; electrical conductivity of 0.48 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.39; slightly effervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter, saturated paste; clear smooth boundary; $CaCO_3$ 27 Percent.

Bk1 --- 10 to 30 centimeters (3.9 to 11.8 inches); pale brown (10YR 6/3) dry, very cobbly sandy clay loam; brown (10YR 5/3) moist; 53 percent sand; 27 percent silt; 20

percent clay; moderate medium subangular blocky structure; very friable, slightly hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and many very fine roots throughout; common fine tubular pores; 2 percent (common) fine spherical masses of carbonate in matrix and 1 percent (few) fine carbonate concretions on bottom of rock fragments; 5 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.44 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.18; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter, saturated paste; clear wavy boundary; CaCO3 41.1 Percent.

Bk2 --- 30 to 54 centimeters (11.8 to 21.3 inches); very pale brown (10YR 7/3) dry, very cobbly sandy loam; brown (10YR 5/3) moist; 56 percent sand; 26 percent silt; 18 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and common very fine roots throughout; common very fine tubular pores; 8 percent (common) fine spherical masses of carbonate in matrix and 2 percent (common) fine carbonate concretions on bottom of rock fragments; 5 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.34 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.18; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter, saturated paste; gradual smooth boundary; CaCO3 40.7 Percent.

Bk3 --- 54 to 90 centimeters (21.3 to 35.4 inches); pale brown (10YR 6/3) dry, very gravelly sandy loam; yellowish brown (10YR 5/4) moist; 74 percent sand; 19 percent silt; 7 percent clay; moderate medium subangular blocky structure; friable, hard, nonsticky, nonplastic; common fine roots throughout and common very fine roots throughout; common very fine tubular pores; 6 percent (common) fine spherical masses of carbonate in matrix and 2 percent (common) fine carbonate concretions on bottom of rock fragments; 5 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.35 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 0.27; violently effervescent by HCl, 1 normal; strongly alkaline, pH 8.5, pH meter, saturated paste; gradual smooth boundary; CaCO3 34.8 Percent.

2Bk --- 90 to 130 centimeters (35.4 to 51.2 inches); very pale brown (10YR 7/3) dry, gravelly sandy loam; brown (10YR 5/3) moist; 64 percent sand; 22 percent silt; 14 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 10 percent (common) medium spherical masses of carbonate in matrix and 4 percent (common) fine carbonate concretions around rock fragments; 5 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 10 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 0.39 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 1.09; violently effervescent by HCl, 1 normal; strongly alkaline, pH 8.7, pH meter, saturated paste; gradual smooth boundary; CaCO3 17 Percent.

3Bk --- 130 to 185 centimeters (51.2 to 72.8 inches); very pale brown (10YR 8/2) dry, extremely bouldery sandy loam; brown (10YR 5/3) moist; 54 percent sand; 27 percent silt; 19 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; 10 percent (common) medium spherical masses of carbonate in matrix and 12 percent (common) medium carbonate concretions around rock fragments; 25 percent nonflat subrounded strongly cemented 600 to 1200 millimeters (24 to 47 inches) calcareous sandstone fragments, 25 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 10 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 10 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; electrical conductivity of 1.34 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 7.82; violently effervescent by HCl, 1 normal; strongly alkaline, pH 8.8, pH meter, saturated paste; CaCO3 38.4 Percent.

PEDON 11UTCR03 DESCRIPTION

Pedon ID: 11UTCR03
Description Date: 5/4/2011 2:15:43 PM
Describer: Robert Long

Site Notes: 1. Climate estimates based on vegetation are informational purposes.
2. Pinyon pine and Utah juniper were removed from site 30 to 40 years ago. Both species have become re-established with heights of 6 to 10 feet.

Soil Name As Described/Sampled: Strych
Soil Name As Correlated: Strych
Classification: Loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcids
Pedon Type: Within range of series
Pedon Purpose: Full pedon description
Taxon Kind: Series

SSURGO MU: BMD
MLRA: 34B - Warm Central Desertic Basins and Plateaus
County or Parish: UT015 - Emery
State or Territory: UT - Utah
7.5' Quad: 39111-D1 - Hiawatha, Utah

Lat/Long: 39°22'37" north, 111°3'4" west
UTM: 495594.74E, 4358599N -- Datum NAD83, Zone 12
Location Description: Pinyon juniper and Utah juniper were removed from the site about 30 years. Both species have become re-established with heights of 6 to 10 feet.
Legal Description: Lot 6 of Section 5, Township 17 South, Range 8 East of the Salt Lake Meridian

Landscape: tableland
Landform: alluvial fan and pediment
Geomorphic Component: Tread
Profile Pos: Backslope
Slope: 5 percent
Elevation: 1973 meters (6473.1 feet)
Aspect: 182°

Shape: up/down: Linear; **across:** Convex
Complexity: Simple
Flooding: None
Ponding: None

Drainage: Well drained
Runoff: Low
Permeability: Moderate
Erosion: Class 1 - Sheet erosion

Primary Earth Cover: ; **Secondary Earth Cover:**
Existing Vegetation: PIED - twoneedle pinyon (*Pinus edulis*); JUOS - Utah juniper (*Juniperus osteosperma*); EPVI - Mormon tea (*Ephedra viridis*); ATCA2 - fourwing saltbush (*Atriplex canescens*); LESAS - Salina wildrye (*Leymus salinus ssp. salinus*); POA - bluegrass (*Poa*); OPUNT - pricklypear (*Opuntia*)

Parent Materials: slightly weathered, colluvium derived from calcareous sandstone
Particle Size Control Section: 25 to 100 centimeters (9.8 to 39.4 inches)
Diagnostic Features: Calcic horizon: 28 to 214 centimeters (11 to 84.3 inches)

Slope	Elevation	Aspect	MAAT	MSAT	MWAT	MAP	Frost-Free Days	Drainage Class	Slope Length	Upslope Length
5 percent	1973 meters (6473.1 feet)	182°	8.4° C (47° F)			254 millimeters (10 inches)	125 days	well		

A --- 0 to 10 centimeters (0 to 3.9 inches); light brown (7.5YR 6/4) dry, gravelly sandy loam; brown (7.5YR 5/4) moist; 70 percent sand; 18 percent silt; 12 percent clay; weak medium subangular blocky parting to moderate fine granular structure; very friable, slightly hard, slightly sticky, slightly plastic; common medium roots throughout, common fine roots throughout and common very fine roots throughout; common very fine interstitial and common very fine tubular pores; 5 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 0.22; strongly effervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter, saturated paste; clear smooth boundary; CaCO3 26.3 Percent.

Bk1 --- 10 to 28 centimeters (3.9 to 11 inches); light brown (7.5YR 6/3) dry, very cobbly sandy loam; brown (7.5YR 5/3) moist; 66 percent sand; 21 percent silt; 13 percent clay; moderate medium subangular blocky structure; very friable, slightly hard, slightly sticky, slightly plastic; common coarse roots throughout, common medium roots throughout, common fine roots throughout and many very fine roots throughout; common very fine tubular pores; 3 percent (common) fine spherical masses of carbonate in matrix; 5 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 0.25; strongly effervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter, saturated paste; clear smooth boundary; $CaCO_3$ 54.2 Percent.

Bk2 --- 28 to 60 centimeters (11 to 23.6 inches); pinkish gray (7.5YR 7/2) dry, very stony sandy loam; light brown (7.5YR 6/3) moist; 64 percent sand; 22 percent silt; 14 percent clay; moderate medium subangular blocky and moderate fine subangular blocky structure; friable, hard, slightly sticky, slightly plastic; common medium roots throughout, common fine roots throughout and common very fine roots throughout; common very fine tubular pores; 10 percent (common) medium spherical masses of carbonate in matrix and 5 percent (common) fine carbonate concretions around rock fragments; 10 percent nonflat subrounded strongly cemented 600 to 2000 millimeters (24 to 79 inches) calcareous sandstone fragments, 15 percent nonflat subangular strongly cemented 250 to 600 millimeters (10 to 24 inches) calcareous sandstone fragments, 15 percent nonflat subangular strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 20 percent nonflat subangular strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 0.29; violently effervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter, saturated paste; gradual wavy boundary; $CaCO_3$ 55.2 Percent.

Bk3 --- 60 to 110 centimeters (23.6 to 43.3 inches); very pale brown (10YR 8/2) dry, extremely stony sandy loam; pale brown (10YR 6/3) moist; 63 percent sand; 36 percent silt; 11 percent clay; moderate fine subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; 10 percent (common) medium spherical masses of carbonate in matrix and 4 percent (common) fine carbonate concretions around rock fragments; 15 percent nonflat subrounded strongly cemented 600 to 2000 millimeters (24 to 79 inches) unspecified fragments, 25 percent nonflat subrounded strongly cemented 250 to 600 millimeters (10 to 24 inches) unspecified fragments, 15 percent subangular strongly cemented 76 to 250 millimeters (3 to 10 inches) unspecified fragments and 20 percent nonflat subangular strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 1.37; violently effervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter, saturated paste; gradual wavy boundary; $CaCO_3$ 42.3 Percent.

2Bk --- 110 to 140 centimeters (43.3 to 55.1 inches); pale yellow (2.5Y 7/3) dry, extremely cobbly sandy loam; brown (10YR 5/3) moist; 60 percent sand; 25 percent silt; 15 percent clay; moderate medium subangular blocky structure; friable, very hard, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 10 percent (common) medium spherical masses of carbonate in matrix and 5 percent (common) fine carbonate concretions around rock fragments; 10 percent flat subangular strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments, 25 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments, 30 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments and 10 percent flat angular 150 to 380 millimeters (6 to 15 inches) unspecified fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 3.78; violently effervescent by HCl, 1 normal; strongly alkaline, pH 8.6, pH meter, saturated paste; gradual wavy boundary; CaCO3 42.5 Percent.

3Bk --- 140 to 170 centimeters (55.1 to 66.9 inches); very pale brown (10YR 7/3) dry, extremely cobbly loamy sand; yellowish brown (10YR 5/4) moist; 85 percent sand; 8 percent silt; 7 percent clay; single grain; loose, loose, nonsticky, nonplastic; common very fine interstitial pores; 5 percent (common) fine spherical masses of carbonate in matrix and 10 percent (common) medium carbonate concretions on bottom of rock fragments; 5 percent nonflat subrounded strongly cemented 76 to 250 millimeters (3 to 10 inches) calcareous sandstone fragments and 10 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 4.71; violently effervescent by HCl, 1 normal; strongly alkaline, pH 8.7, pH meter, saturated paste; clear smooth boundary; CaCO3 28.4 Percent.

4Bk --- 170 to 214 centimeters (66.9 to 84.3 inches); pale yellow (2.5Y 7/4) dry, sandy loam; yellowish brown (10YR 5/4) moist; 70 percent sand; 18 percent silt; 12 percent clay; moderate medium subangular blocky structure; friable, hard, slightly sticky, slightly plastic; common very fine interstitial pores; 2 percent (common) fine spherical masses of carbonate in matrix; 5 percent nonflat subrounded strongly cemented 2 to 76 millimeters (0.1 to 3 inches) calcareous sandstone fragments; EC meter, saturated paste electric conductivity method; sodium absorption ratio of 8.9; violently effervescent by HCl, 1 normal; strongly alkaline, pH 8.6, pH meter, saturated paste; CaCO3 30.8 Percent.

Appendix B

Field Data Sheets

USDA-NRCS PEDON DESCRIPTION FORM Draft 5/97 MO6, LAKEWOOD, CO

Series or Comp Name:	Date: 5-4-2011	State: UT County: Emery	SSA:	Unit: BMD MLRA: 34B
MU Sym:	Pedon Type: Backhoe Pit	Lab #: 11UTCR01	Photo #:	Land Use: Range
Surface Frag %: GR: 15 CB: 5 ST: 2 BD: 25 CN: FL:	Permeability: Ksat: mod	Drainage: well	Elevation: 6468	
Major Landform: [illegible]	Local Landform: Alluvial Fan	Moisture Regime: Aridic	Percent Slope: 4 (3-10%)	Aspect: 224
Up Shape: convex	Across Shape: smooth	Geomorphic: TR	Hillslope: BS	
Erosion: Knd: Water Deg: 2 Runoff: med	Classification: Ustic Haplocalcid lo-skel, mix, super, mesic			
Location: Sec. T. R.	Latitude: ° ' " N Longitude: ° ' " W	UTM: Zone: mE: mN: 12/495650/4358613		
Parent Material/Bedrock: colluvium	Diagnostic: cambic 12-26 cm calcic 26-212 cm	Describer(s): R Long		
Moisture depth(s):	Control Section Ave: Clay %: 12.8 Rock Frag %: 48	Precipitation: 9-12"	Temperature @ 50 cm:	

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Pinyon Pine	
	Utah Juniper	
	Fourwing saltbush	
	Saline wildrye	
	crested wheat	
	yucca	
	Rabbitbrush	

NOTES:

Area was chained 30-40 years ago. Pinyon Juniper regrowth is 6-10' height.

	Depth cm	Horizon	Matrix Color Dry	Matrix Color Moist	Texture	Structure	Rupture Resist Dry	Mst	Stk	Pls	Mottles % Sz Con Col Shp Loc	Ped Surface Features Knd % Con Dst Loc Col Mst	Effer
1	0-12	A	10YR 6/3	10YR 5/3	CBV L	1 m sbk ~~[illegible]~~	sh	vfr	ss	sp	—	—	ST
2	12-26	Bw	10YR 6/3	10YR 5/3	CBV SCL	2 f m sbk	h	fr	ss	sp	—	—	ST
3	26-50	Bk1	2.5Y 7/3	10YR 5/3	CBV SCL	2 m sbk	h	fr	ss	sp	—	—	ST
4	50-94	Bk2	10YR 7/3	10YR 5/4	STX SCL	2 f sbk	h	vfr	ss	sp	—	—	ST/VE
5	94-120	2Bk1	10YR 7/4	10YR 6/4	GR SCL	2 f m sbk	vh	fr	ss	sp	—	—	VE
6	120-165	2Bk2	2.5Y 8/2	10YR 6/3	GR SCL	2 f m sbk	vh	fr	ss	sp	—	—	VE
7	165-216	2Bk3	10YR 7/3	10YR 5/3	GR SCL	2 f m sbk	vh	fr	ss	sp	—	—	VE
8													
9													

Roots Qty Sz Loc	Pores Shp Qty Sz	Concentrations Knd % shp Sz Loc Col	Rock Frag Knd % Rnd Sz	Wet	pH	Clay %	CCE	Bnd	Notes (e.g., Diagnostic)
4vf T 4f 2m 1 C	IR 4 vf	—	SS GR 20 ST 5 CB 15	M		22		CS	
6vf T 4f 3m 1 C	IR 4 vf T 1 vf	—	SS GR 20 ST 5 CB 15 BD —	M		24		CS	
5vf T 2m	IR 4 vf T 1 vf	CAC 3 f BRF SAC 3 f sphere	SS GR 20 ST 2 CB 15	SM		22		CW	
3f T	IR 3 vf	CAC 3 f BRF CAM 3 f Sphere	SS GR 20 ST 10 CB 20 BD 5	SM		20		CW	
2vf T	IR 3 vf	CAC 3 f BRF fine CAF 5 M Sph	SS GR 20	DRY		23		GS	
1vf T	IR 3 vf	CAC 5 BRF fine CAM 10 M Sph	SS GR 15	DRY		23		CS	
1vf Tor	IR 2 vf	CAC 5 BRF fine CAM 12 M Sphere	SS GR 15			23			

USDA-NRCS PEDON DESCRIPTION FORM Draft 5/97 MO6, LAKEWOOD, CO

Series or Comp Name: | Date: 5-4-2011 | State: UT | County: Emery | SSA: | Unit: | MLRA: 34B

MU Sym: | Pedon Type: Backhoe Pit | Lab #: | Photo #: | Land Use: Range

Surface Frag %: GR: 12 CB: 10 ST: 5 BD: 20 CN: FL: | Permeability: Ksat: | Drainage: Well | Elevation: 6456

Major Landform: Pediment | Local Landform: Alluvial Fan | Moisture Regime: Aridic | Percent Slope: 3 | Aspect: 153

Up Shape: smooth | Across Shape: convex | Geomorphic: TR | Hillslope: BS

Erosion: Knd: Water Deg: 2 Runoff: med | Classification: Ustic Haplocalcid Lo-skel, mix, super, mesic

Location: Sec. T. R. | Latitude: ° ' " N Longitude: ° ' " W | UTM: Zone: mE: mN: 12/495683/4358537

Parent Material/Bedrock: colluvium | Diagnostic: ~~cambic~~ Calcic 10-90 | Describer(s): R Lord

Moisture depth(s): | Control Section Ave: Clay %: Rock Frag %: 35.7 | Precipitation: 9-12" | Temperature @ 50 cm:

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Pinyon Pine	
	Utah Juniper	
	Fourwing saltbush	
	Salina wildrye	
	Prickly Pear	

NOTES:

Salvage 0-30cm

Appendix B - crandall Ponds Project

	Depth cm	Horizon	Matrix Color Dry	Matrix Color Moist	Texture	Structure	Rupture Resist Dry	Rupture Resist Mst	Rupture Resist Stk	Rupture Resist Pls	Mottles % Sz Con Col Shp Loc	Ped Surface Features Knd % Con Dst Loc Col Mst	Eff
1	0-10	A	10YR 6/3	10YR 5/4	CBV SCL	2 m sbk 2 fgr	sh	vfr	ss	sp	—	—	SL
2	10-30	Bk1	10YR 6/3	10YR 5/3	CBV L	2 m sbk	sh	vfr	ss	sp	—	—	ST
3	30-54	Bk2	10YR 7/3	10YR 5/3	CBV SCL	2 fm sbk	h	fr	ss	sp	—	—	ST
4	54-90	Bk3	10YR 6/3	10YR 5/4	GRV SL	2 m sbk	h	fr	so	po	—	—	VE
5	90-	2Bk	10YR 7/3	10YR 5/3	GR SCL	2 fm sbk	vh	fr	ss	sp	—	—	VE
6	130-185	3Bk	10YR 8/2	10YR 5/3	BDX SCL	2 fm sbk	vh	fr	ss	sp	—	—	VE
7													
8													
9													

	Roots Qty Sz Loc	Pores Shp Qty Sz	Concentrations Knd % shp Sz Loc Col	Rock Frag Knd % Rnd Sz	Wet	pH	Clay %	CCE	Bnd	Notes (e.g., Diagnostic)
1	7vf 2m 3f 1c T	IR 4 vf T 2 vf	—	SS GR 20 ST 3 CB 20	M		22		CS	
2	5vf 2m 3f 1c T	T 2 vf	CAC 1 F BRF CAM 2 F sphere	SS GR 20 ST 5 CB 15	SM		24		CW	
3	vf 1m 1c	T 3 vf	CAC 2 F BRF CAM 8 F sphere	SS GR 20 ST 5 CB 15	SM		24		GW	
4	1f T	T 2 vf	CAC 2 F BRF CAM 6 F sphere	SS GR 20 ST 5 CB 15	SM		16		GS	
5	2vf T	T 1 vf	CAC 4 F ARF CAM 10 M sphere	SS GR 10 CB 5	SM		24		GS	
6	1vf T	—	CAC 12 2 mm ARF CAM 10 M sphere	SS GR 10 ST 25 CB 10 BD 25	dry		23			

INCORPORATED

NOV 09 2012

Div. of Oil, Gas & Mining

USDA-NRCS PEDON DESCRIPTION FORM Draft 5/97 MO6, LAKEWOOD, CO

- **Series or Comp Name:** Strych – taxadjunct
- **Date:** 5-4-2011
- **State:** UT **County:** Emery
- **SSA:** 623
- **Unit:** BMD
- **MLRA:** 34B
- **MU Sym:** BMD
- **Pedon Type:** Backhoe Pit
- **Lab #:** 11UTCR03
- **Photo #:**
- **Land Use:** Range
- **Surface Frag %:** GR: 10 CB: 5 ST: 5 BD: 10 CN: FL:
- **Permeability: Ksat:** Med
- **Drainage:** Well
- **Elevation:** 6424
- **Major Landform:** Pediment
- **Local Landform:** Alluvial Fan
- **Moisture Regime:** Aridic
- **Percent Slope:** 15
- **Aspect:** 182
- **Up Shape:** Smooth
- **Across Shape:** Convex
- **Geomorphic:** TR
- **Hillslope:** BS
- **Erosion:** Knd: water Deg: 1 Runoff: slow
- **Classification:** Ustic Haplocalcid
- **Location:** Sec. T. R.
- **Latitude:** ° ' " N **Longitude:** ° ' " W
- **UTM:** Zone: 12 mE: 495594 mN: 4358600
- **Parent Material/Bedrock:** Colluvium
- **Diagnostic:** calcic 28 to 214 cm
- **Describer(s):** R Long
- **Moisture depth(s):**
- **Control Section Ave: Clay %:** 12.9 **Rock Frag %:** 67.2
- **Precipitation:**
- **Temperature @ 50 cm:**

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Pinyon Pine	
	Utah Juniper	
	Ephedra	
	Fourwing saltbush	
	Salina Wildrye	
	Poa	
	Prickly Pear	

NOTES:

Large surface Boulders 6-12 feet

	Depth	Horizon cm	Matrix Color Dry	Matrix Color Moist	Texture	Structure	Rupture Resist Dry	Mst	Stk	Pls	Mottles % Sz Con Col Shp Loc	Ped Surface Features Knd % Con Dst Loc Col Mst	Effer
1	A	0-10	7.5YR 6/4	7.5YR 5/4	GR SCL	1msbk 2fgr	sh	vfr	ss	sp	—	—	ST
2	Bw	10-28	7.5YR 6/3	7.5YR 5/3	CBV SCL	2msbk	sh	vfr	ss	sp	—	—	ST
3	Bk1	28-60	7.5YR 7/2	7.5YR 6/3	ST.V	2fmsbk	h	fr	ss	sp	—	—	VE
4	Bk2	60-110	10YR 8/2	10YR 6/3	STX SCL	2fsbk	vh	fr	ss	sp	—	—	VE
5	2Bk	110-140	2.5Y 7/3	10YR 5/3	CBX SCL	2msbk	vh	fr	ss	sp	—	—	VE
6	3Bk	140-170	10YR 7/3	10YR 5/4	CBX Sand	SG	lo	lo	so	po	—	—	VE
7	4Bk	170-214	2.5Y 7/4	10YR 5/4	SCL	2msbk	h	fr	ss	sp	—	—	VE
8													
9													

	Roots Qty Sz Loc	Pores Shp Qty Sz	Concentrations Knd % shp Sz Loc Col	Rock Frag Knd % Rnd Sz	Wet	pH	Clay %	CCE	Bnd	Notes (e.g., Diagnostic)
1	4vf T 2f1m	IR4vf T1vf	—	SS GR20 SR CB5	M		22		cs	
2	5vf T 3f 2m1c	T2vf	CAC 3 f BRF	SS GR20 ST5 SR CB15	M		22		cs	
3	1vf 2f1m	1vf	CAC 5 f ARF CAM 10 m MAT	SS GR20 ST15 SA CB15 FL10	SM		22		gw	
4	1vf	—	CAC 4 f ARF CAM 10 m MAT	SS GR20 ST25 SR CB15 FL15	SM		24		gw	
5	1vf	IR2vf	CAC 5 f ARF CAM 10 m MAT	SS GR30 FL10 SA CB25	dry		24		gw	
6	—	IR1vf	CAC 10 m BRF CAM 5 f VAL	SS GR30 ST10 SR CB25 BD5	dry		0		cs	
7		IR 2 1f	CAM 2 F ped face MAT	SS GR 5 SA	dry		24			

Appendix C

Soil Profile Box Photos

Photo 1. Soil profile 11UTCR01, Strych soil, loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcid.

