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WEST RIDGE MINE
007/041

AMENDMENT
TO
THE MINING AND RECLAMATION PLAN

TO ALLOW INSTALLATION OF A GOB GAS VENT HOLE (GVH)

LOCATED IN THE
RIGHT FORK OF BEAR CANYON

ON

SITLA COAL LEASE ML 49287

SUBMITTED: OCTOBER 22, 2008

RECEIVED
NOV 10 2008
DIV. OF OIL, GAS & MINING

R645-301-100 PERMIT APPLICATION REQUIREMENTS: GENERAL CONTENTS

SCOPE

The objective of this chapter is to set forth all relevant information concerning ownership and control of WEST RIDGE Resources, Inc., the ownership and control of the property to be affected by mining activities and all other information and documentation required under Part UMC.

R645-301-112 IDENTIFICATION OF INTERESTS

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

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

WEST RIDGE Resources, Inc.
P.O. Box 910
East Carbon, Utah 84520
(435) 888-4000
Bruce Hill - President

Employer Identification Number: 87-0585129

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

Dave Shaver
WEST RIDGE Resources, Inc.
P.0. Box 910
East Carbon, Utah 84520

(435) 888-4000

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

R645-301-115 STATUS OF UNSUITABILITY CLAIMS

115.100 The proposed permit area is not within an area designated as unsuitable for mining. WEST RIDGE Resources, Inc. is not aware of any petitions currently in progress to designate the area as unsuitable for coal mining and reclamation activities.

The area in which the proposed facility will be located has been evaluated within area management plans. It has not been found unsuitable for mining activities under any categories of examination.

115.200 Not applicable.

115.300 WEST RIDGE Resources, Inc. will not be conducting mining operations within 100 feet of an occupied dwelling. WEST RIDGE Resources, Inc. has received permission from Carbon County to construct facilities and operate coal mining activities within 100 feet of a public road. Refer to the letter from Carbon County in Appendix 1-8.

R645-301-116 PERMIT TERM

116.100 The anticipated starting and termination dates of the coal mining and reclamation operation are as follows:

	Begin	Complete
Construction of Mining Pad, Mining Support Structures, and Portals	Apr. 1999	Dec. 1999
Begin Mining	Jan. 2000	
Terminate Mining		Dec. 2017*
Remove Facilities	Jan. 2018*	June 2018*
Regrade Area	July 2018*	Sept. 2018*
Revegetate Site	Oct. 2018*	Nov. 2018*

*This assumes mine life extended through acquisition of adjacent state and federal coal reserves.

Approximately 6,114.89 acres are within the permit boundary. Of this acreage, about 29.06 disturbed acres are utilized for surface facilities and structures in C Canyon (all on BLM land), and 0.34 acres are utilized for the Gob Gas Vent Hole (GVH) in the Right Fork of Bear Canyon (all on SITLA land). Refer to Appendix 5-14 for a detailed description of the Bear anyon GVH facility. The surface facilities should be capable of supporting the life of the mine operations as presented in this permit application.

Mining and exploration activities had been conducted in the currently proposed disturbed area prior to August 3, 1977. A road existed into C Canyon in 1952 when drill hole B-6 was drilled in the right fork. A road was also constructed up the left fork of C Canyon to a drill hole site during the same year. In addition to the drill holes, the coal outcrop in the left fork of C Canyon was exposed for sampling purposes. A small pad was built at the outcrop location and it was left in place as were the roads.

In 1986, another drill hole, 86-2, was drilled west of the first drill hole in the right fork. A minor amount of road work was done in conjunction with this second drill hole. Kaiser Coal Company obtained permission from the BLM to grade the existing road and make it passable for the drill rig. The drill hole site was reclaimed but the road, a public road, was left in place.

Through use of aerial photography and site evaluations, it is possible to document previous mining related disturbances in C Canyon. Refer to Map 5-1 for delineation of the disturbance prior to August 3, 1977.

The total of all the previously disturbed areas within the minesite disturbed area is estimated to be as follows:

roads in right and left forks	=	1.27 acres
road culvert	=	.05 acres
water monitoring well	=	.05 acres
material storage pad	=	.05 acres
		1.62 acres

WEST RIDGE Resources, Inc. is proposing to utilize the entire previously disturbed area in their current proposal and to reclaim it upon cessation of mining operations.