Photo 2. Soil profile 11UTCR02, Strych soil, loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcid.

Photo 3. Soil profile 11UTCR01, Strych soil, loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcid.

Appendix D

Photographs of Soil Profiles and Project Area

Photo 1. Soil profile of 11UTCR01. Large boulder is in center of profile.

Photo 2. Soil profile 11UTCR01, Strych soil, looking north. Large boulder in center of profile is typical of project area soils.

Photo 3. Profile 11UTCR02, Strych soil, location, Strych soil, looking east southeast from pit. Numbers are on face of pit. Large stones and boulders cover the surface.

Photo 4. Soil profile 11UTCR02, Strych soil. Base of pit contained stones and boulers that backhoe was unable to dig through. Description was done on side of pit where cut extended down between large rocks.

Photo 5. Soil profile 11UTCR03, Strych taxadjunct, soil, location looking north.

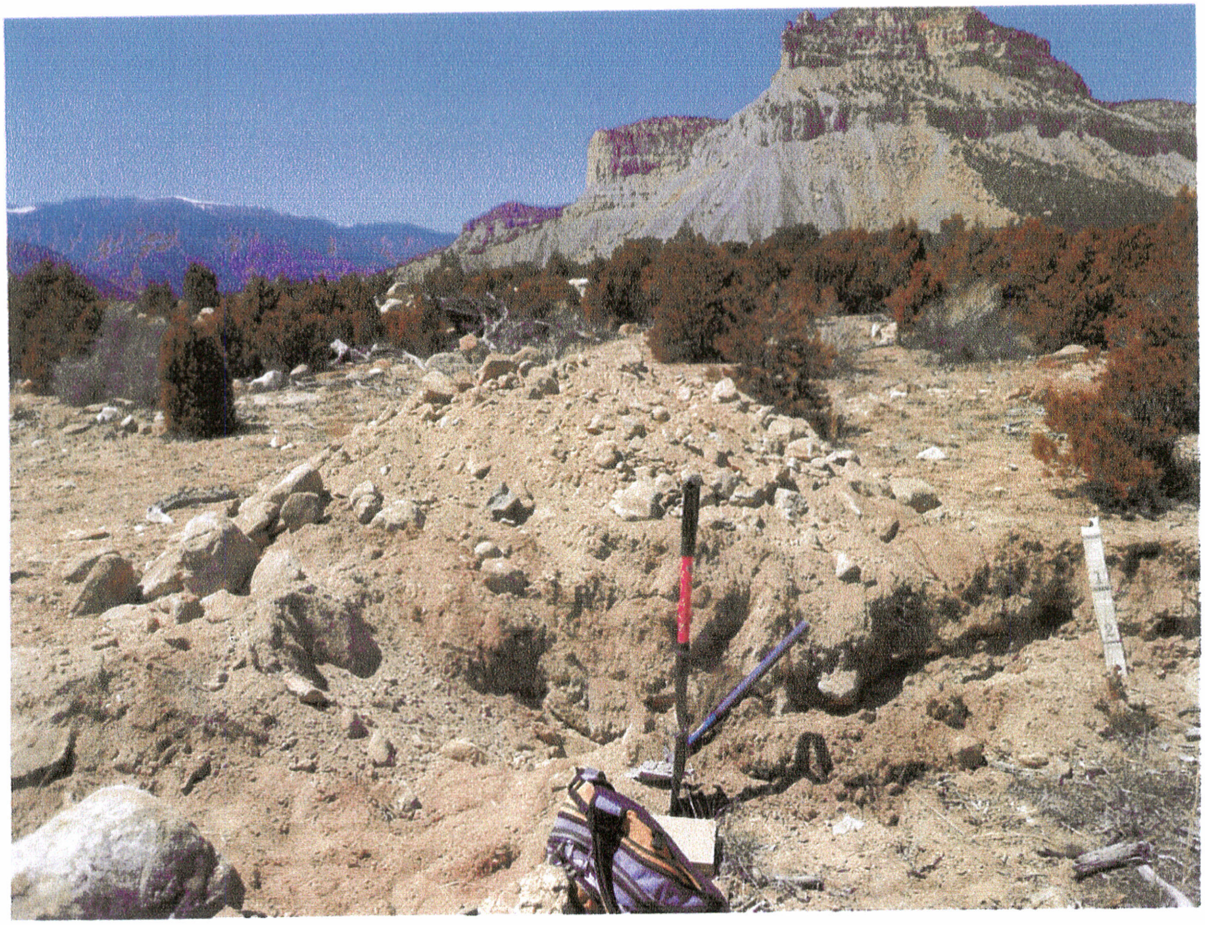


Photo 6. Soil profile 11UTCR03, Strych taxadjunct, looking west across soil-rock pile and top of cut.

Photo 7. Soil profile 11UTCR03, Strych Taxadjunct soil, contains large amount of sandstone cobbles, stones, and a few boulders.

Appendix E

Laboratory Analysis Results

and

Calculated Values

for

Available Water Capacity

and

K Factor

Suitability of soil materials on crandall Ponds Project, using lab analysis results and based on Guidelines for Management of Topsoil and Overburden (Utah DOGM, 2005).

SampleID	Begin Depth	End Depth	pH	Saturation	Electrical Conductivity	Organic Matter	PE Calcium	PE Magnesium	PE Potassium	PE Sodium	SAR
			s.u.	%	dS/m	%	meq/L	meq/L	meq/L	meq/L	
11UTCR01	0	12	7.7	42.0	0.35	2.8	2.77	0.72	0.18	0.21	0.16
11UTCR01	12	26	7.9	35.0	0.35	2.6	2.70	1.09	0.06	0.33	0.24
11UTCR01	26	50	8.3	32.7	0.32	2.1	1.57	1.08	0.05	0.32	0.28
11UTCR01	50	94	8.6	30.4	0.38	1.4	1.33	2.32	0.05	0.53	0.39
11UTCR01	94	120	8.8	33.0	1.07	1.7	0.92	3.78	0.05	6.59	4.30
11UTCR01	120	165	8.9	31.0	2.44	1.4	1.63	9.30	0.11	19.9	8.52
11UTCR01	165	216	8.8	27.1	2.74	1.3	2.99	9.70	0.19	21.5	8.56
11UTCR02	0	10	8.1	31.6	0.48	3.1	2.79	0.69	1.16	0.51	0.39
11UTCR02	10	30	7.9	44.1	0.44	3.1	3.67	0.94	0.13	0.28	0.18
11UTCR02	30	54	8.2	36.5	0.34	2.2	2.86	1.11	0.07	0.25	0.18
11UTCR02	54	90	8.5	33.8	0.35	1.8	1.92	1.87	0.04	0.38	0.27
11UTCR02	90	130	8.7	32.0	0.39	1.0	0.68	2.18	0.04	1.31	1.09
11UTCR02	130	185	8.8	30.4	1.34	1.1	0.89	2.82	0.07	10.6	7.82
11UTCR03	0	10	8.0	30.5	0.45	3.2	4.18	0.69	0.29	0.34	0.22
11UTCR03	10	28	7.8	56.1	0.44	3.2	3.87	1.08	0.06	0.39	0.25
11UTCR03	28	60	8.0	45.6	0.46	3.4	3.25	1.46	0.06	0.45	0.29
11UTCR03	60	110	8.4	41.9	0.71	1.4	3.04	3.43	0.07	2.46	1.37
11UTCR03	110	140	8.6	30.4	1.55	1.1	2.14	10.0	0.08	9.33	3.78
11UTCR03	140	170	8.7	27.4	1.33	0.6	1.81	6.06	0.06	9.34	4.71
11UTCR03	170	214	8.6	25.3	2.15	1.1	1.79	6.34	0.07	17.9	8.90

Good	Fair	Poor	Unacceptable

Suitability of soil materials on c Suitability of soil materials on crandall Ponds Project, using lab analysis results and based on Guidelines for Management of Overburden (Utah DOGM, 200 Topsoil and Overburden (Utah DOGM, 2005), continued.

SampleID	Begin Depth	End Depth	Sand	Silt	Clay	Texture	Very Fine Sand	CaCO3	Nitrate (as N)	Phosphorus	Available Potassium	Total Carbon	TOC	Neutral. Potential
			%	%	%		%	%	ppm	ppm	meq/100g	%	%	t/1000t
11UTCR01	0	12	53.0	29.0	18.0	Sandy Loam	9.8	34.0	0.2	5.82	0.18	5.2	1.2	340
11UTCR01	12	26	53.0	29.0	18.0	Sandy Loam	11.6	33.1	0.2	4.40	0.10	4.7	0.8	331
11UTCR01	26	50	60.0	28.0	12.0	Sandy Loam	12.2	28.9	<0.1	3.73	0.09	4.1	0.7	289
11UTCR01	50	94	64.0	24.0	12.0	Sandy Loam	14.1	31.9	<0.1	2.76	0.09	3.9	<0.1	319
11UTCR01	94	120	58.0	21.0	21.0	Sandy Clay Loam	13.7	22.1	<0.1	3.37	0.18	2.9	0.2	221
11UTCR01	120	165	51.0	28.0	21.0	Loam	10.3	36.4	<0.1	3.06	0.07	4.9	0.5	364
11UTCR01	165	216	56.0	26.0	18.0	Sandy Loam	10.3	33.1	<0.1	1.99	0.07	4.3	0.3	331
11UTCR02	0	10	66.0	16.0	18.0	Sandy Loam	15.4	27.0	0.4	13.8	0.84	4.2	1.0	270
11UTCR02	10	30	53.0	27.0	20.0	Sandy Clay Loam	10.2	41.1	<0.1	6.19	0.14	6.5	1.5	411
11UTCR02	30	54	56.0	26.0	18.0	Sandy Loam	15.1	40.7	0.2	4.25	0.08	5.7	0.8	407
11UTCR02	54	90	74.0	19.0	7.0	Sandy Loam	12.2	34.8	<0.1	2.66	0.08	4.6	0.4	348
11UTCR02	90	130	64.0	22.0	14.0	Sandy Loam	21.9	17.0	<0.1	2.38	0.15	2.2	0.2	170
11UTCR02	130	185	54.0	27.0	19.0	Sandy Loam	10.8	38.4	<0.1	5.47	0.07	4.9	0.3	384
11UTCR03	0	10	70.0	18.0	12.0	Sandy Loam	14.1	26.3	2.6	13.6	0.46	4.1	1.0	263
11UTCR03	10	28	66.0	21.0	13.0	Sandy Loam	8.6	54.2	1.9	8.56	0.09	8.7	2.2	542
11UTCR03	28	60	64.0	22.0	14.0	Sandy Loam	9.0	55.2	2.9	5.94	0.07	7.5	0.9	552
11UTCR03	60	110	63.0	26.0	11.0	Sandy Loam	10.2	42.3	4.5	5.06	0.07	5.8	0.7	423
11UTCR03	110	140	60.0	25.0	15.0	Sandy Loam	9.9	42.5	4.9	3.14	0.06	5.5	0.4	425
11UTCR03	140	170	85.0	8.0	7.0	Loamy Sand	4.9	28.4	1.2	4.14	0.03	3.4	<0.1	284
11UTCR03	170	214	70.0	18.0	12.0	Sandy Loam	12.3	30.8	<0.1	3.46	0.06	3.9	0.2	308

Good	Fair	Poor	Unacceptable

Table E-2. Calculated available water capacity (AWC) for soils on Crandall Ponds project area using empirical equation using laboratory data for sand, silt, clay, organic matter, electrical conductivity, and estimated rock fragments (Saxton and Willey, 2011)

Sample ID	Top Depth	Bottom Depth	AWC	AWC
	cm	cm	in/foot	in/in
11UTCR01	0	12	0.86	0.07
11UTCR01	12	26	0.84	0.07
11UTCR01	26	50	0.79	0.07
11UTCR01	50	94	0.56	0.05
11UTCR01	94	120	0.97	0.08
11UTCR01	120	165	1.14	0.10
11UTCR01	165	216	1.04	0.09
11UTCR02	0	10	0.62	0.05
11UTCR02	10	30	0.85	0.07
11UTCR02	30	54	0.79	0.07
11UTCR02	54	90	0.60	0.05
11UTCR02	90	130	0.92	0.08
11UTCR02	130	185	0.64	0.05
11UTCR03	0	10	0.80	0.07
11UTCR03	10	28	0.70	0.06
11UTCR03	28	60	0.61	0.05
11UTCR03	60	110	0.57	0.05
11UTCR03	110	140	0.57	0.05
11UTCR03	140	170	0.29	0.02
11UTCR03	170	214	0.86	0.07

Good	Fair	Poor

Table E-3. Calculated soil K factors based on lab analysis data and field descriptions of soil profiles using the nomograph outlined in Guidelines for Management of Topsoil and Overburden (Utah DOGM 2005).

SampleID	Begin Depth	End Depth	Organic Matter (a)	Structural Code (b)	Texture	Permeability Code (c)	Silt	Very Fine Sand	Clay	M	$M^{1.14}$	K factor
			%				%	%	%			
11UTCR01	0	12	2.8	2	Sandy Loam	2	29.0	9.8	18.0	3,181.6	9840.473	0.17
11UTCR01	12	26	2.6	4	Sandy Loam	2	29.0	11.6	18.0	3,329.2	10362.57	0.24
11UTCR01	26	50	2.1	4	Sandy Loam	2	28.0	12.2	12.0	3,537.6	11105.24	0.27
11UTCR01	50	94	1.4	4	Sandy Loam	2	24.0	14.1	12.0	3,352.8	10446.35	0.27
11UTCR01	94	120	1.7	4	Sandy Clay Loam	4	21.0	13.7	21.0	2,741.3	8303.678	0.27
11UTCR01	120	165	1.4	4	Loam	3	28.0	10.3	21.0	3,025.7	9292.691	0.27
11UTCR01	165	216	1.3	4	Sandy Loam	2	26.0	10.3	18.0	2,976.6	9120.977	0.24
11UTCR02	0	10	3.1	2	Sandy Loam	2	16.0	15.4	18.0	2,574.8	7731.212	0.12
11UTCR02	10	30	3.1	4	Sandy Clay Loam	4	27.0	10.2	20.0	2,976.0	9118.881	0.26
11UTCR02	30	54	2.2	4	Sandy Loam	2	26.0	15.1	18.0	3,370.2	10508.18	0.26
11UTCR02	54	90	1.8	4	Sandy Loam	2	19.0	12.2	7.0	2,901.6	8859.451	0.23
11UTCR02	90	130	1.0	4	Sandy Loam	2	22.0	21.9	14.0	3,775.4	11960.18	0.32
11UTCR02	130	185	1.1	4	Sandy Loam	2	27.0	10.8	19.0	3,061.8	9419.19	0.26
11UTCR03	0	10	3.2	2	Sandy Loam	2	18.0	14.1	12.0	2,824.8	8592.627	0.13
11UTCR03	10	28	3.2	4	Sandy Loam	2	21.0	8.6	13.0	2,575.2	7732.581	0.18
11UTCR03	28	60	3.4	4	Sandy Loam	2	22.0	9.0	14.0	2,666.0	8044.158	0.19
11UTCR03	60	110	1.4	4	Sandy Loam	2	26.0	10.2	11.0	3,221.8	9982.34	0.26
11UTCR03	110	140	1.1	4	Sandy Loam	2	25.0	9.9	15.0	2,966.5	9085.704	0.25
11UTCR03	140	170	0.6	1	Loamy Sand	2	8.0	4.9	7.0	1,199.7	3237.001	0.02
11UTCR03	170	214	1.1	4	Sandy Loam	2	18.0	12.3	12.0	2,666.4	8045.533	0.22

Good	Fair	Poor

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Soil Analysis Report

Long Resource Consultants, Inc.
1960 West Deep Creek Road
Morgan, UT 84050

Report ID: S1105143002
(Replaces S1105143001)
Date Reported: 7/1/2011
Work Order: S1105143

Project: Utah American Energy Crandall Ponds
Date Received: 5/9/2011

Lab ID	Sample ID	Depths cm	pH s.u.	Saturation %	Electrical Conductivity dS/m	Organic Matter %	PE Calcium meq/L	PE Magnesium meq/L	PE Potassium meq/L	PE Sodium meq/L	SAR
S1105143-001	11UTCR01	0-12	7.7	42.0	0.35	2.8	2.77	0.72	0.18	0.21	0.16
S1105143-002	11UTCR01	12-26	7.9	35.0	0.35	2.6	2.70	1.09	0.06	0.33	0.24
S1105143-003	11UTCR01	26-50	8.3	32.7	0.32	2.1	1.57	1.08	0.05	0.32	0.28
S1105143-004	11UTCR01	50-94	8.6	30.4	0.38	1.4	1.33	2.32	0.05	0.53	0.39
S1105143-005	11UTCR01	94-120	8.8	33.0	1.07	1.7	0.92	3.78	0.05	6.59	4.30
S1105143-006	11UTCR01	120-165	8.9	31.0	2.44	1.4	1.63	9.30	0.11	19.9	8.52
S1105143-007	11UTCR01	165-216	8.8	27.1	2.74	1.3	2.99	9.70	0.19	21.5	8.56
S1105143-008	11UTCR02	0-10	8.1	31.6	0.48	3.1	2.79	0.69	1.16	0.51	0.39
S1105143-009	11UTCR02	10-30	7.9	44.1	0.44	3.1	3.67	0.94	0.13	0.28	0.18
S1105143-010	11UTCR02	30-54	8.2	36.5	0.34	2.2	2.86	1.11	0.07	0.25	0.18
S1105143-011	11UTCR02	54-90	8.5	33.8	0.35	1.8	1.92	1.87	0.04	0.38	0.27
S1105143-012	11UTCR02	90-130	8.7	32.0	0.39	1.0	0.68	2.18	0.04	1.31	1.09
S1105143-013	11UTCR02	130-185	8.8	30.4	1.34	1.1	0.89	2.82	0.07	10.6	7.82
S1105143-014	11UTCR03	0-10	8.0	30.5	0.45	3.2	4.18	0.69	0.29	0.34	0.22
S1105143-015	11UTCR03	10-28	7.8	56.1	0.44	3.2	3.87	1.08	0.06	0.39	0.25
S1105143-016	11UTCR03	28-60	8.0	45.6	0.46	3.4	3.25	1.46	0.06	0.45	0.29
S1105143-017	11UTCR03	60-110	8.4	41.9	0.71	1.4	3.04	3.43	0.07	2.46	1.37
S1105143-018	11UTCR03	110-140	8.6	30.4	1.55	1.1	2.14	10.0	0.08	9.33	3.78
S1105143-019	11UTCR03	140-170	8.7	27.4	1.33	0.6	1.81	6.06	0.06	9.34	4.71
S1105143-020	11UTCR03	170-214	8.6	25.3	2.15	1.1	1.79	6.34	0.07	17.9	8.90