In the 1950's a road was constructed in the Right Fork of Bear Canyon to access an exploratory drillhole site. This road now provides access to the site of the Bear Canyon GVH installation.

ATTACHMENT 1-5
VERIFICATION STATEMENT

I hereby certify that I am a responsible official (Resident Agent) of the applicant (ANDALEX and IPA for WEST RIDGE Resources, Inc.) 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

David Shaver, Resident Agent

Signed - Name - Position - Date

Subscribed and sworn to before me this 21st day of October 2008

Linda Kerns
Notary Public

My commission Expires: April 6, 2009)

Attest: STATE OF Utah) ss:

COUNTY OF Carbon)

Notary Public
LINDA KERNS
345 N. 700 E.
Price, UT 84501
My Commission Expires
April, 6, 2009
State of Utah

APPENDIX 1-2

VIOLATION INFORMATION

VIOLATION INFORMATION

Information updated to October , 2008

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Centennial		007/019	42-01750 42-01474 42-02028 42-01864

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
9/27/2006	10000	DOGM			Failure to renew	9/29/2006	terminated	N
10/6/2006	10002	DOGM			Failure to submit fan plan	12/4/2006	terminated	N
2/7/2007	10003	DOGM			Non coal Waste	2/12/2007	terminted	N
7/6/2007	10007	DOGM			Vehicle in ditch	7/06/07	terminated	N
8/27/2007	10008	DOGM			vehicle in ditch	8/28/2007	terminated	N
8/27/2007	10009	DOGM			no sed pond inspection	8/27/07	terminated	N
6/18/2007	10024	DOGM			non coal waste	6/18.08	terminated	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Crandall		015/032	42-01715

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
8/19/2004	Nov4-49-4-1	DOGM			Parking in Forest	Term	moved vehicle	N
9/13/2004	Nov4-49-5-1	DOGM			non-coal waste	Term	moved waste	N
9/8/2005	Nov5-49-2-1	DOGM			Failure annual subsidene	Term		N
10/4/2006	#10001	DOGM			Culvet Plugged	TErm	Unplugged	N
9/6/2007	10014	DOGM			no sed pond inspection	TERM	Inspected	N
9/10/2007	10015	DOGM			plugged culvert	term	unplugged	N
1/14/2008	10016	DOGM			mine water stored in pond	Term	rerouted water	N
1/14/2008	10017	DOGM			grvity flow fro m portals	Term	stopped flow	N
2/06/2008	10019	DOGM			failure to request permit renewal	Term	submitted renewal	N
5/28/2008	10021	DOGM			Plugged culverts	Term	Unplugged	N
5/28/2008	10022	DOGM			Failure to maintain silt fence	Term	Cleaned fence	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
West Ridge		007/041	42-02233

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
1/22/2004	Nov4-49-1-1	DOGM			Failure to request renewal	Term		N
4/6/2005	Nov5-39-1-1	DOGM			Failure to submit 4qtr water	Term		N
7/31/2008	10025	DOGM			coal pushed on topsoil	Term		N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Horse Cyn.		007/013	42-00100

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N

Name of Operation			Identifying number for operation			Federal or State Permit Number	MSHA ID Number
Canterbury Coal Inc.			644			D-024-1/S-1020	3600813/3605708
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Abatement Action**	**Appeal Y or N**
5/13/2004	143419	PADEP		3743701	90.124		N
7/29/2004	165278	PADEP		3743701	90.106		N
7/29/2004	165278	PADEP		3743701	90.152		N
7/29/2004	169136	PADEP		3743701	90.152		N
7/29/2004	165279	PADEP		3743701	89.68		N
7/29/2004	165279	PADEP		3743701	89.83		N
8/13/2004	169138	PADEP		3743701	90.124		N
9/7/2004	169139	PADEP		3743701	89.81		N
5/13/2004	143416	PADEP		3743701	86.13 CO		N
6/15/2004	145872	PADEP		3743701	89.52 CO		N
2/8/2005	182734	PADEP		3743701	90.124		N
8/5/2005	199322	PADEP		3743701	90.159		N