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Labs
Your Enviromental Monitoring Partner
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Soil Analysis Report

Long Resource Consultants, Inc.
1960 West Deep Creek Road
Morgan, UT 84050

Report ID: S1105143002
(Replaces S1105143001)
Date Reported: 7/1/2011
Work Order: S1105143

Project: Utah American Energy Crandall Ponds
Date Received: 5/9/2011

Lab ID	Sample ID	Depths	Sand	Silt	Clay	Texture	Very Fine Sand	CaCO3	Nitrate (as N)	Phosphorus	Available Potassium
		cm	%	%	%		%	%	ppm	ppm	meq/100g
S1105143-001	11UTCR01	0-12	53.0	29.0	18.0	Sandy Loam	9.8	34.0	0.2	5.82	0.18
S1105143-002	11UTCR01	12-26	53.0	29.0	18.0	Sandy Loam	11.6	33.1	0.2	4.40	0.10
S1105143-003	11UTCR01	26-50	60.0	28.0	12.0	Sandy Loam	12.2	28.9	<0.1	3.73	0.09
S1105143-004	11UTCR01	50-94	64.0	24.0	12.0	Sandy Loam	14.1	31.9	<0.1	2.76	0.09
S1105143-005	11UTCR01	94-120	58.0	21.0	21.0	Sandy Clay Loam	13.7	22.1	<0.1	3.37	0.18
S1105143-006	11UTCR01	120-165	51.0	28.0	21.0	Loam	10.3	36.4	<0.1	3.06	0.07
S1105143-007	11UTCR01	165-216	56.0	26.0	18.0	Sandy Loam	10.3	33.1	<0.1	1.99	0.07
S1105143-008	11UTCR02	0-10	66.0	16.0	18.0	Sandy Loam	15.4	27.0	0.4	13.8	0.84
S1105143-009	11UTCR02	10-30	53.0	27.0	20.0	Sandy Clay Loam	10.2	41.1	<0.1	6.19	0.14
S1105143-010	11UTCR02	30-54	56.0	26.0	18.0	Sandy Loam	15.1	40.7	0.2	4.25	0.08
S1105143-011	11UTCR02	54-90	74.0	19.0	7.0	Sandy Loam	12.2	34.8	<0.1	2.66	0.08
S1105143-012	11UTCR02	90-130	64.0	22.0	14.0	Sandy Loam	21.9	17.0	<0.1	2.38	0.15
S1105143-013	11UTCR02	130-185	54.0	27.0	19.0	Sandy Loam	10.8	38.4	<0.1	5.47	0.07
S1105143-014	11UTCR03	0-10	70.0	18.0	12.0	Sandy Loam	14.1	26.3	2.6	13.6	0.46
S1105143-015	11UTCR03	10-28	66.0	21.0	13.0	Sandy Loam	8.6	54.2	1.9	8.56	0.09
S1105143-016	11UTCR03	28-60	64.0	22.0	14.0	Sandy Loam	9.0	55.2	2.9	5.94	0.07
S1105143-017	11UTCR03	60-110	63.0	26.0	11.0	Sandy Loam	10.2	42.3	4.5	5.06	0.07
S1105143-018	11UTCR03	110-140	60.0	25.0	15.0	Sandy Loam	9.9	42.5	4.9	3.14	0.06
S1105143-019	11UTCR03	140-170	85.0	8.0	7.0	Loamy Sand	4.9	28.4	1.2	4.14	0.03
S1105143-020	11UTCR03	170-214	70.0	18.0	12.0	Sandy Loam	12.3	30.8	<0.1	3.46	0.06

These results apply only to the samples tested.

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Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Soil Analysis Report

Long Resource Consultants, Inc.
1960 West Deep Creek Road
Morgan, UT 84050

Report ID: S1105143002
(Replaces S1105143001)
Date Reported: 7/1/2011
Work Order: S1105143

Project: Utah American Energy Crandall Ponds
Date Received: 5/9/2011

Lab ID	Sample ID	Depths cm	Total Carbon %	TOC %	Neutral. Potential t/1000t
S1105143-001	11UTCR01	0-12	5.2	1.2	340
S1105143-002	11UTCR01	12-26	4.7	0.8	331
S1105143-003	11UTCR01	26-50	4.1	0.7	289
S1105143-004	11UTCR01	50-94	3.9	<0.1	319
S1105143-005	11UTCR01	94-120	2.9	0.2	221
S1105143-006	11UTCR01	120-165	4.9	0.5	364
S1105143-007	11UTCR01	165-216	4.3	0.3	331
S1105143-008	11UTCR02	0-10	4.2	1.0	270
S1105143-009	11UTCR02	10-30	6.5	1.5	411
S1105143-010	11UTCR02	30-54	5.7	0.8	407
S1105143-011	11UTCR02	54-90	4.6	0.4	348
S1105143-012	11UTCR02	90-130	2.2	0.2	170
S1105143-013	11UTCR02	130-185	4.9	0.3	384
S1105143-014	11UTCR03	0-10	4.1	1.0	263
S1105143-015	11UTCR03	10-28	8.7	2.2	542
S1105143-016	11UTCR03	28-60	7.5	0.9	552
S1105143-017	11UTCR03	60-110	5.8	0.7	423
S1105143-018	11UTCR03	110-140	5.5	0.4	425
S1105143-019	11UTCR03	140-170	3.4	<0.1	284
S1105143-020	11UTCR03	170-214	3.9	0.2	308

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

ATTACHMENT 7

SEDIMENTATION AND DRAINAGE CONTROL PLAN
BLACKHAWK ENGINEERING

GENWAL RESOURCES, INC.

CRANDALL CANYON MINE

PROPOSED EVAPORATION BASIN

UTAH REGISTERED PROFESSIONAL ENGINEER
#154168
DAN W. GUY
11/11/11

DAN W. GUY, P.E.

November 2011

PROPOSED EVAPORATION BASIN
CRANDALL CANYON MINE

Introduction

This evaporation basin will be constructed to contain the slurry being removed from the Mine Water Treatment Facility located at the Crandall Canyon Mine. The proposed site is located approximately 8 miles southeast of the Crandall Canyon Mine, along Emery County Public Road No. 303, also known as the Burma Road. The material is proposed to be hauled by truck from the Crandall Canyon Mine to U.S. Highway 31 in Huntington Canyon, then down Highway 31 to the Burma Road and into the evaporation basin. The basin will allow for total containment of the material and evaporation of the liquid.

General

The proposed evaporation basin is shown in detail on Drawings 1 through 6 in this report. The basin is proposed to be constructed on slightly sloping ground; with the upper (northern) portion completely incised and the lower (southern) portion partially incised with a designed containment berm.

As shown on Drawings 4 and 5, the evaporation basin will be accessed from the Burma Road by an entrance road, which ties to a perimeter access road around the basin. Construction of the basin and roads will involve a cut/fill volume of approximately 3500 cubic yards of material. Approximately 1137 cubic yards of topsoil is expected to be salvaged and stored on site prior to construction of the basin.

The basin is proposed to be completely enclosed, with no outlet or discharge. It will have a depth of at least 5 feet below the top of the berm. Stored/dried material will not exceed 24" in depth, and the maximum water level will not exceed 36". This will provide for a minimum of 24" of freeboard to the top of the berm. The maximum water level includes not only fluid from the deposited material but also direct precipitation into the basin from a 10 year-24 hour precipitation event. The slurry to be placed in the basin is primarily water, with some chemicals and precipitated iron particles. After evaporation of the liquid, only a very small amount of solids are left behind. The slurry material is cleaned from the Mine Water Treatment Facility approximately every other month. Although the amount of cleaned material may vary, it is conservatively estimated that the total cleaning volume will not exceed over 15 truckloads per month.

Since the slurry material is primarily liquid, the 2' depth for the solid material in the basin will provide for an extremely long-term storage of the solids. There are no present plans for removal of this material; however, should it become necessary, it would be removed and disposed of in accordance with applicable laws at that time.

Drainage above the basin will be diverted by a constructed undisturbed drainage ditch, which will flow to the east into a natural drainage channel, and to the west into an 18" cmp beneath the entrance road and into a natural drainage. Sediment control structures will be placed in each of the natural drainage channels, as well as below the basin containment berm and the topsoil pile, as shown on Drawings 4 and 5.

The containment berm will be approximately 20' wide on top with a 3H:1V slope into the basin and a 2H:1V slope to the outside. It will be constructed of a compacted earthen core on the inside with excess boulder storage on the outer slope. The top, roadway portion will be surfaced with a layer of impervious material. The outslope will be covered with at least 6" of subsoil material and revegetated with the approved, interim seed mix. A stability analysis has been completed for the proposed containment berm, showing it will have a factor of safety well in excess of the required 1.3. This stability analysis is included in this report as Attachment 1.

The salvaged topsoil will be placed in a pile southeast of the containment berm. The pile will be approximately 10' high with 2H: 1V side slopes, and surrounded by a 1' or higher berm for runoff protection. The topsoil pile will also be seeded with the interim vegetation mix.

The undisturbed drainage ditch (B-UD1) will be at least 15" deep with approximately 1H:1V side slopes. This ditch will be armored with rip-rap, if necessary, to prevent erosion; however, calculations show the expected flow in this ditch to be less than 2 fps, which is not considered erosive. The culvert to be placed beneath the entrance road will be at least an 18" cmp. Inlet and/or outlet protection will be provided as necessary to prevent erosion; however, once again, the calculated flow and velocity are well below erosive levels.

All drainage control structures and the evaporation basin are designed to safely contain or carry runoff from a 10 year-24 hour precipitation event for the area. The following section will provide design calculations for each of the structures.

Calculations

Hydrologic calculations have been performed for each of the structures in this proposal.

Peak flows, channel flow depths and velocities were calculated using the computer program "Office of Surface Mining Watershed Model", Storm Version 6.20 by Gary E. McIntosh. (Triangular Channel Flow). All flow is based on the SCS-TR55 method for Type II storms.

Culverts were sized using the "Haestad methods, Flowmaster I, Version 3.43" Computer Program.

Design Parameters

The following parameters have been used in the hydrologic calculations:

1. 10 year-24 hour Precipitation Event 2.00"
2. Runoff CN for Undisturbed Area 80
   a. Based on the most conservative undisturbed CN for the Crandall Canyon Minesite.
3. Manning's N for Undisturbed Ditch 0.035
4. Manning's N for Culverts 0.020
5. Channel Calculations Based on 1H:1V Side Slopes.

Evaporation Basin

1.	Surface Area	1.16 acres
2.	Direct Precipitation	2.00"
3.	Precipitation Volume	8427 cu.ft.
4.	Depth in Basin	4.26"

Based on the above, the direct precipitation of a 10 year-24 hour event to the 1/16 acres of surface area of the basin and applicable portion of the entrance road would increase the water depth in the basin by approximately 4.26". This increase in depth is based on the accumulation being at the maximum depth of 24" per Drawing 5.

Runoff to Undisturbed Drainage Ditch B-UD-1

1. Drainage Area 1.58 acres
2. Hydraulic Length 225'
3. Ground Slope 7.11%
4. Runoff CN 80

Based on the above, the calculated flow to the ditch would be 0.30 cfs.

B-UD-1

1. Flow 0.30 cfs
2. Ditch Slope 2.25%
3. Side Slopes 1H:1V
4. Manning's N 0.035
5. Flow Depth 0.41'
6. Velocity 1.77 fps

Undisturbed drainage ditch B-UD1 will be constructed with a minimum depth of 15" and approximate 1H:1V side slopes. The calculated flow through this ditch will be 0.30 cfs at a depth of 0.41' and a velocity of 1.77 fps. The ditch will have a freeboard of approximately 0.84' and should not need to be armored based on expected velocity calculations.

Runoff to 18" cmp B-C1

1. Drainage Area 0.71 acres
2. Hydraulic Length 188'
3. Ground Slope 6.38%
4. Runoff CN 80

The calculated flow to the culvert B-C1 is 0.13 cfs.

B-C1

1.	Flow	0.13 cfs
2.	Culvert Slope	3.0 %
3.	Manning's N	0.020
4.	Minimum Size Req'd	0.28'
5.	Velocity	2.17 fps

Culvert B-C1 will be an 18" cmp. Based on the calculations, the expected flow could be passed with a 4" diameter culvert. The proposed culvert is therefore more than adequate to carry the expected runoff. The calculated velocity of 2.17 fps in not expected to be erosive; however, armoring will be employed at the culvert outlet if it becomes necessary.

Summary

The proposed evaporation basin as designed will safely contain the expected slurry material from the Crandall Canyon Mine, as well as the direct precipitation from a 10 year-24 hour rainfall event. The designed hydrologic structures are also shown to be adequate to safely carry the runoff from a 10 year-24 hour precipitation event.

A stability analysis has also been completed for the proposed berm on the basin, showing it to have a factor of safely well in excess of the required 1.3 for both dry and saturated conditions.

ADDENDUM

ADDITIONAL CALCULATIONS

Stage-Area-Storage for Pond 1P: Burma Pond

Elevation (feet)	Storage (acre-feet)
6,390.00	0.000
6,390.10	0.046
6,390.20	0.093
6,390.30	0.140
6,390.40	0.187
6,390.50	0.235
6,390.60	0.283
6,390.70	0.332
6,390.80	0.381
6,390.90	0.430
6,391.00	0.480
6,391.10	0.530
6,391.20	0.581
6,391.30	0.632
6,391.40	0.684
6,391.50	0.736
6,391.60	0.789
6,391.70	0.842
6,391.80	0.895
6,391.90	0.949
6,392.00	1.003
6,392.10	1.058
6,392.20	1.113
6,392.30	1.169
6,392.40	1.225
6,392.50	1.281
6,392.60	1.338
6,392.70	1.396
6,392.80	1.454
6,392.90	1.512
6,393.00	1.571
6,393.10	1.630
6,393.20	1.690
6,393.30	1.750
6,393.40	1.811
6,393.50	1.872
6,393.60	1.934
6,393.70	1.996
6,393.80	2.058
6,393.90	2.121
6,394.00	2.185
6,394.10	2.249
6,394.20	2.313
6,394.30	2.378
6,394.40	2.444
6,394.50	2.510
6,394.60	2.576
6,394.70	2.643
6,394.80	2.710
6,394.90	2.778
6,395.00	2.847

Stage-Discharge for Pond 1P: Burma Pond

Elevation (feet)	Primary (cfs)
6,390.00	0.00
6,390.10	0.00
6,390.20	0.00
6,390.30	0.00
6,390.40	0.00
6,390.50	0.00
6,390.60	0.00
6,390.70	0.00
6,390.80	0.00
6,390.90	0.00
6,391.00	0.00
6,391.10	0.00
6,391.20	0.00
6,391.30	0.00
6,391.40	0.00
6,391.50	0.00
6,391.60	0.00
6,391.70	0.00
6,391.80	0.00
6,391.90	0.00
6,392.00	0.00
6,392.10	0.00
6,392.20	0.00
6,392.30	0.00
6,392.40	0.00
6,392.50	0.00
6,392.60	0.00
6,392.70	0.00
6,392.80	0.00
6,392.90	0.00
6,393.00	0.00
6,393.10	0.00
6,393.20	0.00
6,393.30	0.00
6,393.40	0.00
6,393.50	0.00
6,393.60	0.00
6,393.70	0.00
6,393.80	0.00
6,393.90	0.00
6,394.00	0.00
6,394.10	0.00
6,394.20	0.00
6,394.30	0.00
6,394.40	0.00
6,394.50	0.00
6,394.60	0.51
6,394.70	1.45
6,394.80	2.68
6,394.90	4.16
6,395.00	5.84

10yr-24hr Hydrograph for Pond 1P: Burma Pond

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
5.00	0.04	0.000	6,393.00	0.00
5.50	0.04	0.002	6,393.00	0.00
6.00	0.04	0.003	6,393.01	0.00
6.50	0.04	0.005	6,393.01	0.00
7.00	0.05	0.007	6,393.01	0.00
7.50	0.05	0.009	6,393.02	0.00
8.00	0.05	0.011	6,393.02	0.00
8.50	0.06	0.013	6,393.02	0.00
9.00	0.07	0.016	6,393.03	0.00
9.50	0.07	0.019	6,393.03	0.00
10.00	0.09	0.023	6,393.04	0.00
10.50	0.12	0.027	6,393.05	0.00
11.00	0.17	0.033	6,393.06	0.00
11.50	0.30	0.042	6,393.07	0.00
12.00	0.85	0.115	6,393.19	0.00
12.50	0.21	0.130	6,393.22	0.00
13.00	0.14	0.137	6,393.23	0.00
13.50	0.11	0.142	6,393.24	0.00
14.00	0.09	0.146	6,393.25	0.00
14.50	0.08	0.150	6,393.25	0.00
15.00	0.07	0.153	6,393.26	0.00
15.50	0.06	0.156	6,393.26	0.00
16.00	0.05	0.158	6,393.26	0.00
16.50	0.05	0.160	6,393.27	0.00
17.00	0.05	0.162	6,393.27	0.00
17.50	0.05	0.164	6,393.27	0.00
18.00	0.04	0.166	6,393.28	0.00
18.50	0.04	0.168	6,393.28	0.00
19.00	0.04	0.169	6,393.28	0.00
19.50	0.03	0.171	6,393.29	0.00
20.00	0.03	0.172	6,393.29	0.00

100yr-24hr Hydrograph for Pond 1P: Burma Pond

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
5.00	0.05	0.000	6,393.00	0.00
5.50	0.05	0.002	6,393.00	0.00
6.00	0.05	0.004	6,393.01	0.00
6.50	0.06	0.007	6,393.01	0.00
7.00	0.06	0.009	6,393.02	0.00
7.50	0.06	0.012	6,393.02	0.00
8.00	0.07	0.014	6,393.02	0.00
8.50	0.08	0.017	6,393.03	0.00
9.00	0.10	0.021	6,393.04	0.00
9.50	0.10	0.025	6,393.04	0.00
10.00	0.12	0.030	6,393.05	0.00
10.50	0.16	0.035	6,393.06	0.00
11.00	0.22	0.043	6,393.07	0.00
11.50	0.38	0.055	6,393.09	0.00
12.00	1.10	0.149	6,393.25	0.00
12.50	0.27	0.168	6,393.28	0.00
13.00	0.19	0.178	6,393.30	0.00
13.50	0.14	0.184	6,393.31	0.00
14.00	0.11	0.190	6,393.32	0.00
14.50	0.10	0.194	6,393.32	0.00
15.00	0.09	0.198	6,393.33	0.00
15.50	0.08	0.202	6,393.34	0.00
16.00	0.07	0.205	6,393.34	0.00
16.50	0.07	0.207	6,393.35	0.00
17.00	0.06	0.210	6,393.35	0.00
17.50	0.06	0.213	6,393.36	0.00
18.00	0.05	0.215	6,393.36	0.00
18.50	0.05	0.217	6,393.36	0.00
19.00	0.05	0.219	6,393.37	0.00
19.50	0.04	0.221	6,393.37	0.00
20.00	0.04	0.223	6,393.37	0.00

ATTACHMENT 8

BLM RECOMMENDED SEED MIX

Shaver, Dave

From: Truman, Dana K [dtruman@blm.gov]
Sent: Tuesday, January 10, 2012 9:12 AM
To: Shaver, Dave
Subject: Crandal
Attachments: Seedmix for Crandal Canyon Evaporation pond suggestion.docx

Seed mix

Dana

Dana Truman
BLM Price Field Office
125 South 600 West
Price, UT 84501
Field Manager: Patricia Clabaugh
Phone: (435) 636-3628
Fax (435) 636-3657

Seedmix for Crandal Canyon Evaporation pond suggestion.......