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
UMCO			74645				PA 63921301	3608375
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Status (Abated, Term. etc.)**	**Abatement Action**	**Appeal Y or N**
9/1/2004	426787	DMRM		63921301	86.13	No resolution		N
9/3/2004	426786	DMRM		63921301	89.142a(b)	No resolution		N
9/20/2004	427936	DMRM		63921301	89.142a(b)	No resolution		N
1/4/2005	445603	Air Quality		63921301	25.127.25	ADM. Close Out		N
1/13/2005	445603	Air Quality		63921301	25.127.25	ADM Close Out		N
3/18/2005	445603	Air Quality		63921301	25.127.25	ADM Close Out		N
6/10/2005	466153	DEP		63921301	25.89.21	No resolution		N
7/15/2005	448412	DEP		63921301	25.89.68	Abated		N
7/15/2005	448413	DEP		63921301	25.89.83(a)	Abated		N
10/10/2006	499479	PADEP		63921301	89.142a(f)	No resolution		Y

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
Maple Creek			4244				63723707	36-00970
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Status (Abated, Term. etc.)**	**Abatement Action**	**Appeal Y or N**
5/7/2004	394440	MCM		63841302	89.142A.F.1	Abated		N
5/12/2004	394880	MCM		63841302	89.142A.F.1	No resolution		N
5/13/2004	395344	MCM		63841302	89.142A.F.1	No resolution		N
5/13/2004	395345	MCM		63841302	89.142A.F.1V	No resolution		N
5/13/2004	395346	MCM		63841302	89.142A.E	Abated		N
5/7/2004	394440	MCM		63841302	89.142A.F.1	Abated		N
7/7/2004	401714	MCM		63841302	89.142A.F.1	No resolution		N
7/30/2004	421806	MCM		63841302	SMCRA.18.6	Abated		N
8/26/2004	425804	MCM		63841302	89.142A.F.1	No resolution		N
8/13/2004	426148	MCM		63723707	86.13	Abated		N
9/8/2004	427302	MCM		63723707	90.102	Abated		N
9/10/2004	427564	MCM		63723707	90.102	Abated		N
9/13/2004	427565	MCM		63723707	90.102	Abated		N
9/14/2004	427566	MCM		63723707	90.102	Abated		N
9/14/2004	427567	MCM		63723707	90.112	Abated		N
10/19/2004	432068	MCM		63723707	90.102	Abated		N
7/29/2005	469866	DEP		63723707	89.142a(b)(1)(iii)	No Resolution		N
12/1/2005	478486	PADEP		63841302	89.145a(b)	No Resolution		N
12/1/2005	478487	PADEP		63841302	89.145a(f)(1)(v)	No Resolution		N
12/1/2005	478488	PADEP		63841302	89.145a(b)	No Resolution		N
1/9/2006	480660	PADEP		63841302	1396.18(f)	Abated		N
6/12/2006	491619	PADEP		6381302	89.142a(e)	No Resolution		Y

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
PENNAMERICAN COAL LP	93081	32951301	36-00970

Kim Betcher

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Ohio American Coal, Inc.	N/A	N/A	3304550/3304569

Kim Betcher

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
8/9/2006	21861	ODNR	OAEI	D-2180	outside of permit bndry	Abadted	IBR	N
3/1/2007	13101	ODNR	OAEI	D-2291	mining without a permit	Abadted	Permit issued	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Energy Resources, Inc.	470	License # 1465	360 269 5

Charlie Shestak

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
5/11/2004	143258	PaDEP	ERI	24010101	87.147	Abated	Corrected	N
8/26/2004	167665	PaDEP	ERI	24010101	87.140	Abated	Corrected	N
8/30/2004	168590	PaDEP	ERI	24970102	87.147	Abated	Corrected	N
7/6/2004	147120	PaDEP	ERI	33901602	89.52	Abated	Corrected	N
7/31/2006	211989	PaDEP	ERI	17841607	86.152	Abated	Corrected	N
4/11/2006	486936	PaDEP	ERI	17930120	87.157	Abated	Corrected	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
TDK Coal Sales, Inc.	27182	17910124	3608867