Based on the vegetation report, this area appears to be dominated by pinyon trees, crested wheatgrass, and several native forbs. Because of the current site conditions BLM would recommend using more native grasses to try to encourage a more natural ecosystem. Because crested wheatgrass is already in the system, crested wheatgrass is also recommended for its soil stabilization ability. If due to high seed costs or availability, grasses such as Needle and Thread grass could be substituted with sandburg bluegrass, etc. There are several ways to create a seed mix, so this is just a suggestion. If changing the seed mix, I would recommend keeping the seedmix simple and relatively similar to the surrounding vegetation.

The following table has suggested species and seeding rate for broadcast seeding.

Specie	**Species/Variety**	**Scientific name**	**Seeding Rate** (PLS lbs/ac)
1	Galleta	*Pleuraphis jamesii*	1.5
2	Ricegrass, Indian	*Achnatherum hymenoides*	4
3	Wheatgrass, Crest. (Nordan)	*Agropyron cristatum*	2.5
4	Needle and thread	*Hesperostipa comata*	1.5
5	Penstemon, Rocky Mtn.	*Penstemon palmeri*	0.5
6	Globemallow	*Sphaeralcea coccinea*	0.3
7	Fourwing Saltbush	*Atriplex canescens*	1.3
8	Winterfat	*Krascheninnikovia lanata*	0.7
	Total		12.3

ATTACHMENT 9

EMERY COUNTY ROAD ENCROACHMENT PERMIT

EMERY COUNTY

Road Department

ANNUAL PERMIT

Permit #201139

Application having been made by Genwal Resources, Inc.through David Shaver, its authorized agent, a fee of $50.00 being paid, and the Application having been reviewed and accepted, permission is hereby granted Applicant to proceed with the installation of an access into the Crandall Canyon Mine water treatment pond located off the Burma Road #303.

Stipulations:

1. Dust control during construction period.
2. Proper signing while construction is in effect.
3. Posting for safety during construction and traffic control (if needed).
4. Road repairs in the event of damages.
5. Final inspection upon completion of installation.
6. Strict compliance with Ordinance 8-7-85A or as amended.
7. Permittee will be responsible to contact Blue Stakes (1-800-662-4111) before any construction begins.

DATED this 11th day of October, 2011.

Supervisor

EMERY COUNTY ROAD DEPARTMENT

By ______________________

INSPECTION AND RELEASE

The Emery County Road Department Supervisor inspected said site on the ________ day of __________, 20 _____, finds the following:

__ Deficiencies which must be corrected before release can be considered.

__ Released

____

Supervisor

EMERY COUNTY ROAD DEPARTMENT

By ______________________

Person to Contact:

Name: David Shaver for Genwal Resources, inc.

Address: P O Box 109, East Carbon City, UT 84520

Phone #: (435) 888-4000

INCORPORATED
NOV 09 2012
Div. of Oil, Gas & Mining

ROADWAY ENCROACHMENT APPLICATION

Date: October 11, 2011

Applicant: Genwal Resources, Inc

Address: P.O. Box 910

City: East Carbon City State: UT Zip: 84520

Phone: 435 888-4000

Purpose of application, explain in detail:

To provide access into the site of a proposed evaporation pond to be used as part of the Crandall Canyon Mine water treatment

Plan for restoration of road/right of way, explain in detail:

The facility will be constructed and operated under the Crandall Mine mining and reclamation plan approved by DOGM, and will be reclaimed under State and federal law

Plans for safety, traffic and dust control, explain in detail:

The general contractor (not yet chosen) will assume all responsibility for safety, traffic and dust control including warning signs, flagging and road watering as needed

Location of encroachment (enclose a map/sketch): See enclosed drawings

County Road #: 303 Name of Road: Burma Road

Date beginning Project: Jan 2012 (est) Date of Project Completion: April 2012 (est)

Has Applicant acquired written permission from all agencies or property owners affected by this project?

Yes ✓ No ___ SITLA lease 1708

The law requires that Blue Stakes be contacted (1-800-662-4111) before digging. Has Blue Stakes been contacted? Yes ___ No ✓ Date Contacted: There will be no digging required within the road encroachment

Applicant agrees to comply with all laws, ordinances and regulations of all governing agencies including but not limited to Emery County, as well as the instructions of the Emery County Road Supervisor or his indicated representative. It is the responsibility of the Applicant to contact and acquire written permission from the other agencies and property owners affected by Applicant's activities before commencing the project. All liability and restitution for damages will be the sole responsibility of the Applicant. A non refundable processing fee of $50.00 is tendered with this application. **Additional impact fees maybe required on certain classes of Permit.**

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David Shaver, for Genwal Resources, Inc.

Applicant's Name (Print)

[signature]

Applicant's Signature

Oct 11, 2011

Date

ATTACHMENT 10

LABORATORY ANALYSIS OF SLUDGE MATERIAL

SGS

Analysis Report

Sediment

March 04, 2011

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Client Sample ID:	Genwal Resources Inc.	Sample ID By:	Genwal Resources Inc.
Date Sampled:	Feb 11, 2011	Sample Taken At:	Sludge site
Date Received:	Feb 11, 2011	Sample Taken By:	Dana
Product Description:	WATER	Time Received:	1545
		Time Sampled:	1500
		Mine:	8

Comments: Analyzed at American West Analytical Lab
Hex-Cr Matrix spike recovery indicates interference. The method is in control as indicated by the LCS
Hex-Cr was re-analyzed outside of the holding time. The results for the total chromium indicate no hexavalent chromium is present in the sample
The results for the total chromium and the hexavalent chromium indicate no trivalent chromium in the sample

SGS Minerals Sample ID: 782-1106539-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
Cyanide	<0.005	mg/L	EPA 335.4	0.005	2011-02-24	12:46:00	DI
Hexavalent chromium	<0.05	mg/L	SM 3500-Cr	0.050	2011-03-01	12:03:00	DI
Mercury, Hg - Total	<0.0015	mg/L	EPA 245.1	0.002	2011-02-18	08:50:00	DI
METALS BY ICP							
Aluminum, Al - Total	3260	mg/L	EPA 200.7	10.000	2011-02-17	19:45:00	DI
Arsenic, As - Total	0.046	mg/L	EPA 200.8	0.003	2011-02-18	01:12:00	DI
Cadmium, Cd - Total	0.0047	mg/L	EPA 200.8	0.001	2011-02-18	01:12:00	DI
Chromium, Cr - Total	<0.01	mg/L	EPA 200.7	0.010	2011-02-17	19:45:00	DI
Copper, Cu - Total	0.025	mg/L	EPA 200.8	0.004	2011-02-18	01:12:00	DI
Iron, Fe - Total	1110	mg/L	EPA 200.7	10.000	2011-02-17	19:45:00	DI
Lead, Pb - Total	0.018	mg/L	EPA 200.8	0.002	2011-02-18	01:12:00	DI
Nickel, Ni - Total	0.428	mg/L	EPA 200.8	0.004	2011-02-18	01:12:00	DI
Selenium, Se - Total	0.012	mg/L	EPA 200.8	0.004	2011-02-18	01:12:00	DI
Silver, Ag - Total	<0.002	mg/L	EPA 200.8	0.002	2011-02-18	01:12:00	DI
Zinc, Zn - Total	2.100	mg/L	EPA 200.8	0.025	2011-02-18	01:12:00	DI

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Lab Supervisor

Domenic Ibanez
Lab Supervisor

Analysis Report

Supernatant

March 02, 2011

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Client Sample ID:	Genwal Resources Inc.	Sample ID By:	Genwal Resources Inc.
Date Sampled:	Feb 23, 2011	Sample Taken At:	UPDES 002
Date Received:	Feb 23, 2011	Sample Taken By:	Dana
Product Description:	WATER	Time Received:	1025
		Time Sampled:	0845
		Mine:	8
		Site:	40
		Field - pH:	7.6 pH
		Field - Dis. Oxygen:	10.46 MG/L
		Field - Conductivity:	828 UMHOS/CM
		Field - Temperature:	9 DEG. C
Comments:	Dissolved Metal Field Filtered		

SGS Minerals Sample ID: 782-1106701-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
Oil and Grease, (HEM)	<5	mg/L	EPA 1664-A	5.000	2011-02-25	08:00:00	CM
Sulfate, SO4	176	mg/L	EPA 300.0	1.000	2011-02-25	16:05:00	AL
Total Dissolved Solids	634	mg/L	SM2540-C	30.000	2011-02-24	13:50:00	CM
Total Suspended Solids	<5	mg/L	SM2540-D	5.000	2011-02-24	13:50:00	CM
Alkalinity, mg CaCO3/L (pH 4.5)	363	mg/L	SM2320-B	5.000	2011-02-24	07:45:00	AL
Carbonate Alkalinity as CaCO3	<5	mg/L	SM2320-B	5.000	2011-02-24	07:45:00	AL
Bicarbonate Alkalinity as CaCO3	363	mg/L	SM2320-B	5.000	2011-02-24	07:45:00	AL
METALS BY ICP							
Aluminum, Al - Dissolved	<0.03	mg/L	EPA 200.7	0.030	2011-02-28	17:26:00	AL
Aluminum, Al - Total	0.23	mg/L	EPA 200.7	0.030	2011-03-01	16:30:48	AL
Iron, Fe - Dissolved	<0.03	mg/L	EPA 200.7	0.030	2011-02-28	17:26:00	AL
Iron, Fe - Total	<0.05	mg/L	EPA 200.7	0.050	2011-03-01	16:30:46	AL
Manganese, Mn - Dissolved	0.108	mg/L	EPA 200.7	0.002	2011-02-28	17:26:00	AL
Manganese, Mn - Total	0.108	mg/L	EPA 200.7	0.002	2011-03-01	16:30:44	AL

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Lab Supervisor

Domenic Ibanez
Lab Supervisor

SGS North America Inc. | Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

RcRA

General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
Laboratory: 65 North 300 East Price, UT. 84501

HORIZON LABORATORIES

Report Date
4/15/2010

Client
UtahAmerican Energy Inc.
Genwal Resources, Inc.
PO Box 1077
Price, UT. 84501
Dave Shaver
(435)888-4017

Sample I.D.
Flock

Sampled By: D.M.

Date: 4/8/2010 Time: 11:00

Received
Date: 4/8/2010 Time: 14:05

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU

Notes:

Lab I.D. #: 999 Mine Code 8 Site Code

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
Metals by ICP							
Arsenic, Total	<0.10	mg/L	0.10	EPA 200.7	4/13/2010	10:37	BLP
Barium, Total	0.825	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Cadmium, Total	<0.02	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Chromium, Total	<0.02	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Lead, Total	<0.05	mg/L	0.050	EPA 200.7	4/13/2010	10:37	BLP
Selenium, Total	<0.10	mg/L	0.10	EPA 200.7	4/14/2010	10:35	BLP
Silver, Total	<0.02	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Manual Cold Vapor							
Mercury, Total	<0.0005	mg/L	0.0005	EPA 245.1	4/14/2010	13:57	BLP

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Brandon Pierce
Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
Balance and Hardness are calculated from certified results.

ATTACHMENT 11

STABILITY ANALYSIS
BLACKHAWK ENGINEERING

ATTACHMENT A

STABILITY ANALYSIS

FOR

PROPOSED EVAPORATION BASIN

GENWAL MINE

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Div. of Oil, Gas & Mining

UTAH REGISTERED PROFESSIONAL ENGINEER
#154168
DAN W. GUY
11/11/11

PREPARED BY: DAN W. GUY, P.E.
NOVEMBER 2011

Introduction:

This report is an evaluation of the expected factors of safety of the proposed embankment for the Evaporation Basin.

Procedure:

Soil characteristics for the proposed embankment material have been tested by RB&G Engineering, Inc., to determine density, cohesion and internal friction angles. These parameters were then used in the safety factor calculations along with the maximum slope height and slope angles for the structure.

Calculations:

Stability calculations were performed using the Hoek Method from Rock Slope Engineering. Under this method, stability projections can be made using soil characteristics such as density, cohesion, internal friction angle and proposed slope height. This information can then be plotted on the provided circular failure charts to determine factors of safety for both Dry and Saturated Conditions. The shear strength available to resist failure and the shear stress present along the possible failure surface are included in the analysis of the factor of safety. The shear strength is characterized by the cohesion and the friction angle. Failure would be assumed to occur on a circular failure slope, which is based on the angle of internal friction. These analyses have been address and verified using the Hoek Method (Hoek, Evert, and J.W. Bray, "Rock Slope Engineering" Spon Press, 270 Madison Ave, New York, NY, 1974).

Slope heights and angles were taken from Drawing 5 of the Proposed Evaporation Basin Report for the Crandall Canyon Mine. Calculations were run on the maximum expected slope height of 5' and maximum expected slope angle of 2H:1V.

Results:

Based on the soil characteristics and slope height and angle, a factor of safety of 12.03 for dry conditions and 10.53 for saturated conditions can be achieved for the proposed slope of 2H:1V (26.57°) at a height of 5'.

Summary:

Based on the parameters used in this report, expected factors of safety for the proposed embankment are 12.03 for dry conditions and 10.53 for saturated conditions. These results show the expected factor of safety to be well in excess of the required 1.30.

TABLE 1
CALCULATION SUMMARY

Maximum Slope Height (H)	5'
Slope Angle	2H:1V (26.57°)
Safety Factor (Dry)	12.03
Safety Factor (Saturated)	10.53

*Density (γ)	=	118.1 pcf
*Cohesion ©	=	908 psf
*Internal Friction Angle (φ)	=	40.1°

Note:

Based on most conservative results of laboratory tests.

FIGURES

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

ϕ=Internal Friction Angle

(DRYCONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

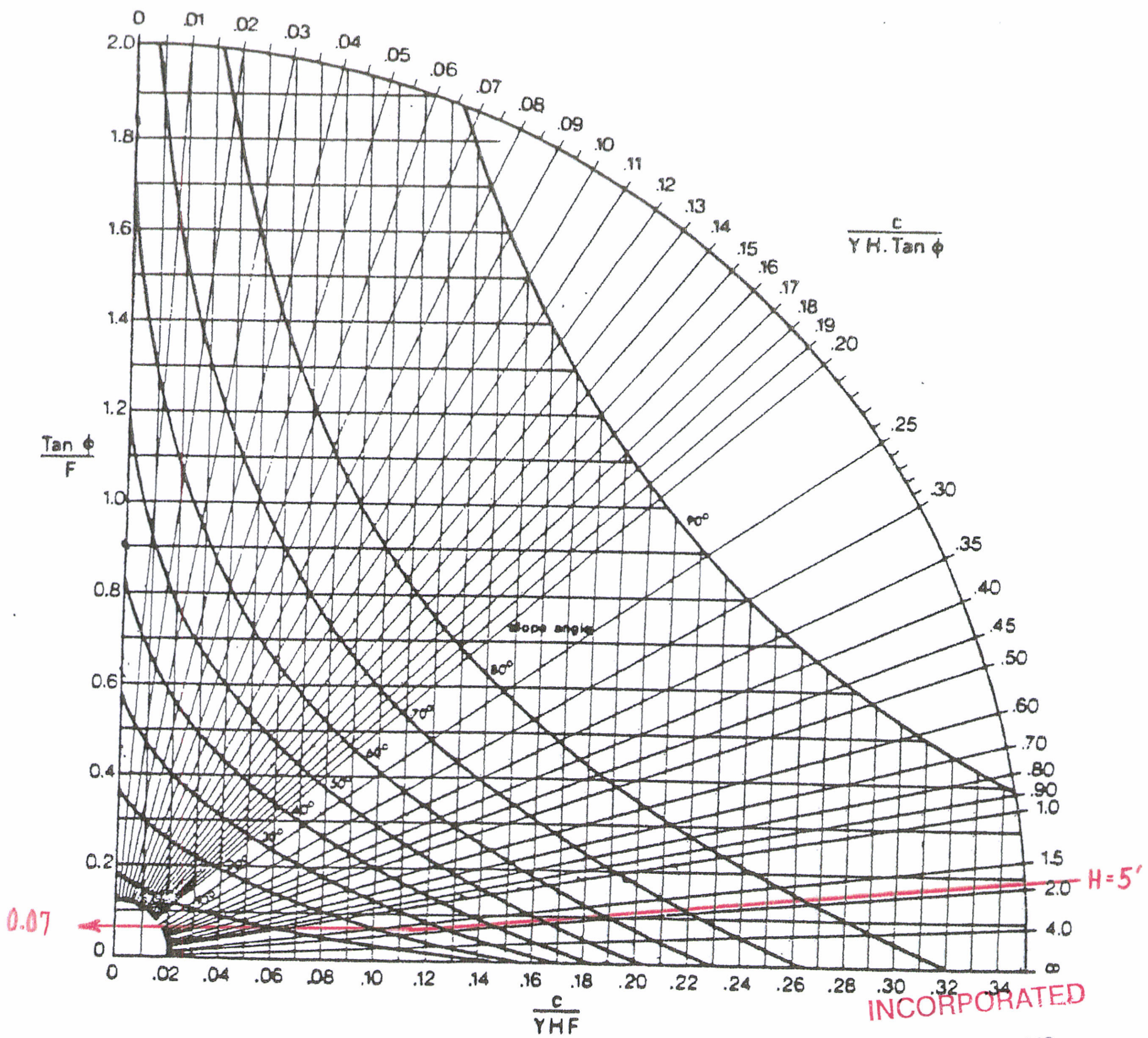


Figure 1

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

Φ=Internal Friction Angle

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

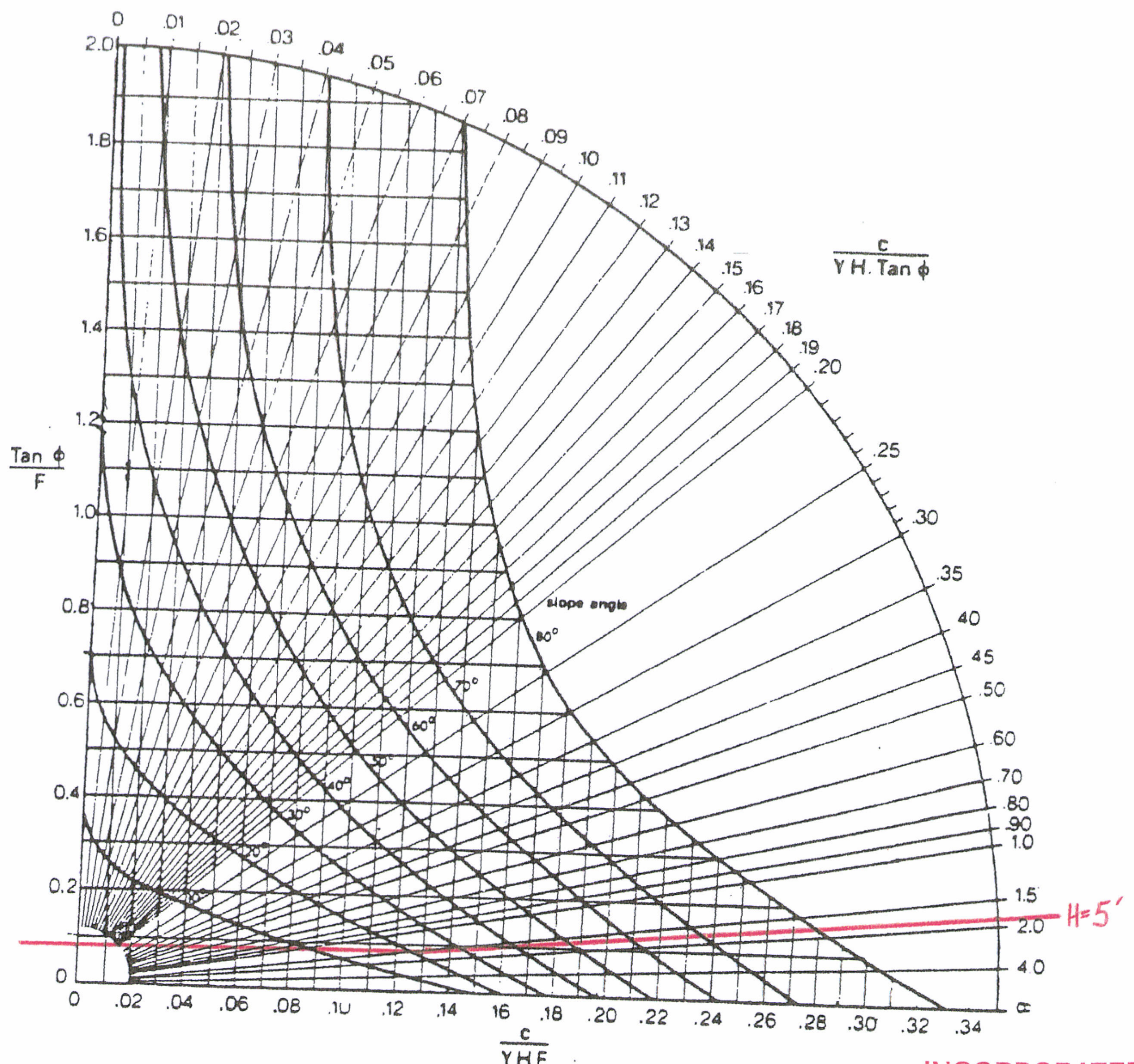


Figure 2

APPENDIX 1
SOIL ANALYSES

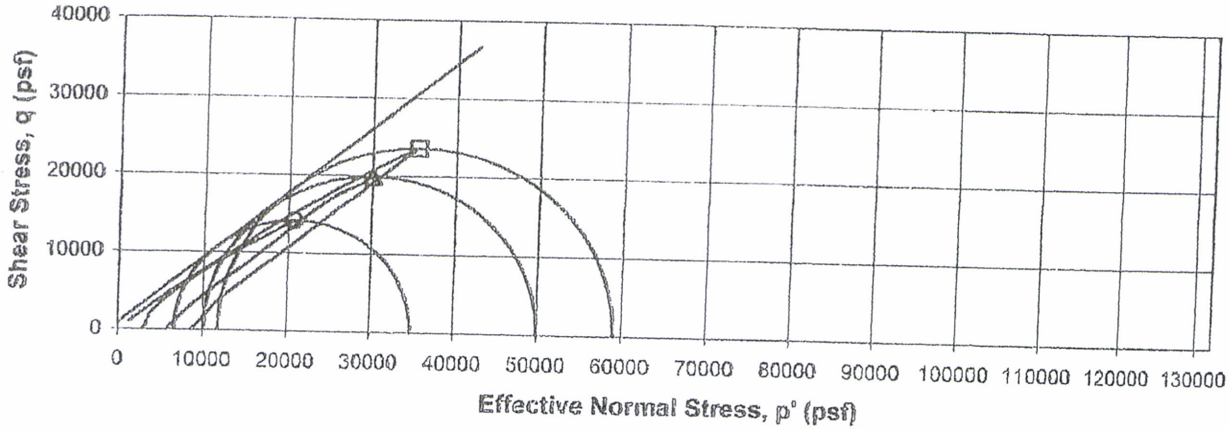
RB&G ENGINEERING, INC.