Charlie Shestak

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
5/13/2004	143257	PaDEP	TDK	24970104	87.147	Abated	Waved	N
6/1/2004	144659	PaDEP	TDK	03940101	87.148	Abated	Corrected	N
9/15/2004	169382	PaDEP	TDK	03940102	87.106	Abated	Corrected	N
9/20/2004	169388	PaDEP	TDK	24970104	87.14	Abated	Corrected	N
10/7/2004	170575	PaDEP	TDK	24970104	87.106	Abated	Corrected	N
4/11/2006	486945	PaDEP	TDK	17900143	87.157	Abated	Corrected	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Belmont Coal Company		D-0241/D-1020	33-04397/33-03048

David Bartsch

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
2/24/2004	24541	DMR	Mine	D-0241	Gullies exis in regraded	Terminated	regraded	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
The Ohio Valley Coal Co.	Powhatan No. 6 Mine	State – D-0360	33-01159

David Bartsch

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
8/2/2004	19662	DMRM	Mine	D-0360	Failure to maintain sediment control	Terminated	Cleaned Ditch	N
5/23/2006	19656	DMRM	Mine	D-0360	Failure to maintain the perimeter of diversion ditch	Terminated	Cleaned Ditch	N
11/30/2006	28473	DMRM	Mine	D-0360	Undirected Drainage	Terminated	Cleaned Ditch	N
11/30/2006	28484	DMRM	Mine	D-0360	Coal Blocking Diversion Ditch	Terminated	Cleaned Ditch	N

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
American Energy Corp							D-0425	33-01070
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Status (Abated, Term. etc.)**	**Abatement Action**	**Appeal Y or N**
1/25/2005	21807	ODNR		D-0425	subsided residnet ran out of water	Terminated	filled tank with water	N
4/27/2005	19696	ODNR		D-0425	Coal located outside stockpile area	Terminated	cleaned coal	N
4/29/2005	19695	ODNR		D-0425	Maintenance on pond 018	Terminated	cleaned out pond	N
4/27/2005	19697	ODNR		D-0425	drainage from property not entering sumps	Terminated	construct sumps	N
10/3/2005	21871	ODNR		D-0425	Failure to sub specific repairs (landowner)	Active		N
6/15/2006	21860	ODNR		D-1159	Segregate Prim Farmland soils	Active	Waiting on ODNR, All information submitted	N
Aug-05	CO-1726	ODNR		D-0425	Uncontroled discharge (Slurry)	Avtive	Will submit revised Plan Mid Month	N

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
The American Coal Co.			Galatia Mine & Millennium Portal				IDNR Mining Pemrit #2 and #352	11-02752
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Status (Abated, Term. etc.)**	**Abatement Action**	**Appeal Y or N**
9/27/2004	37-1-04	IDNR	DeNeal	Permit #2	Failure to submit groundwater report on schedule	Terminited		N
4/13/2005	37-01-05	IDNR	DeNeal	Permit #2	Failure to submit u/g mining maps	Terminited		N
5/12/2005	37-02-05	IDNR	DeNeal	Shadow Area 9	failure to complete subsidence mitigation in	Modified		N
					contemporaneous manner.			
6/1/2005	37-03-05	IDNR	DeNeal	352	broken waterline-fialure to prevent minepumpage from passing through sediment pond before going offsite	Terminated		N

The following companies either did not have any violations in the last three years or do not have permits.

Oklahoma Coal Company

KenAmerican Resources, Inc.

Onieda Coal, Inc.

MonValley Transportation Center, Inc.

Mill Creek Mining Co.

Pinski Corp

American Compliance Coal Inc.

Coal Resources Inc.

PA Transloading, Inc.

West Virginia Resources Inc.

WildCat Loadout

American Coal Sales Co.

Hocking Valley Resources Co..

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CHAPTER 2
R645-301-200 SOILS

R645-301-200 SOILS

NOTE: The following discussion for the remainder of R645-301-200 applies specifically to the Gob Gas Vent Hole (GVH) installation proposed in Bear Canyon. In order to facilitate the review it is presented here in its entirety rather than interspersed throughout the chapter. A more detailed and complete discussion of the Bear Canyon GVH proposal can be found in Appendix 5-14. Unless specifically noted in this following discussion, nothing related to the Bear Canyon GVH proposal affects the contents of the existing approved MRP as described hereinafter.