MULTI-STAGE CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

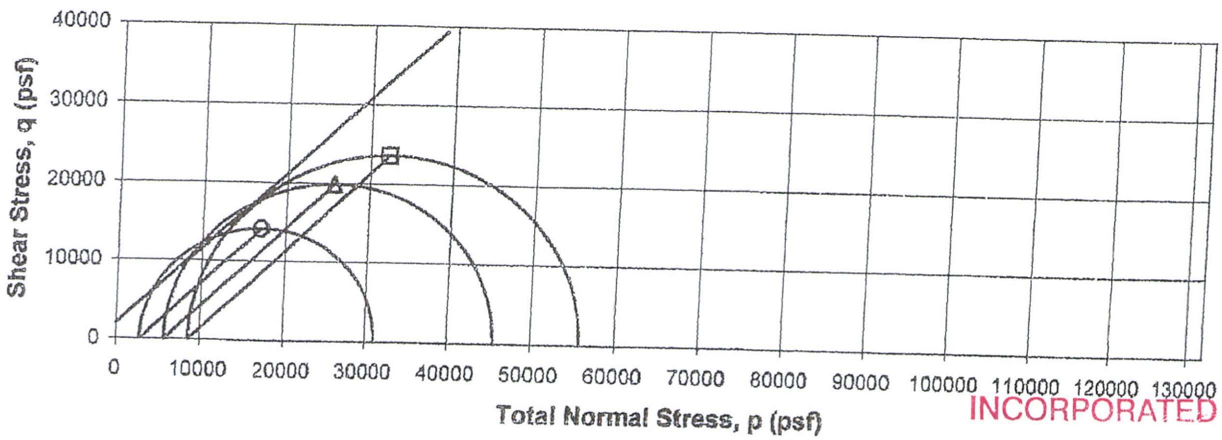
Project	Crandall Cyn ~~Westridge~~ Mine		
Project No.	0	Boring No	0
Location	0	Depth / Elev. (ft)	
Date	11/5/09	Sample Type	Remolded
Tested By	J Boone	Failure Criteria	Max deviator stress
Sample Description	Lt Brown Silty Gravel w/ Sand GM: Non Plastic		

Summary of Results		σ'_{consol} psf	$\sigma_{d,f}$* psf	ε_f	$\sigma'_{1,f}$* psf	$\sigma'_{3,f}$* psf
Stage 1	○	2880	28253	6.2%	34920	6667
Stage 2	Δ	5758	39866	12.0%	49987	10121
Stage 3	□	8639	47239	12.8%	59108	11869

Effective stress failure envelope $c' = 908$ psf $\phi' = 40.1°$



Total stress failure envelope $c = 2000$ psf $\phi = 44°$



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See page two for plots of deviator stress and pore water pressure versus strain.

*Values corrected for membrane effects

**A_c calculated according to ASTM D 4767 10.3.2.1 *Method A*

C:\Documents and Settings\dshaver\Local Settings\Temporary Internet Files\OLK18A\Multistage CU report.xls

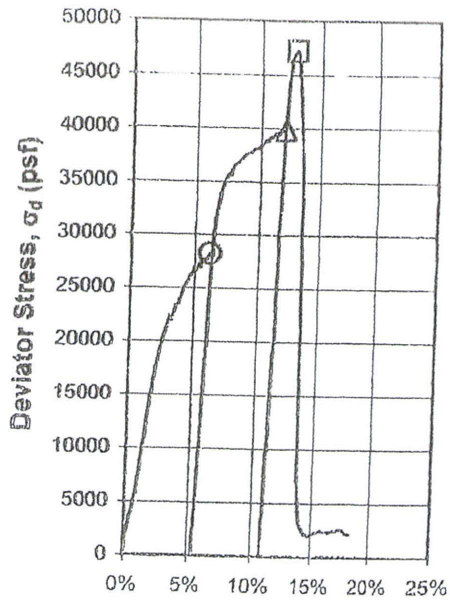
Tested in general accordance with **ASTM D 4767**

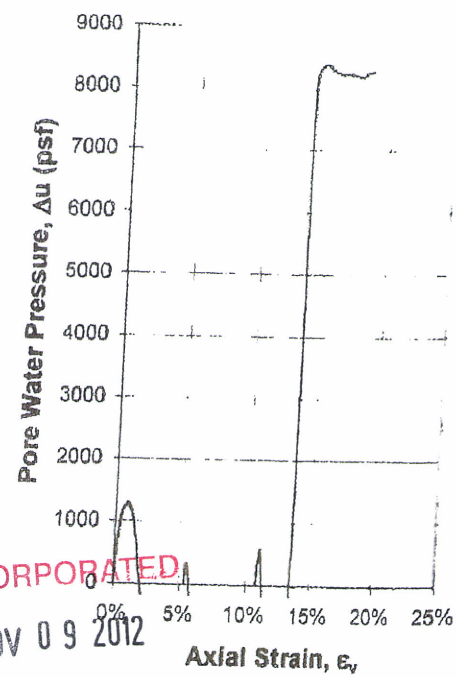
RB&G ENGINEERING, INC.

MULTI-STAGE CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project	Crandall Cyn ~~Westridge~~ Mine	Boring No	0
Project No.	0	Depth / Elev. (ft)	
Location	0	Sample Type	Remolded
Date	11/5/09	Failure Criteria	Max deviator stress
Tested By	J Boone		
Sample Description	Lt Brown Silty Gravel w/ Sand GM: Non Plastic		

			○	△	□	
Symbol			○	△	□	
Stage			1	2	3	
Vertical effective consolidation stress		σ'_c	2880	5758	8639	(psf)
Initial	Height	L_o	6.3	5.90	5.56	(in)
	Diameter	D_o	2.8	2.95	3.02	(in)
	Moisture	w_o	6.9%	15.5%	15.0%	
	Dry unit weight	γ_{do}	122.5	118.1	119.2	(pcf)
	Est. specific gravity	G_s	2.68	2.68	2.68	
	Void ratio	e_o	0.36	0.42	0.40	
	Saturation	S_o	51%	100%	100%	
After consolidation	Moisture	w	15.5%	15.0%	14.6%	
	Dry unit weight	γ_d	118.1	119.2	120.3	(pcf)
	Void ratio	e	0.416	0.403	0.390	
	Saturation	S	100%	100%	100%	
	Area	A_c	6.40	6.70	7.04	(in^2)
	Time to 50% consolidation	t_{50}	0.23	2.23	262.16	(min)
	B-value	B	0.95	-	-	
	Total back pressure		14400	10914	12507	(psf)
Results at Failure	Deviator stress	$\sigma_{d,f}$	28253	39866	47239	(psf)
	Major principal effective stress	σ'_1	34920	49987	59108	(psf)
	Minor principal effective stress	σ'_3	6667	10121	11869	(psf)
	Strain	ε_f	6.2%	12.0%	12.8%	
	Strain rate, /min		0.04%	0.04%	0.04%	
	Sketch at Failure					





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Remarks Draft

*Values corrected for membrane effects
**A_c calculated according to ASTM D 4767 10.3.2.1 *Method A*
C:\Documents and Settings\dshaver\Local Settings\Temporary Internet Files\OLK18A\Multistage CU report.xls

Tested in general accordance with **ASTM D 4767**

RB&G
ENGINEERING, INC.

MULTI-STAGE CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project	Crandall Cyn ~~Westridge~~ Mine		
Project No.	0	Boring No	0
Location	0	Depth / Elev. (ft)	
Date	11/5/09	Sample Type	Remolded
Tested By	J Boone	Failure Criteria	Max deviator stress
Sample Description	Lt Brown Silty Gravel w/ Sand GM: Non Plastic		

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*Values corrected for membrane effects
**A_c calculated according to ASTM D 4767 10.3.2.1 *Method A*
C:\Documents and Settings\dshaver\Local Settings\Temporary Internet Files\OLK16A\Multistage CU report.xls

Tested in general accordance with
ASTM D 4767

ATTACHMENT 12

MSDS SHEETS, COAGULANT AND FLOCCULANT

NALCO

SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : NALCLEAR® 7763

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION
May cause irritation with prolonged contact. Toxic to aquatic organisms.
Do not get in eyes, on skin, on clothing. Do not take internally. Wear suitable protective clothing. Keep container tightly closed. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water. Protect product from freezing.
Wear suitable protective clothing, gloves and eye/face protection.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.
Water in contact with the product will cause slippery floor conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. If swallowed a jelly mass may form which in digestion may cause blockage.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT :
Remove contaminated clothing. Wash off affected area immediately with soap and plenty of water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition. If swallowed a jelly mass may form which in digestion may cause blockage.

5. FIRE FIGHTING MEASURES

FLASH POINT :	Not flammable
LOWER EXPLOSION LIMIT :	Not flammable
UPPER EXPLOSION LIMIT :	Not flammable

EXTINGUISHING MEDIA :
Foam, Dry powder, Carbon dioxide, Other extinguishing agent suitable for Class B fires

UNSUITABLE EXTINGUISHING MEDIA :
Do not use water unless flooding amounts are available.

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FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Notify appropriate government, occupational health and safety and environmental authorities. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Spill may be slippery.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Water in contact with the product will create a voluminous, slippery gel. Soak up as thoroughly as possible with inert absorbent material or sawdust. Do NOT hose down area until all possible traces of polymer are removed. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish and other water organisms. Do not discharge directly into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :
Do not take internally. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not get in eyes, on skin, on clothing. Use with adequate ventilation. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Protect product from freezing.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

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Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit

ENGINEERING MEASURES :
General ventilation is recommended

RESPIRATORY PROTECTION :
Due to its low volatility and toxicity, the hazard potential associated with this material is relatively low. Respiratory protection is not normally needed.

HAND PROTECTION :
Nitrile gloves PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Emulsion
APPEARANCE	Opaque Off-white
ODOR	Hydrocarbon
SPECIFIC GRAVITY	1.03 - 1.07 @ 77 °F / 25 °C
DENSITY	8.6 - 9.0 lb/gal
SOLUBILITY IN WATER	Emulsifiable
pH (100 %)	8
VISCOSITY	400 - 1,200 cps @ 77 °F / 25 °C
FREEZING POINT	< -4 °F / < -20 °C
VOC CONTENT	27.4 % EPA Method 24

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Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures. Extremes of temperature

MATERIALS TO AVOID :
Addition of water results in gelling. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a 1% aqueous solution of the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Sheepshead Minnow	96 hrs	> 1,000 mg/l	1% Aqueous Solution of a Similar Product
Rainbow Trout	96 hrs	> 1,000 mg/l	1% Aqueous Solution of a Similar Product
Fathead Minnow	96 hrs	34.3 mg/l	Product
Inland Silverside	96 hrs	52.5 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	280 mg/l		1% Aqueous Solution of Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	400 mg/l		1% Aqueous Solution of Product

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	70 - 90%

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

CERCLA/SUPERFUND, 40 CFR 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

INCORPORATED
NOV 09 2012
Div. of Oil, Gas & Mining

Limitation: For use as an adjuvant in the manufacture of paper and paperboard in an amount not to exceed that necessary to accomplish the technical effect and not to exceed 2 percent (as polymer) by weight of the paper or paperboard.

NSF INTERNATIONAL :
This product has received NSF/International certification under NSF/ANSI Standard 60 in the coagulation and flocculation category. This product has received NSF/International certification under NSF/ANSI Standard 60 in the Filtration Aid category. The official name is "Polyacrylamide." Maximum product application dosage is : 1 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product. Trace levels of listed components may be present.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND
All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996,and are listed on or are exempt from the New Zealand Inventory of Chemicals.

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight® CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 11/06/2009
Version Number : 1.20

NALCO

SAFETY DATA SHEET

PRODUCT
ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	ULTRION® 8187
APPLICATION :	WATER CLARIFICATION AID
COMPANY IDENTIFICATION :	Nalco Company 1601 W. Diehl Road Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER(S) :	(800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 2 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Aluminum Chloride Hydroxide	12042-91-0	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Irritating to eyes.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing.
Not flammable or combustible. May evolve HCl under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause moderate irritation.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. May cause mucosal damage.

INHALATION :
Not a likely route of exposure. May cause irritation of mucous membranes.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :
Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT :
Remove contaminated clothing. Wash off affected area immediately with plenty of water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire. Keep containers cool by spraying with water.

FIRE AND EXPLOSION HAZARD :
Not flammable or combustible. May evolve HCl under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

STORAGE CONDITIONS :
Store the containers tightly closed. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :
PVC, Buna-N, Polyurethane, Polypropylene, Polyethylene, Viton, HDPE (high density polyethylene), 100% phenolic resin liner

UNSUITABLE CONSTRUCTION MATERIAL :
Brass, Hypalon, Stainless Steel 304, EPDM, Mild steel, Stainless Steel 316L, Neoprene, Epoxy phenolic resin

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Country/Source	Substance(s)	Category:	ppm	mg/m3

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Due to its low volatility and toxicity, the hazard potential associated with this material is relatively low. Respiratory protection is not normally needed.

HAND PROTECTION :
When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE Liquid

APPEARANCE Colorless

ODOR None

SPECIFIC GRAVITY	1.34 @ 77 °F / 25 °C
DENSITY	11.1 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	3.5
FREEZING POINT	32 °F / 0 °C
BOILING POINT	219.2 °F / 104 °C
VAPOR PRESSURE	Same as water
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Avoid extremes of temperature.

MATERIALS TO AVOID :
Strong Bases

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: HCl

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Inland Silverside	96 hrs	> 5,000 mg/l	Product
Rainbow Trout	96 hrs	590 mg/l	Product
Fathead Minnow	96 hrs	1,094 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 5,000 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	4,773 mg/l		Product
Ceriodaphnia dubia	48 hrs	> 5,000 mg/l		Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia		15 mg/l / 30 mg/l	Reproduction	Product

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 99 mg/l

Chemical Oxygen Demand (COD) : 490 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
5 d	< 14 mg/l	Product

Greater than 95% of this product consists of inorganic substances for which a biodegradation value is not applicable.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Aluminum Chloride Hydroxide : Eye irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

Product must be used at a pH above 5.5 to retain its FDA status. Limitations: no more than required to produce intended technical effect.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

NSF INTERNATIONAL :
This product has received NSF/International certification under NSF/ANSI Standard 60 in the coagulation and flocculation category. The official name is "Polyaluminum Chloride." Maximum product application dosage is : 180 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
D2B - Materials Causing Other Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
This product contains substance(s) which are not in compliance with the Law Regulating the Manufacture and Importation Of Chemical Substances and are not listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL).

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/31/2009
Version Number : 3.0

ATTACHMENT 13

WATER RIGHTS SUMMARY

Search all of Utah.gov »

Utah Division of Water Rights

Search Radius: 5280 ft.

From the CT corner North 0 East 0 section 05 township 17S range 8E SLbm

WR Number	Diversion Type	Well Log	Location	Status	Priority	Uses	CFS	ACFT	Owner Name
0393003M00	Underground		S0 W350 E4 06 17S 8E SL	A			0.000	0.000	WATER & ENVIRONMENTAL TECHNOLOGIES
93-928	Rediversion		N760 0 SW 05 17S 8E SL	P	19160725	DIMOSP	0.000	600.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-928	Rediversion		N100 E1270 SW 05 17S 8E SL	P	19160725	DIMOSP	0.000	600.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-928	Rediversion		S1320 W300 N4 08 17S 8E SL	P	19160725	DIMOSP	0.000	600.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-928	Rediversion		S840 E2480 NW 08 17S 8E SL	P	19160725	DIMOSP	0.000	600.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-950	Rediversion		N760 0 SW 05 17S 8E SL	P	19210112	DIMOSP	0.000	465.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-950	Rediversion		N100 E1270 SW 05 17S 8E SL	P	19210112	DIMOSP	0.000	465.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-950	Rediversion		S1320 W300 N4 08 17S 8E SL	P	19210112	DIMOSP	0.000	465.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-950	Rediversion		S840 E2480 NW 08 17S 8E SL	P	19210112	DIMOSP	0.000	465.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-951	Rediversion		N760 0 SW 05 17S 8E	P	19220803	DIMOSP	0.000	9892.620	HUNTINGTON CLEVELAND IRRIGATION

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		SL						COMPANY
93-951	Rediversion	N100 E1270 SW 05 17S 8E SL	P	19220803	DIMOSP	0.000	9892.620	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-951	Rediversion	S1320 W300 N4 08 17S 8E SL	P	19220803	DIMOSP	0.000	9892.620	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-951	Rediversion	S840 E2480 NW 08 17S 8E SL	P	19220803	DIMOSP	0.000	9892.620	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-954	Surface	N1565 W1430 SE 06 17S 8E SL	A	19620702	IS	75.000	0.000	USA BUREAU OF RECLAMATION -- PROVO AREA OFFICE
a14107	Rediversion	N760 0 SW 05 17S 8E SL	A	19800228	DIMSPX	0.000	3000.000	STATE OF UTAH BOARD OF WATER RESOURCES
a14107	Rediversion	N100 E1270 SW 05 17S 8E SL	A	19800228	DIMSPX	0.000	3000.000	STATE OF UTAH BOARD OF WATER RESOURCES
a14107	Rediversion	S1320 W300 N4 08 17S 8E SL	A	19800228	DIMSPX	0.000	3000.000	STATE OF UTAH BOARD OF WATER RESOURCES
0393003M00	Underground	S1700 E400 N4 06 17S 8E SL	A			0.000	0.000	WATER & ENVIRONMENTAL TECHNOLOGIES
0393003M00	Underground	S1150 E700 N4 06 17S 8E SL	A			0.000	0.000	WATER & ENVIRONMENTAL TECHNOLOGIES
0393003M00	Underground	S1900 E1000 N4 06 17S 8E SL	A			0.000	0.000	WATER & ENVIRONMENTAL TECHNOLOGIES
93-3370	Point to Point	S660 W660 N4 08 17S 8E SL	P	18600000	S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-347	Point to Point	N990 W300 E4 08 17S	P	18680000	S	0.000	0.000	CHARLES HOMER & RUTH L. ROWLEY

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		8E SL					
93-555	Point to Point	N660 E1980 W4 08 17S 8E SL	P	18680000 S	0.000	0.000	SAMUEL HERBERT ROWLEY
93-152	Point to Point	S660 W660 N4 08 17S 8E SL	P	19020000 S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-214	Point to Point	N660 W660 SE 06 17S 8E SL	P	19020000 S	0.000	0.000	PACIFICORP DBA UTAH POWER & LIGHT COMPANY
93-216	Point to Point	N660 E660 SW 05 17S 8E SL	P	19020000 S	0.000	0.000	EDWARD HARRISON
93-225	Point to Point	S660 W660 N4 05 17S 8E SL	P	19020000 S	0.000	0.000	RUTH LARUE JOHNSON
93-227	Point to Point	S660 W660 N4 08 17S 8E SL	P	19020000 S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-230	Point to Point	N990 W300 E4 08 17S 8E SL	P	19020000 S	0.000	0.000	CHARLES HOMER & RUTH L. ROWLEY
93-231	Point to Point	N990 W1150 E4 08 17S 8E SL	P	18750000 S	0.000	0.000	CHARLES HOMER & RUTH L. ROWLEY
93-3370	Point to Point	S660 W660 N4 08 17S 8E SL	P	18600000 S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-347	Point to Point	N660 W660 E4 08 17S 8E SL	P	18680000 S	0.000	0.000	CHARLES HOMER & RUTH L. ROWLEY
93-410	Point to Point	S660 W660 N4 08 17S 8E SL	P	19020000 S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-555	Point to Point	S1850 E250 N4 08 17S	P	18680000 S	0.000	0.000	SAMUEL HERBERT ROWLEY

		8E SL						
93-564	Point to Point	N660 W660 S4 32 16S 8E SL	P	19020000	S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-152	Point to Point	S660 E660 N4 05 17S 8E SL	P	19020000	S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-216	Point to Point	N660 E660 SW 05 17S 8E SL	P	19020000	S	0.000	0.000	EDWARD HARRISON
93-225	Point to Point	S660 W660 N4 05 17S 8E SL	P	19020000	S	0.000	0.000	RUTH LARUE JOHNSON
93-227	Point to Point	S660 W660 N4 08 17S 8E SL	P	19020000	S	0.000	0.000	UTAH SCHOOL AND INSTITUTIONAL TRUST LANDS ADMIN.
93-230	Point to Point	N990 W1150 E4 08 17S 8E SL	P	19020000	S	0.000	0.000	CHARLES HOMER & RUTH L. ROWLEY
93-231	Point to Point	S1850 E250 N4 08 17S 8E SL	P	18750000	S	0.000	0.000	CHARLES HOMER & RUTH L. ROWLEY
93-1063	Surface	N165 W750 S4 05 17S 8E SL	U	19610330	DIS	0.000	130800.000	STATE OF UTAH BOARD OF WATER RESOURCES
93-1063	Rediversion	S550 W400 N4 08 17S 8E SL	U	19610330	DIS	0.000	130800.000	STATE OF UTAH BOARD OF WATER RESOURCES
93-1136	Rediversion	N760 0 SW 05 17S 8E SL	P	1892	DIMOSP	0.000	2025.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1136	Rediversion	N100 E1270 SW 05 17S 8E SL	P	1892	DIMOSP	0.000	2025.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1136	Rediversion	S1320 W300 N4 08 17S 8E SL	P	1892	DIMOSP	0.000	2025.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY

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93-1136	Rediversion	S840 E2480 NW 08 17S 8E SL	P	1892	DIMOSP	0.000	2025.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1137	Rediversion	N760 0 SW 05 17S 8E SL	P	1890	DIMOSP	0.000	3274.710	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1137	Rediversion	N100 E1270 SW 05 17S 8E SL	P	1890	DIMOSP	0.000	3274.710	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1137	Rediversion	S1320 W300 N4 08 17S 8E SL	P	1890	DIMOSP	0.000	3274.710	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1137	Rediversion	S840 E2480 NW 08 17S 8E SL	P	1890	DIMOSP	0.000	3274.710	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1138	Rediversion	N760 0 SW 05 17S 8E SL	P	18900000	DIMOSP	0.000	50.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1138	Rediversion	N100 E1270 SW 05 17S 8E SL	P	18900000	DIMOSP	0.000	50.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1138	Rediversion	S1320 W300 N4 08 17S 8E SL	P	18900000	DIMOSP	0.000	50.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1138	Rediversion	S840 E2480 NW 08 17S 8E SL	P	18900000	DIMOSP	0.000	50.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1139	Rediversion	N760 0 SW 05 17S 8E SL	P	18900000	DIMOSP	0.000	58.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1139	Rediversion	N100 E1270 SW 05 17S 8E SL	P	18900000	DIMOSP	0.000	58.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1139	Rediversion	S1320 W300 N4 08 17S 8E SL	P	18900000	DIMOSP	0.000	58.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY

93-1139	Rediversion	S840 E2480 NW 08 17S 8E SL	P	18900000	DIMOSP	0.000	58.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-1140	Surface	N1572 W1466 SE 06 17S 8E SL	A	19220808	I	0.000	4000.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-221	Surface	S840 E2480 NW 08 17S 8E SL	P	1875	DM	150.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2211	Surface	S1320 W300 N4 08 17S 8E SL	P	1879	IS	45.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2212	Surface	S1320 W300 N4 08 17S 8E SL	P	1884	IS	77.250	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2213	Surface	S1320 W300 N4 08 17S 8E SL	P	1888	IS	80.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2226	Surface	S840 E2480 NW 08 17S 8E SL	P	1879	DM	45.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2228	Surface	S840 E2480 NW 08 17S 8E SL	P	1888	DM	80.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2229	Surface	N760 0 SW 05 17S 8E SL	P	18790000	IS	45.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2230	Surface	N760 0 SW 05 17S 8E SL	P	18840000	IS	77.250	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2231	Surface	N760 0 SW 05 17S 8E SL	P	18880000	IS	80.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-2232	Surface	N100 E1270 SW 05 17S 8E SL	P	18790000	IS	45.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY

93-2233	Surface		N100 E1270 SW 05 17S 8E SL	P	18840000 IS	77.250	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
a14107	Rediversion		S840 E2480 NW 08 17S 8E SL	A	19800228 DIMSPX	0.000	3000.000	STATE OF UTAH BOARD OF WATER RESOURCES
a3812	Rediversion		S550 W400 N4 08 17S 8E SL	A	19601102 I	0.000	10000.000	HUNTINGTON-CLEVELAND IRRIGATION COMPANY
E1708	Surface		S700 W1220 E4 06 17S 8E SL	A	19800915 IS	0.000	10.800	PACIFICORP DBA UTAH POWER & LIGHT COMPANY
E2504	Surface		S600 E2480 NW 08 17S 8E SL	A	19870326 M	0.000	325.000	CASTLE VALLEY SPECIAL SERVICE DISTRICT
9793004M00	Underground	15588	N3300 W2400 SE 06 17S 8E SL	A		0.000	0.000	UTAH POWER
9793004M00	Underground	15584	N300 W550 SE 06 17S 8E SL	A		0.000	0.000	UTAH POWER
9793004M00	Underground	15585	N1050 W450 SE 06 17S 8E SL	A		0.000	0.000	UTAH POWER
9793004M00	Underground	15583	N200 E150 SW 05 17S 8E SL	A		0.000	0.000	UTAH POWER
a15762	Rediversion		N760 0 SW 05 17S 8E SL	A	19900730 IMP	0.000	31264.000	PACIFICORP DBA UTAH POWER & LIGHT COMPANY
a15762	Rediversion		N100 E1270 SW 05 17S 8E SL	A	19900730 IMP	0.000	31264.000	PACIFICORP DBA UTAH POWER & LIGHT COMPANY
a15762	Rediversion		S1320 W300 N4 08 17S 8E SL	A	19900730 IMP	0.000	31264.000	PACIFICORP DBA UTAH POWER & LIGHT COMPANY

a15762	Rediversion	S840 E2480 NW 08 17S 8E SL	A	19900730	IMP	0.000	31264.000	PACIFICORP DBA UTAH POWER & LIGHT COMPANY
a25346	Surface	S662 E2449 NW 08 17S 8E SL	A	20010315	IS	0.000	344.800	HUNTINGTON-CLEVELAND IRRIGATION COMPANY
93-2234	Surface	N100 E1270 SW 05 17S 8E SL	P	18880000	IS	80.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-224	Surface	N760 0 SW 05 17S 8E SL	P	1875	IS	150.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-226	Surface	N100 E1270 SW 05 17S 8E SL	P	18750000	IS	150.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-239	Surface	S1320 W300 N4 08 17S 8E SL	P	1875	IS	150.000	0.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-3195	Rediversion	N760 0 SW 05 17S 8E SL	P	19800228	DIMOSP	0.000	2000.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-3195	Rediversion	N100 E1270 SW 05 17S 8E SL	P	19800228	DIMOSP	0.000	2000.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-3195	Rediversion	S1320 W300 N4 08 17S 8E SL	P	19800228	DIMOSP	0.000	2000.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY
93-3195	Rediversion	S840 E2480 NW 08 17S 8E SL	P	19800228	DIMOSP	0.000	2000.000	HUNTINGTON CLEVELAND IRRIGATION COMPANY

Utah Division of Water Rights | 1594 West North Temple Suite 220, P.O. Box 146300, Salt Lake City, Utah 84114-6300 | 801-538-7240

ATTACHMENT 14

PHC

Attachment 14

Probable Hydrologic Consequences Determination

June 2012

UTAH REGISTERED PROFESSIONAL ENGINEER
#152606
R. Jay Marshall
6/21/12

Probable Hydrologic Consequences Determination

General

The best available adjacent area data to assist in making a determination of probable hydrologic consequences of the proposed operation comes from the adjacent Bear Canyon Mine and from the USGS and Utah State Water Resources. The Bear Canyon Mine has been operating since the mid-1980's.

Data gathered from this mine and the surrounding hydrologic regime has been used in this determination, as well as data gathered in the area of the proposed Burma Pond.

Pertinent water monitoring data for the Fish Creek drainage are included in DOGM Water Database. Baseline geologic information is presented in Chapter 6 of Appendix 7-66. Baseline hydrologic information, descriptions of the function of the streams and groundwater systems, and discussions of various issues regarding the data are presented in Chapter 7 of Appendix 7-66. To ensure that this document addresses these issues, these data, descriptions, and discussions are referenced and should be considered a part of this document.

Analysis of Data

Potential impacts of operation of the Burma Pond on the quality and quantity of surface and groundwater flow may include:

- Contamination by Sludge Materials;
- Increased sediment yield from disturbed areas;
- Increased sediment yield from disturbed areas;
- Increased total dissolved solids concentrations;
- Impacts to groundwater or surface water availability;
- Hydrocarbon contamination from trucks or from the use of hydrocarbons in the permit area;
- Contamination of surface and groundwater from road salting; and

- Contamination of surface water from sludge spillage due to hauling operations.

Potential Impacts to the Hydrologic Balance. Potential impacts of the Burma Pond on the hydrologic balance of the permit and adjacent areas are addressed in the following sections:

Sludge Materials. Information on the sludge materials proposed to be discharged to the pond are presented in Chapter 6. These data show that no acid- or toxic-forming materials are present in the sludge. Therefore, given that the sludge is suitable for disposal in a normal land fill once it is dried out, no impacts from Acid or Toxic forming materials are anticipated.

Sediment Yield. The potential impact of mining and reclamation on sediment yield is an increase in sediment in the surface waters downstream from disturbed areas. Sediment-control measures (such as sedimentation ponds, diversions, etc.) will be installed to minimize this impact. These facilities will be regularly inspected and maintained to ensure that they remain in proper operating condition.

The implementation of sediment control measures are mandated to minimize the erosion hazard associated with mining operations. Argument has been presented that reducing the sediment load, while the sediment carrying capacity of the stream remains the same, can result in increased stream bed and stream bank erosion. This would be true, if the flow rate released to the stream remained the same. However, the use of sediment control structures results in the peak flow released from the site being reduced to a controlled rate which is less than the natural peak flow. Therefore, the sediment carrying capacity of the stream is correspondingly reduced. Additionally, the duration of the lower rate controlled release from the sediment control structures aids in enhancing the development of vegetation along the stream banks which provides additional stabilization of the channel banks and bed. While the bed and bank impacts are not anticipated, the applicant has agreed to monitor the conditions of the channel downstream of the site for geomorphic and erosional change as a result of mine discharges.

All construction and upgrading activities will be undertaken during periods of dry weather, commencing in late spring and lasting through fall. For both the mining and reclamation periods, it is expected that construction, upgrading, or regrading activities would cause an increase in sediment load to the stream. Temporary sediment controls will be used whenever possible to lessen the impact of construction activities.

Various sediment-control measures will be implemented during reclamation as the vegetation becomes established. As discussed in Chapter 7 of Appendix 7-66, these measures will include installation of excelsior logs, silt fences, and straw-bale dikes in appropriate locations to minimize potential contributions of sediment from the reclaimed drainage surface. These measures will reduce the amount of erosion from the reclaimed areas, thereby precluding adverse impacts to the environment.

Acidity, Total Suspended Solids, and Total Dissolved Solids. Probable impacts of mining and reclamation 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. Since the proposed Burma Pond occurs in an ephemeral area, no water qulatiy data are available. However, the Pond is a total containment structure which is not expected to have any releases. Therefore, there is not expected to be any impact to acidity, TSS or TDS for the surrounding resources.

Flooding or Streamflow Alteration. Runoff from all disturbed areas will flow through a sediment-control device prior to discharge from the permit area. Three factors indicate that these sediment-control devices will minimize or preclude flooding impacts to downstream areas as a result of mining operations:

1. The flow routing that occurs through the sediment-control devices reduces peak flows from the disturbed areas. This precludes flooding impacts to downstream areas.

2. By retaining sediment on site in the sediment-control devices, the bottom elevations of Fish Creek downstream from the disturbed area will not be artificially raised. Thus, the hydraulic capacity of the stream channel will not be altered.

During operations of the pond, the volume of runoff contributed to Fish Creek will decrease slightly as the pond will be a total containment structure.

Following reclamation, pond will be closed and the site reclaimed re creating the natural drainage pattern that existed before the site was used. The reclamation surface and channels have been designed to safely pass the peak flow resulting from the 10-year, 6-hour or the 100-year, 6-hour precipitation event as appropriate for the channel and in accordance with the R645 regulations. Thus, flooding in the reclaimed areas will be minimized. Interim sediment-control measures and maintenance of the reclaimed areas during the post-mining period will preclude deposition of significant amounts of sediment in downstream channels following reclamation, thus maintaining the hydraulic capacity of the channels and precluding adverse, off-site flooding impacts.

Groundwater and Surface Water Availability. Potential impacts to the availability of surface and groundwater in the area of the Burma Pond operations include both decreased and increased stream flows and new spring discharges caused by pond operations. These potential impacts are discussed below.

The decrease in flow would be the result of the total containment of the evaporation pond. This will have little effect on the adjacent drainage due to the small nature of the pond.

The increase in flow and occurrence of new springs could result from leakage of leachate from the pond. Due to the limit quantity of materials and the limited amount of water included in the sludge, this is highly unlikely. Also, this will be controlled by the use of an engineered liner and the high evaporation rate for the site area.

Due to the total containment of the evaporation pond and the limited area of the proposed site, it is felt that there will not be any increase of decrease in the ground and surface water availability in the site area.

Potential Hydrocarbon Contamination. Diesel fuel, oils, greases, and other hydrocarbon products will be used on the trucks that transport the sludge to the site and for a variety of maintenance purposes. No diesel and/or oil are planned to be stored at the facilities. Some spillage or leakage onto the ground during filling of vehicle tanks. Similarly, greases and other oils may be spilled during use in surface operations.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for three reasons. First, because no on-site tanks will be used. Second, spillage during filling of the storage or vehicle tanks will be minimized to avoid loss of an economically valuable product. Finally, the Spill Prevention Control and Countermeasure Plan which will be developed for the site will provide inspection, training, and operation measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site. This plan is not required to be submitted. However, a copy will be maintained at the mine site as required by the Utah Division of Water Quality.

Road Salting. No salting of roads will occur within the permit area. Hence, this impact is not a significant concern.

Sludge Haulage. Sludge will be hauled over the county road from the mine site area to Utah Highway 31 and thence to the Burma Road Turnoff. Once the evaporation pond site is reached, the road will be about 250 to 300 feet long to the pond off-loading area. In the event of an accident which causes sludge to spill from the trucks, residual sludge following cleanup of the spill may wash into local streams during a runoff event. Possible impacts to the surface water are increased total suspended solids concentrations and turbidity from the fine sludge particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce sludge to the stream bed is considered small.

In addition to spills, wind may carry dried sludge dust or small pieces of sludge from the open top of the coal trucks into drainages near the roads. The impact from fugitive sludge dust is considered to be insignificant due to the small amounts lost during haulage in the permit and adjacent areas.

Conclusion

Based on available data and expected evaporation pond conditions, the proposed mining and reclamation activity is not expected to proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial, wildlife or other legitimate purpose.

References

Croley, Thomas W. III, 1977. Hydrologic and hydraulic computations on small programmable calculators, Iowa Institute of Hydraulic Research, Univ. of Iowa, Iowa City, Iowa.

Goldman, et.al., 1986. Erosion and Sediment Control Handbook, McGraw-Hill Book Company, N.Y.

Lines, G. C., 1985. The groundwater system and possible effects of underground coal mining in the Trail Mountain area, central Utah. U.S. Geological Survey Water-Supply Paper 2259, 32 p.

Lines, G. C. and others, 1984. Hydrology of Area 56, Northern Great Plains and Rocky Mountain coal provinces, Utah: U.S. Geological Survey Water-Resources Investigations Open-File Report 83-38, 69 p.

Lines, G. C. and Plantz, G. G., 1981. Hydrologic monitoring in the coal fields of central Utah, August 1978- September 1979: U.S. Geological Water-Resources Investigations Open-File Report 81-138, 56 p.

United States Department of Agriculture Soil conservation Service. National Engineering Handbook Section 4 - Hydrology, 1985.

Unites States Department of Agriculture Soil Conservation Service. Computer program for the project formulation - hydrology, technical release number 20, 1982.

Waddell, K. M., Dodge, J. E., Darby, D. W., and Theobald, S. M., 1986. Hydrology of the Price River Basin, Utah, with emphasis on selected coal-field areas: U.S. Geological Survey Water-Supply Paper 2246, 51 p.

ATTACHMENT 15

Raptor Information

Jay Marshal

UEI

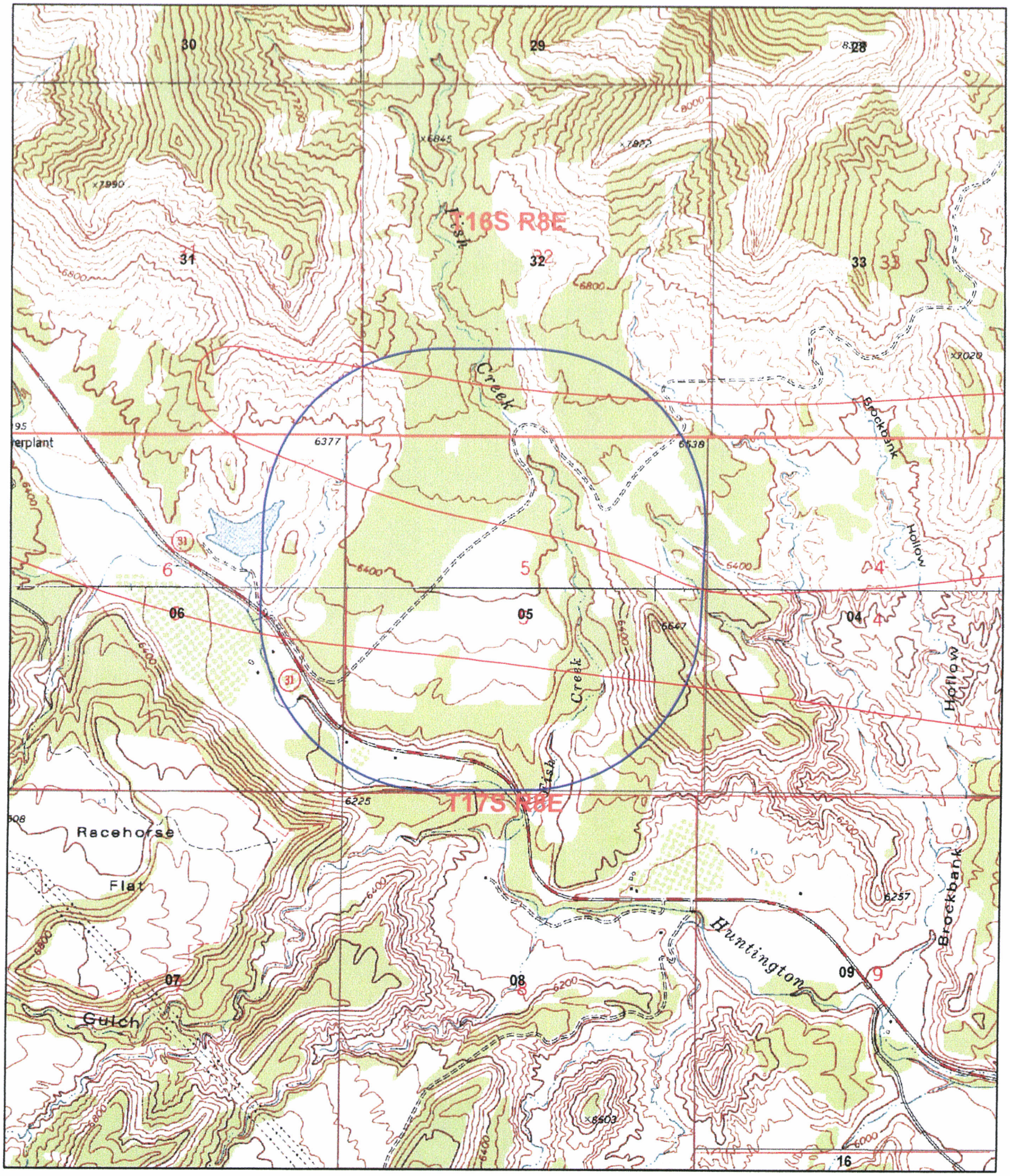
PO Box 910

East Carbon UT 84520

Dear Jay

We have completed the helicopter raptor survey for 2012. Attached you will find a map with the helicopter flight lines as well as the locations of all the nests we found on the survey. In addition is a spread sheet with the 2012 status and condition of the nests as well as the history of the nest status. I hope you find all the needed information on these documents. If you need any further data or different format of the data, please don't hesitate to contact either Derris Jones (435) 630-0239 or Joe Via at (435) 472-3814. EIS biologists are available to do any follow up monitoring of any of these nests or complete ground surveys for any area not included on the helicopter survey for any future disturbance you might have planned.

Here is a quick summary of what was found on your survey area in 2012: No known nests were available to locate. No new nests were located. No cliff nesting Habitat was found.



Environmental Industrial Services

Environmental Engineering & Consulting

31 North Main Street (435) 472-3814

Helper, Utah 84526 fax (435) 472-8780

eisec@preciscom.net

No Cliff Nesting Habitat

No Nests Found

Flight Line

Survey Area

Feet

0 1,000 2,000

N

2012 Helicopter Raptor Survey

ATTACHMENT 16

Air Quality Information

Marshall, Jay

From: Maung Maung [mmaung@utah.gov]
Sent: Thursday, August 30, 2012 10:40 AM
To: Marshall, Jay
Subject: Re: FW: Evaporative Pond near Crandall Canyon.

Hello Jay, I reviewed your information regarding the haul road distance and the truck loads, and I took rough estimates of the fugitive emissions from the haul road. The emissions turned out to be insignificant. The pond site of the emissions was not accounted as the pond is located too far to consider as part of this site. I do not believe, to the best my estimates, you need to modify your existing permit for Crandall Canyon Mine. Thanks for checking with us.

>>> "Marshall, Jay" <jmarshall@coalsource.com> 8/29/2012 1:24 PM >>>
Maung:

Thanks for the conference call today. Our people back east wish that all the states are as good to work with as is Utah.

Attached is the last email I sent you on Burma pond. If there was a response I have lost it.

Would you please resent to me.

Thanks

Jay

From: Marshall, Jay
Sent: Wednesday, August 22, 2012 1:51 PM
To: 'Maung Maung'
Cc: Leonard, JD
Subject: RE: Evaporative Pond near Crandall Canyon.

No Problem with questions.

The pond is approximately 10 miles down the canyon from the mine site. The Forest Service Road actually runs through the mine site. The trucks will travel approximately 25' on paved road on Crandall Canyon Mine site before hitting the Forest Service Road. The evaporative pond will be owned and managed by UtahAmerican Energy, Inc. who also own and manage the Crandall Canyon Mine. If needed, I can do the emission estimate of the trucks travel on the 250' of access-road before they discharge. Do we need the full trucks and empty trucks returning?

Let me know what is needed.

Thanks

Jay

From: Maung Maung [mailto:mmaung@utah.gov]
Sent: Wednesday, August 22, 2012 1:42 PM
To: Marshall, Jay
Subject: Re: Evaporative Pond near Crandall Canyon.

Hello Jay, here is what I understand. Crandall Canyon Mine operator will transport sludge from the mine to evaporative pond which is some distance away. My questions: how far is the pond from the mine? How much distance (feet of paved/unpaved road) trucks will travel on the Crandall Canyon Mine before the trucks hit the Forest Service Road. If the evaporative pond owned/managed by the Crandall Canyon Mine management? We may need emissions estimate of trucks travel on the 250 feet access-road before they discharge their load. Sorry, I have ask more questions. Thanks.

>>> "Marshall, Jay" <jmarshall@coalsource.com> 8/22/2012 11:39 AM >>>
Maung:

Attached is a map showing the layout of our new evaporative basin. This basin will receive sludge from our sediment pond at Crandall Canyon Mine. The sludge will be loaded into a sealed trucks that will haul 4,000 gallons at a time. These trucks will leave the Crandall Canyon Mine site onto a Forest Service Road, then to a State Road US 31, then on to a County Road No. 303, finally turning off on to our entrance road (Shown on the Attached Map). The trucks will then travel approximately 250' and discharge their load into the evaporation pond.

An average of approximately two truck trips a day will be utilized.

The total length traveled on the access road is shown in yellow on the attached map.

It calculates out to approximately 11 truck miles per year at under 10 MPH.

Do we need to revise our air quality permit for Crandall, get a new permit, or do nothing?

The Air Quality Permit for Crandall is DAQE-798-97.

Please advise.

If you have any questions please give me a call.

Thanks

Jay

R. Jay Marshall P.E.
Chief Engineer/Project Manager
Lila Canyon Mine

435 888 4007 Office
435 650 3157 Cell

BONDING............

Bonding Calculations
Crandall Canyon Mine C/007/032
Revised June 5, 2012

Bond Summary

Direct Costs

Subtotal Demolition and Removal	$772,145.67	
Subtotal Backfilling and Grading	$552,982.72	
Subtotal Revegetation	$62,735.00	
Direct Costs	$1,387,863.39	
Indirect Costs		
Mob/Demob	$138,786.00	10.0%
Contingency	$69,393.00	5.0%
Engineering Redesign	$34,697.00	2.5%
Main Office Expense	$94,375.00	6.8%
Project Mainagement Fee	$34,697.00	2.5%
Subtotal Indirect Costs	$371,948.00	26.8%
Total	$1,759,811.39	
Escalation factor		0.012
Number of years		5
Escalation	$108,153.00	
Total Main Mine	$1,867,964.39	
East Mountain	$404,619.00	
Reclamation Cost 2015	$2,272,583.39	
Bond Amount (rounded to nearest $1,000)	$2,273,000.00	
Bond Posted 2011	$2,327,000.00	
Difference Between Cost Estimate and Bond	$54,000.00	
Percent Difference	2.38%	

INCORPORATED
NOV 09 2012
Div. of Oil, Gas & Mining

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Shop 01																			$37,324.00
	Ventilation Fan 02																			$11,767.00
	Rock Dust Silo 03																			$1,950.00
	Concrete Dump Pad 04																			$25,358.00
	Power Center 05																			$11,889.00
	Power Poles 06																			$2,859.00
	Underground Bathhouse 07																			$8,124.00
	Portals 08																			$31,200.00
	BeltPortals 09																			$5,200.00
	Crusher Pad 10																			$3,490.00
	Mine Belt 11																			$1,845.00
	Silo 13																			$41,918.00
	Weight Shed 14																			$426.00
	Bulk Oil 15																			$11,511.00
	Truck Pad 17																			$825.00
	General Storage 18																			$16,346.00
	Reclaim Hopper Belt 19																			$3,075.00
	Visual Disconnect 20																			$615.00
	New Shop 21																			$14,575.00
	Shop Extension 22																			$4,316.00
	Shotcrete Slopes 23																			$1,366.00
	Fan Transfomer 24																			$179.00
	Chain Link Fence 25																			$463.00
	Concrete Guard 26																			$5,340.00
	Retaining Wall 27																			$3,495.00
	Culverts 28																			$77,965.00
	Guard Rail 29																			$1,976.00
	Inlets 30																			$1,620.00
	Sed Pond Culvert 31																			$545.00
	Gabion Retaining Wall 32																			$2,191.00
	Overhead Conveyor Supports 35																			$773.00
	Reclaim Tunnel 36																			$2,257.00
	Feeder Boxes 37																			$3,965.00
	Reclaim Conveyor Supports 38																			$89.00
	Crusher Platform Supports 39																			$1,096.00
	Feeder Conveyor Supports 40																			$89.00
	Scale Pads 41																			$5,198.00
	New Scale House 42																			$2,141.00
	Proposed Bathhouse 43																			
	Coal Silo 44																			$3,772.00
	Conveyors 45																			$8,664.00
	Parking Lot 46																			$62,128.00
	RubberLiner 47																			$20,295.00
	Culvert Bedding Removal 48																			$173,049.00
	Off Site Dump Fee 49																			$66,096.00
	Drainage Control 50																			$81,720.00
	WaterTreatmentArea51																			$10,862.00
	Burma Basin 52																			$198.67
	Total																			**$772,145.67**

INCORPORATED

NOV 09 2012

Div. of Oil, Gas & Mining

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
01	Shop 01																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	160	20	20										64000	CF	$19,840.00
	Structure's Vol. Demolished																0.35	830	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY															
	Transportation Cost Non Steel Truck																	830	CY	$9,919.00
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		830	ton	$5,810.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			**$35,569.00**
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	160	20	0.5										59	CY	$651.00
	Concrete's Vol. Demolished																1.3	77	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													77	CY	$115.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													77	CY	$284.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													77	CY	$705.00
	Subtotal																			**$1,755.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$37,324.00**

6/21/12

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
02	Ventilation Fan 02																			
	Structure's Demolition Cost	Steel Bld, Large	02220 110 0012	0.31	/CF	60	20	16.67										20004	CF	$6,201.00
	Structure's Vol. Demolished																0.35	259	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													259	CY	$3,095.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		259	ton	$1,813.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$11,109.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	60	20	0.5										22	CY	$243.00
	Concrete's Vol. Demolished																1.3	29	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													29	CY	$43.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													29	CY	$107.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													29	CY	$265.00
	Subtotal																			$658.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$11,767.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
03	Rock Dust Silo 03																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF			30	12							FT		3393	CF	$1,052.00
	Structure's Vol. Demolished																0.35	44	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													44	CY	$526.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		44	ton	$308.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$1,886.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	2	3	2							4			2	CY	$22.00
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													3	CY	$4.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													3	CY	$11.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													3	CY	$27.00
	Subtotal																			$64.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$1,950.00

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
04	Concrete Dump Pad 04																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Pavement removal (asphalt) 3 inch	02220 250 5010	11.03	/SY	30	25	1								FT		28	CY	$309.00
	Concrete's Vol. Demolished																1.3	36	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													36	CY	$54.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													36	CY	$133.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													36	CY	$329.00
	Subtotal																			**$825.00**
	Asphalt Demolition																			
	Demolition Cost	Pavement removal (asphalt) 3 inch	02220 250 5010	11.03	/SY	135	130									FT		1950	YD2	$21,509.00
	Concrete's Vol. Demolished							0.25								FT	1.3	211	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													211	CY	$314.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													211	CY	$779.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													211	CY	$1,931.00
	Subtotal																			**$24,533.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$25,358.00**

6/21/12

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
05	Power Center 05																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Mechanical Equipment	Mechanical equipment heavy	15055 300 3600	615	/ton							5				Ton		5	Ton	$3,075.00
	Transformer	Mechanical equipment heavy	15055 300 3600	615	/ton							2				Tom		2	Tom	$1,230.00
	Underground Wire	Wire Removal	Soldier Creek	4.81	/LF	900										CLF		900	LF	$4,329.00
	Aerial Wire	Wire Removal	Soldier Creek	4.81	/LF	500										CLF		500	LF	$2,405.00
	Chain Link Fence	Chain link remove 8'-10'	02220 220 1700	3.86	/LF	120										LF		120	LF	$463.00
	Subtotal																			$11,502.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition																13	CY	$143.00
	Concrete's Vol. Demolished		ConcreteDemo1	11.03	/CY	25	21	0.67									1.3	17	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													17	CY	$25.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													17	CY	$63.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													17	CY	$156.00
	Subtotal																			$387.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$11,859.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
06	Power Poles 06																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Remove wire	Wire Removal	Soldier Creek	4.81	/LF	180												180	LF	$866.00
	Remove conduit (use wire)	Wire Removal	Soldier Creek	4.81	/LF	100												100	LF	$481.00
	Remove Fixtures (use poles)	Powerpole	Hiawatha	126	EA										6	EA		6	EA	$755.00
	Remove Poles	Powerpole	Hiawatha	126	EA										6	EA		6	EA	$755.00
	Disposal Costs																			
	Subtotal																			**$2,859.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$2,859.00**

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
07	Underground Bathhouse 07																			
	Structure's Demolition Cost	Masonary Bld. Large	02220 110 0080	0.28	/CF						14000					CF		14000	CF	$3,920.00
	Structure's Vol. Demolished																0.35	181	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													181	CY	$2,163.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON									1		Ton/CY		181	ton	$1,257.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			**$7,350.00**
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	70	20	0.5										26	CY	$287.00
	Concrete's Vol. Demolished																1.3	34	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													34	CY	$51.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													34	CY	$125.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													34	CY	$311.00
	Subtotal																			**$774.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$8,124.00**

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
08	Portals 08																			
	Structure's Demolition Cost	Seal Portals	AML1	5200	EA.										6	EA		6	EA	$31,200.00
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$31,200.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$31,200.00

6/21/12

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
09	BeltPortals 09																			
	Structure's Demolition Cost	Seal Portals	AML1	5200	EA.										1	EA		1	EA	$5,200.00
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$5,200.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$5,200.00

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
10	Crusher Pad 10																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	36	20	1										720	CF	$223.00
	Structure's Vol. Demolished																0.35	9	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													9	CY	$108.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Tons/CY		9	ton	$63.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			**$394.00**
	Equipment's Disposal Cost	Mechanical equipment heavy	15055 300 3600	615	/ton							3				ton		3	ton	$1,845.00
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			**$1,845.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	36	20	1										27	CY	$298.00
	Concrete's Vol. Demolished																1.3	35	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													35	CY	$52.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													35	CY	$129.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													35	CY	$320.00
	Subtotal																			**$799.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						418					CF		15	CY	$165.00
	Concrete's Vol. Demolished																1.3	20	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													20	CY	$30.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													20	CY	$74.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													20	CY	$183.00
	Subtotal																			**$452.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$3,490.00**

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
11	Mine Belt 11																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost	Mechanical equipment heavy	15055 300 3600	615	/ton							2.5				ton		3	ton	$1,845.00
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			$1,845.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$1,845.00

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
13	Silo 13																			
	Structure's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.28	/CF			75	30							FT		53014	CF	$14,844.00
	Structure's Vol. Demolished																0.35	687	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													687	CY	$8,210.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		687	ton	$4,809.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			**$27,863.00**
	Equipment's Disposal Cost	Mechanical equipment heavy	15055 300 3600	615	/ton							20				ton		20	ton	$12,300.00
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			**$12,300.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	160	20	0.5										59	CY	$651.00
	Concrete's Vol. Demolished																1.3	77	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													77	CY	$115.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													77	CY	$284.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													77	CY	$705.00
	Subtotal																			**$1,755.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$41,918.00**

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Task #3997

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
14	Weight Shed 14																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						2					CY		2	CY	$22.00
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													3	CY	$4.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													3	CY	$11.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													3	CY	$27.00
	Subtotal																			**$64.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						235					CF		9	CY	$99.00
	Concrete's Vol. Demolished																1.3	12	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													12	CY	$18.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													12	CY	$44.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													12	CY	$110.00
	Subtotal																			**$271.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						80					CF		3	CY	$33.00
	Concrete's Vol. Demolished																1.3	4	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													4	CY	$6.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													4	CY	$15.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													4	CY	$37.00
	Subtotal																			**$91.00**
	Total																			**$426.00**

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
15	Bulk Oil 15																			
	Structure's Demolition Cost	Masonary Bld. Large	02220 110 0080	0.44	/CF	55	20	10										11000	CF	$4,840.00
	Structure's Vol. Demolished																0.35	143	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													143	CY	$1,709.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON									1		Ton/CY		143	ton	$1,001.00
	Subtotal																			**$7,550.00**
	Tank																			
	Dismantling Cost	9000 gal to 12000 gal tank	02115 200 0130	1300	Ea.										1	Ea		1	EA	$1,300.00
	Loading Costs																			
	Transport Costs	9000 gal to 12000 gal tank	02115 200 1029	1100	Ea.										1			1	EA	$1,100.00
	Disposal Costs	9000 gal to 12000 gal tank	02115 200 0320	325	Ea.										1			1	EA	$325.00
	Subtotal																			**$2,725.00**
	Slab																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	55	0.5								FT		20	CY	$221.00
	Concrete's Vol. Demolished																1.3	26	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													26	CY	$39.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													26	CY	$95.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													26	CY	$238.00
	Subtotal																			**$594.00**
	Footings																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	150	2	1								FT		11	CY	$121.00
	Concrete's Vol. Demolished																1.3	14	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													14	CY	$21.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													14	CY	$52.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													14	CY	$128.00
	Subtotal																			**$322.00**
	Slab																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	20	0.5								FT		7	CY	$77.00
	Concrete's Vol. Demolished																1.3	9	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													9	CY	$13.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													9	CY	$33.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													9	CY	$82.00
	Subtotal																			**$205.00**
	Walls																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	0.67	8.4								FT		4	CY	$44.00
	Concrete's Vol. Demolished																1.3	5	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.43	/CY													5	CY	$7.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													5	CY	$18.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													5	CY	$45.00
	Subtotal																			**$115.00**
	Total																			**$11,511.00**

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
17	Truck Pad 17																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF															
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						750					CF		28	CY	$309.00
	Concrete's Vol. Demolished																1.3	36	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													36	CY	$54.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													36	CY	$133.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													36	CY	$329.00
	Subtotal																			$825.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$825.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
18	General Storage 18																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	20	60	23												
	Structure's Vol. Demolished															FT		27600	CF	$8,556.00
	Rubble's Weight (exclude steel)																0.35	358	CY	
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY															
	Transportation Cost Non Steel Truck																	358	CY	$4,278.00
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON															
	Steel's Weight												1			Ton/CY		358	ton	$2,505.00
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
																				$15,340.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	67.5	0.67												
	Concrete's Vol. Demolished															FT		34	CY	$375.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	44	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													44	CY	$66.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													44	CY	$162.00
	Subtotal																	44	CY	$403.00
																				$1,006.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			
																				$16,346.00

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
19	Reclaim Hopper Belt 19																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost	Mechanical equipment heavy	15055 300 3600	615	/ton							5				ton		5	ton	$3,075.00
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			$3,075.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$3,075.00

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
20	Visual Disconnect 20																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost	Mechanical equipment heavy	15055 300 3600	615	/ton							1				ton		1	ton	$615.00
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			$615.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	4	6	0.5								FT		0	CY	$0.00
	Concrete's Vol. Demolished																1.3	0	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													0	CY	$0.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													0	CY	$0.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													0	CY	$0.00
	Subtotal																			$0.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$615.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
21	New Shop 21																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	20	62.5	20								FT		25000	CF	$7,750.00
	Structure's Vol. Demolished																0.35	324	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY															
	Transportation Cost Non Steel Truck																	324	CY	$3,872.00
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		324	ton	$2,268.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$13,890.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	62.5	0.5								FT		23	CY	$254.00
	Concrete's Vol. Demolished																1.3	30	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													30	CY	$45.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													30	CY	$111.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													30	CY	$275.00
	Subtotal																			$685.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$14,575.00

INCORPORATED
NOV 09 2012
Div. of Oil, Gas & Mining

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
22	Shop Extension 22																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	20	30	12								FT		7200	CF	$2,232.00
	Structure's Vol. Demolished																0.35	93	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													93	CY	$1,111.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON															
	Steel's Weight												1			Ton/CY		93	ton	$551.00
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$3,994.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	30	0.5								FT		11	CY	$121.00
	Concrete's Vol. Demolished																1.3	14	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													14	CY	$21.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													14	CY	$52.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													14	CY	$128.00
	Subtotal																			$322.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$4,316.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
23	Shotcrete Slopes 23																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY															
	Concrete's Vol. Demolished										46					CY		46	CY	$507.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	60	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													60	CY	$89.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													60	CY	$221.00
	Subtotal																	60	CY	$549.00
																				$1,366.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$1,356.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
24	Fan Transfomer 24																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost	Mechanical equipment heavy	15055 300 3600	615	/ton															
	Dismantling Cost											0.25				ton		0.25	ton	$154.00
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
																				$154.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY															
	Concrete's Vol. Demolished					6	8	0.67								FT		1	CY	$11.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	1	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													1	CY	$1.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1	CY	$4.00
	Subtotal																	1	CY	$9.00
																				$25.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$179.00

6/21/12

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
25	Chain Link Fence 25																			
	Structure's Demolition Cost	Chain link remove 8'-10'	02220 220 1700	3.86	/LF	120										LF		120	LF	$463.00
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$463.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$463.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
26	Concrete Guard 26																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	530	2	3								FT		118	CY	$1,302.00
	Concrete's Vol. Demolished																1.3	153	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													153	CY	$228.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													153	CY	$565.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													153	CY	$1,400.00
	Subtotal																			**$3,495.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	250	10	0.67								FT		62	CY	$684.00
	Concrete's Vol. Demolished																1.3	81	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													81	CY	$121.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													81	CY	$299.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													81	CY	$741.00
	Subtotal																			**$1,845.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			**$5,340.00**

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
27	Retaining Wall 27																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	530	2	3								FT		118	CY	$1,302.00
	Concrete's Vol. Demolished																1.3	153	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													153	CY	$228.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													153	CY	$565.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													153	CY	$1,400.00
	Subtotal																			$3,495.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$3,495.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
28	Culverts 28																			
	UD-1	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	295	3.5	7								FT		268	CY	$4,422.00
	C2, C4, C8, C10	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	600	2	4								FT		178	CY	$2,937.00
	C1	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	60	1.5	3								FT		10	CY	$165.00
	C12	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	85	1.25	2.5								FT		10	CY	$165.00
	C3, C7, C9, C11	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	251	1	2								FT		19	CY	$314.00
	UD-3	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	500	1.5	3								FT		83	CY	$1,370.00
	C-5	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	120	1	2								FT		9	CY	$149.00
	Bypass	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	1400	2	4								FT		415	CY	$6,848.00
	Main Creek	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	1400	6	12								FT		3733	CY	$61,595.00
	Subtotal																			$77,965.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$77,965.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
29	Guard Rail 29																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Remove Rails	Guiderail remove	02220 240 0800	15.05	LF	120										LF		120	LF	$1,806.00
	Remove Posts	Guide Posts Remove	02220 240 0860	16.95	Ea										10	EA		10	EA	$170.00
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			$1,976.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$1,976.00

6/21/12

Task #3997

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
30	Inlets 30																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost	Mechanical equipment heavy	15055 300 3600	615	/ton							1				ton		1	ton	$615.00
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			$615.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						11				3	CY		33	CY	$364.00
	Concrete's Vol. Demolished																1.3	43	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													43	CY	$64.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													43	CY	$159.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													43	CY	$393.00
	Subtotal																			$980.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	4	6	0.67								FT		1	CY	$11.00
	Concrete's Vol. Demolished																1.3	1	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													1	CY	$1.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													1	CY	$4.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1	CY	$9.00
	Subtotal																			$25.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$1,620.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
31	Sed Pond Culvert 31																			
	CMP 24	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY	110	2	4												
	Structure's Vol. Demolished															FT		33	CY	$545.00
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$545.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$545.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
32	Gabion Retaining Wall 32																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						2000					CF		74	CY	$815.00
	Concrete's Vol. Demolished																1.3	96	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													96	CY	$143.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													96	CY	$354.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													96	CY	$878.00
	Subtotal																			$2,191.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$2,191.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
33	Water Wells 33																			
	Structure's Demolition Cost	Plug Well	AML3	5000	EA.										4	EA		4	EA	$20,000.00
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$20,000.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$20,000.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
34	**Headwalls 34**																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	18	18	0.5								FT		6	CY	$66.00
	Concrete's Vol. Demolished																1.3	8	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													8	CY	$12.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													8	CY	$30.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													8	CY	$73.00
	Subtotal																			**$181.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY						3600					CF		133	CY	$1,467.00
	Concrete's Vol. Demolished																1.3	173	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													173	CY	$258.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													173	CY	$638.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													173	CY	$1,583.00
	Subtotal																			**$3,946.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Overhead Conveyor Supports 35																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	7	7	2							6	FT		22	CY	$243.00
	Concrete's Vol. Demolished																1.3	29	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													29	CY	$43.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													29	CY	$107.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													29	CY	$265.00
	Subtotal																			$658.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	2	2	4							6	FT		4	CY	$44.00
	Concrete's Vol. Demolished																1.3	5	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													5	CY	$7.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													5	CY	$18.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													5	CY	$46.00
	Subtotal																			$115.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$773.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
36	Reclaim Tunnel 36																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	170	12	1								FT		76	CY	$838.00
	Concrete's Vol. Demolished																1.3	99	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													99	CY	$148.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													99	CY	$365.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													99	CY	$906.00
	Subtotal																			$2,257.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$2,257.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
37	Feeder Boxes 37																			
	Structure's Demolition Cost	Concrete Bld. Large	02220 110 0050	0.44	/CF	13.5	16.5	8.5							3	FT		5680	CF	$2,499.00
	Structure's Vol. Demolished																0.35	74	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													74	CY	$884.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		74	ton	$518.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			**$3,901.00**
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	8	5	0.5							3	FT		2	CY	$22.00
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													3	CY	$4.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													3	CY	$11.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													3	CY	$27.00
	Subtotal																			**$64.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$3,965.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
38	Reclaim Conveyor Supports 38																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	4.5	4.5	1							2	FT		2	CY	$22.00
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													3	CY	$4.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													3	CY	$11.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													3	CY	$27.00
	Subtotal																			$64.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	2	4	2							2	FT		1	CY	$11.00
	Concrete's Vol. Demolished																1.3	1	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													1	CY	$1.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													1	CY	$4.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1	CY	$9.00
	Subtotal																			$25.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$89.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
39	Crusher Platform Supports 39																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	8	8	3							4	FT		28	CY	$309.00
	Concrete's Vol. Demolished																1.3	36	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													36	CY	$54.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													36	CY	$133.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													36	CY	$329.00
	Subtotal																			**$825.00**
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	4	4	4							4	FT		9	CY	$99.00
	Concrete's Vol. Demolished																1.3	12	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													12	CY	$18.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													12	CY	$44.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													12	CY	$110.00
	Subtotal																			**$271.00**
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$1,096.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
40	Feeder Conveyor Supports 40																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	4.5	4.5	1							2	FT		2	CY	$22.00
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													3	CY	$4.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	02315 490 0320	3.69	/CY													3	CY	$11.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													3	CY	$27.00
	Subtotal																			$54.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	2	4	2							2	FT		1	CY	$11.00
	Concrete's Vol. Demolished																1.3	1	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													1	CY	$1.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	02315 490 0320	3.69	/CY													1	CY	$4.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1	CY	$9.00
	Subtotal																			$25.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$89.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
41	Scale Pads 41																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	20	0.5							2	FT		15	CY	$165.00
	Concrete's Vol. Demolished																1.3	20	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													20	CY	$30.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													20	CY	$74.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													20	CY	$183.00
	Subtotal																			$452.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	12	60	1							2	FT		53	CY	$585.00
	Concrete's Vol. Demolished																1.3	69	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													69	CY	$103.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													69	CY	$255.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													69	CY	$631.00
	Subtotal																			$1,574.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	12	60	2							2	FT		107	CY	$1,180.00
	Concrete's Vol. Demolished																1.3	139	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													139	CY	$207.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													139	CY	$513.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													139	CY	$1,272.00
	Subtotal																			$3,172.00
	Total																			$5,198.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
42	New Scale House 42																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	20	20	8												
	Structure's Vol. Demolished															FT		3200	CF	$992.00
	Rubble's Weight (exclude steel)																0.35	41	CY	
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY															
	Transportation Cost Non Steel Truck																	41	CY	$490.00
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON															
	Steel's Weight												1			Ton/CY		41	ton	$287.00
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$1,769.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	20	30	0.5												
	Concrete's Vol. Demolished															FT		11	CY	$121.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	14	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													14	CY	$21.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													14	CY	$52.00
	Subtotal																	14	CY	$128.00
																				$322.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	3	8	1.5												
	Concrete's Vol. Demolished															FT		1	CY	$11.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	1	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													1	CY	$1.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1	CY	$4.00
	Subtotal																	1	CY	$9.00
																				$25.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	0.66	80	0.66												
	Concrete's Vol. Demolished															FT		1	CY	$11.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	1	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													1	CY	$1.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1	CY	$4.00
	Subtotal																	1	CY	$9.00
																				$25.00
	Total																			$2,141.00

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NOV 09 2012
Div. of Oil, Gas & Mining

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
43	Proposed Bathhouse 43																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	60	100	18								FT		108000	CF	$33,480.00
	Structure's Vol. Demolished																0.35	1400	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													1400	CY	$15,730.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON								1			Ton/CY		1400	ton	$9,800.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$60,010.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	60	100	0.5								FT		111	CY	$1,224.00
	Concrete's Vol. Demolished																1.3	144	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													144	CY	$215.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													144	CY	$531.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													144	CY	$1,318.00
	Subtotal																			$3,288.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	3	320	1.5								FT		53	CY	$585.00
	Concrete's Vol. Demolished																1.3	69	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													69	CY	$103.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													69	CY	$255.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													69	CY	$631.00
	Subtotal																			$1,574.00
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	11.03	/CY	1	80	0.66								FT		2	CY	$22.00
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													3	CY	$4.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													3	CY	$11.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													3	CY	$27.00
	Subtotal																			$64.00
	Total																			$64,935.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
44	Coal Silo 44																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF															
	Structure's Vol. Demolished							60	12							FT		6786	CF	$2,104.00
	Rubble's Weight (exclude steel)																0.35	88	CY	
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY															
	Transportation Cost Non Steel Truck																	88	CY	$1,052.00
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Neilson Con.	7	/TON															
	Steel's Weight												1			Ton/CY		88	ton	$616.00
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$3,772.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$3,772.00

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
45	Conveyors 45																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.31	/CF	5	780	4								FT		15600	CF	$4,836.00
	Structure's Vol. Demolished																0.35	202	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage	12 CY (16 Ton) Dump Truck 5 mi. rnd. trip	02315 490 0540	11.95	/CY													202	CY	$2,414.00
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	Nielson Construction	Nellson Con.	7	/TON								1			Ton/CY		202	ton	$1,414.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$8,664.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$8,664.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
46	Parking Lot 46																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Pavement removal (asphalt) 3 inch	02220 250 5010	5.2	/SY													4800	SY	$24,960.00
	Concrete's Vol. Demolished							0.25		4800						SY FT	1.3	520	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													520	CY	$775.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													520	CY	$1,919.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													520	CY	$4,758.00
	Subtotal																			$32,412.00
	Concrete Demolition																			
	Demolition Cost	Pavement removal (asphalt) 3 inch	02220 250 5010	5.2	/SY													4400	SY	$22,880.00
	Concrete's Vol. Demolished							0.25		4400						SY FT	1.3	477	CY	
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY													477	CY	$711.00
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.69	/CY													477	CY	$1,760.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													477	CY	$4,355.00
	Subtotal																			$29,716.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$62,128.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
47	RubberLiner 47																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished	Mechanical equipment heavy	15055 300 3600	615	/ton															
	Rubble's Weight (exclude steel)											32.5				ton		33	ton	$20,295.00
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$20,295.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	xxxxx																			
	Total																			$20,295.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
48	Culvert Bedding Removal 48																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Stream Bed Sand																			
	Demolition Cost	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY															
	Concrete's Vol. Demolished										1296					CY		1296	CY	$21,384.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	1685	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 ml. rnd. trip	02315 490 0320	3.69	/CY													1685	CY	$2,511.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													1685	CY	$6,218.00
	Subtotal																	1685	CY	$15,418.00
																				$45,531.00
	Culvert Bed Sand																			
	Demolition Cost	Excavation 1 CY backhoe earth	02315 462 6040	16.5	/CY															
	Concrete's Vol. Demolished										3630					CY		3630	CY	$59,895.00
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.49	/CY												1.3	4719	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 ml. rnd. trip	02315 490 0320	3.69	/CY													4719	CY	$7,031.00
	Disposal Costs	On site disposal	02220 240 5550	9.15	/CY													4719	CY	$17,413.00
	Subtotal																	4719	CY	$43,179.00
																				$127,518.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	xxxxx																			
	Total																			
																				$173,049.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	See Backfilling & Grading Plan																			
49	Off Site Dump Fee 49																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	City Services Clean Dirt Only	City Service Dirt	1	/CY						66096					CY		66096	CY	$66,096.00
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$66,096.00
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$66,096.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	See Backfilling and Grading																			
	Drainage Control 50																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Filter Material	Silt fence	02370 700 1100	1.34	LF	3000										LF		3000	LF	$4,020.00
	Rip-rap	Rip-Rap dumped 300 lbs. average	02370 450 0370	37	Ton							2100				TON		2100	TON	$77,700.00
	Subtotal																			$81,720.00
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$81,720.00

Ref.	Description	Materials	Means Reference	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	WaterTreatmentArea51	Concrete Removal	02220-250-5010	$5.20	SY															
	Task ID # 3261	concrete volume demolished								1499	165					CY				$7,795
											214						1.3			
		Loading Cost	02315-424-1300	$1.49	CY						214					CY				$319
		Transportation Cost	02315-490-0320	$3.69	CY						214					CY				$790
		Disposal Cost	02220240-5550	$9.15	CY						214					CY				$1,958
	Subtotal																			$10,862.00
	Subtotal																			
	Subtotal																			
	Subtotal																			
	Subtotal																			
	Total																			$10,862.00

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
31	Burma Basin 52																			
	CMP 24																			
	Structure's Vol. Demolished	Demolition of 18" CMP	02 41 13.40 0120	2.35	LF	20		1.5								FT		20	LF	$47.00
	Rubble's Weight (exclude steel)	Excavate 3/8 CY excavator	31 23 16.13 0050	9.10	LF	20	5	4.5								BCY		16.67	BCY	$151.67
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$198.57
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$198.57

Crandell Canyon Mine Earthwork Costs	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. - Labor Time/Drs.	Units	Cost
Backfilling and Grading															438117.98
Topsoil Distribution															47740.74
Support Equipment and Labor															67124
Total															552982.72

Crandell Canyon Mine Backfilling and Grading	Means Reference Number	Hourly Operating Costs	Rent Per Day	Operator's Hourly Inc. O&P	Total Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Ripping Fill Area (D9 Dozer)															
D9R 400 HP	01 54 33.20 4360	117.20	2225	70.25	372.87	1	372.87	$/HR	57387	CY	1473	CY/HR	39	HR	$14,542.00
Grader/Dozer Attachment ripper/scarifer	01 54 33	8.95	0.1		28.41	1	28.41	$/HR					39	HR	$1,108.00
Subtotal															$15,650.00
Backfill On Site															
Loading															
988G EROPS (9-37) (2nd2005) 2005		40.05	0.1	55.4	180	1	180	$/HR	70192	CY	498	CY/HR	140.9	HR	$25,362.00
Hauling															
769D (20-11) (2nd2005)		46.35	0.1	43.3	175	2	350	$/HR	70192	CY	498	CY/HR	140.9	HR	$49,315.00
Place with Excavator															
CAT 385BL (10-23)(2nd2005) (2005)		115.15	0.1	55.4	341.35	1	341.35	$/HR	12805	CY	181.3	CY/HR	70.6	HR	$24,099.00
Place with Dozer															
D9R Semi-U EROPS (9-54) (2H2005)		80.3	0.1	55.4	279.26	1	279.26	$/HR	57387	CY	215	CY/HR	266.9	HR	$74,534.00
Subtotal															$173,310.00
Backfill Off Site															
Loading															
988G EROPS (9-37) (2nd2005) 2005		40.05	0.1	55.4	180	1	180	$/HR	66096	CY	583	CY/HR	113.4	HR	$20,412.00
Hauling															
8X4 85,000lbs 15-18 CY (20-11) (2nd2005)		33.5	0.1	43.3	115	17	1955	$/HR	66096	CY	583	CY/HR	113.4	HR	$221,697.00
Subtotal															$242,109.00
Miscellaneous Removal/Excavate Stream Channels															
446D 4WD (9-26)(2nd2005)		22.4	0.1	55.4	120	1	120	$/HR	1560	CY	151.1	CY/HR	10.3	HR	$1,236.00
Subtotal															$1,236.00
Burma Basin															
Backfill and grading on Site From Lines 16 to 25 Above	$173,310/70192 CY = $2.46/CY						2.46		2363	CY					$5,812.98
Subtotal															$5,812.98
Total Backfilling and Grading															$438,117.98

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Crandell Canyon Mine															
Topsoil Distribution															
Load From Topsoil Stockpile															
Load															
966G Series II EROPS (9-36) (2nd2005)	7170	32.65	0.1	55.4	136.13	1	136.13	$/HR	10737	CY	298.8	CY/HR	35.9	HR	$4,887.00
Haul															
6X4 50,000lbs 10-12 CY (20-15) (2nd2005)	3225	26.8	0.1	43.3	92.94	5	464.7	$/HR	10737	CY	298.8	CY/HR	35.9	HR	$16,683.00
Subtotal															$21,570.00
Place Topsoil															
Place with Wheel Loader															
966G Series II EROPS (9-36) (2nd2005)	7170	32.65	0.1	55.4	136.13	1	136.13	$/HR	7354	CY	160.1	CY/HR	45.9	HR	$6,248.00
Grading															
D7R Series II (9-54) (2nd2005)	11230	46.65	0.1	55.4	176.9	1	176.9	$/HR	7354	CY	145	CY/HR	50.7	HR	$8,969.00
Excavator															
CAT 385BL (10-23)(2nd2005) (2005)	25485	115.15	0.1	55.4	341.35	1	341.35	$/HR	3383	CY	181.3	CY/HR	18.7	HR	$6,383.00
Subtotal															$21,600.00
Burma Basin															$43,170.00
From Lines 7 to 23 above $43,170/10,737CY = $4.02/CY							4.02		1137					CY	$4,570.74
Total															$47,740.74

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Div. of Oil, Gas & Mining

Crandell Canyon Mine Support Equipment and Labor	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Backfilling															
5,000 gal H2O truck Diesel (20-17) (2nd2005)	4990	31.95	0.1	43.3	138.46	1	138.46	$/HR					306	HR	42359
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2005)	900	5.4	0.1	0	21	1	21	$/HR					306	HR	6426
Foreman Average, Outside					59.9	1	59.9	$/HR					306	HR	18329
Subtotal															67124
Total															67124

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Vegetation																			
	Non Riparian																			
	Hydroseed Equipment and Labor	Hydro Spreader (equip. & labor) B-81	Reveg005	19.8	/MSF					6						AC		261.36	MSF	5175
	Hydroseed Materials	Seed Non Riparian Area	Crandall15321	394.75	$/AC					6						AC		6	AC	2369
	Hydromulch Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	19.8	/MSF					6						AC		261.36	MSF	5175
	Hydromuluch Material	Hay 1" material only 029105000250	Reveg001	69.85	/MSF					6						AC		261.36	MSF	18256
	Transplant																			
	Non Riparian																			
	Transplant Labor 150/AC	Bare root seedlings, 11" to 16" med. soil	02915 400 0562	1.31	Ea										675	EA		675	EA	884
	Transplant Material	Transplants Non Riparian	Crandall 15322	349	$/AC					4.5						AC		4.5	AC	1571
	Transplant North Slope																			
	In addition to Non-Riparian Trans.																			
	Transplant Labor 150/AC	Bare root seedlings, 11" to 16" med. soil	02915 400 0562	1.31	Ea										2300	EA		2300	EA	3013
	Transplant Material	Transplants North Slopes	Crandall 15323	1859	$/AC					1.8						AC		1.8	AC	3346
	Riparian																			
	Hydroseed Equipment and Labor	Hydro Spreader (equip. & labor) B-81	Reveg005	19.8	/MSF					0.3						AC		13.07	MSF	259
	Hydroseed Materials	Seed Riparian Area	Crandall 15324	261.01	$/AC					0.3						AC		0.3	AC	78
	Hydromulch Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	19.8	/MSF					0.3						AC		13.07	MSF	259
	Hydromuluch Material	Hay 1" material only 029105000250	Reveg001	129	/MSF					0.3						AC		13.07	MSF	1686
	Transplant																			
	Riparian																			
	Transplant Labor 150/AC	Bare root seedlings, 11" to 16" med. soil	02915 400 0562	1.31	Ea										189	EA		189	EA	248
	Transplant Material	Transplants Riparian	Crandall 15325	1967.3	$/AC					0.3						AC		0.3	AC	590
	Burma Basin	Burma Pond																		
		Hydro Spreader (equip & labor) B-81	Reveg005	19.8	MSF										1.41	AC		61.42	MSF	1216
		Seed Non Riparian Area	Crandall 15321	394.75	$/AC													1.41	AC	557
		Hydro Spreader (equip & labor) B-81	Reveg005	19.8	/MSF										1.41	AC		61.42	MSF	1216
		Hay 1" material only 029105000250	Reveg001	69.85	/MSF													61.42	MSF	4290
	Subtotal																			50188
	Revegetation																			
	Assume 25% revegetation rate																			12547
	Subtotal																			12547
	Total																			52735