The location of the GVH in Bear Canyon is adjacent to the end of the existing road in the canyon. Construction of the GVH facilities will involve disturbing about 0.24 acres in the east side of the bottom of the canyon. Before any excavation begins at the GVH site, all available topsoil will be salvaged. Bob Long, CPSS, of Long Resource Consultants, Inc., has conducted an Order 1 soils survey of the site. His report is included in Appendix 2-10, and also Attachment 2 of Appendix 5-14. Three test pits were dug in the hillside and the soil resources were measured and catalogued. There is a significant layer of soil material present, which will be salvaged and stored nearby for final reclamation. Due to its location in the bottom of the canyon, and the varying steepness of the sideslope, the thickness of the soil varies considerably over the site. Also, as is typical for the Book Cliff canyons, there are a number of large boulders lying on the surface, surrounded by pockets of topsoil. Based on the results of the survey, the average depth of topsoil at the site is about 16". The area of the GVH site, including both the pad and the adjacent cutslope, is approximately 0.24 acres. Therefore, according to the soils survey, at least 515 cu. yds., or 13,878 cu. ft. of topsoil should be salvaged from the site.

Soils samples were taken by Mr. Long and have been sent to the laboratory for analysis. Once the analysis results are obtained they will be submitted to the Division and inserted as part of Appendix 2-10. Soil profile field descriptions are included in this Attachment as well. If laboratory analysis of the soils indicates a need for additives, fertilizers, or enhancement of other kinds, the Company commits to providing such at the time of final reclamation as determined by the Division . However, it is felt that this soil in its existing condition should be adequate for final reclamation because it appears to be well developed and of sufficient quantity. In fact, it is the identical same soil removed from the site which will be replaced at the time of reclamation. The Order 1 Soils Reports concludes that *"the potential for successfully reclaiming the Bear Canyon GVH location is good based on the estimated quality and quantity of topsoil that may be salvaged."*

The topsoil will be carefully removed using a trackhoe which can reach up the slope from the road surface below. Large boulders will be separated from the material, and the

topsoil will then be loaded into rock-trucks and hauled off-site for storage. The storage site is located approximately 3300' down-canyon from the GVH site, in a flat area adjacent to the road. This storage area is located on SITLA surface and SITLA coal lease ML49287 (see Attachment 1 of Appendix 5-14 for location). The pile will be constructed with overall dimensions of approximately 100' long, 40' wide, and 8' high, with 2:1 sideslopes (see Appendix 2-10 and/or Attachment 3 of Appendix 5-14 for details of the pile configuration). The pile will be kept low to prevent unnecessary compaction, and to help maintain viable micro-organisms. Attachment 3 shows that a pile configuration with a capacity in excess of 700 cu. yds. can easily be stored at this site.

Upon completion of topsoil salvage, the storage pile will be pocked (roughened) and reseeded with a previously approved seed mix as shown in Table 3-3, and is also included in Attachment 13 of Appendix 5-14 for ready reference. As an alternate, Attachment 13 also includes a seed mix which was used on the Crandall Canyon East Mountain drillhole reclamation project and is readily available, subject to Division concurrence of its use. A layer of wood straw will then be scattered over the surface. 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. 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, the Company commits to having an monitor on site at all times. The purpose of this person will be to make sure that all topsoil resources are properly salvaged, to maintain accurate truck count of 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.

R645-301-220 ENVIRONMENTAL DESCRIPTION

The West Ridge Mine is located in eastern Carbon County, Utah on the east side of the Price River drainage basin at the western edge of the Book Cliffs. The Book Cliffs are oriented northwest-southeast in the vicinity of the proposed permit area. The mine site surface facilities is located in C Canyon (just north of B Canyon) in an east-west trending canyon incised down through the cliff face. The elevation differences in the area of the mine site range from approximately 6,800 feet amsl at the mouth of C Canyon to over 8,800 feet on top of West Ridge. Elevations of the mine site area range from 6,900 feet amsl to 7,200 feet amsl.

In addition to the mine site, a substitute topsoil borrow area has been permitted as backup soil material for reclamation at the proposed mine site. This site is located approximately 1 ½ miles west of the mine site and would only be used to supplement existing soil resources at the mine site if reclamation efforts do not prove successful utilizing the materials on site. The elevation of the proposed borrow site is about 6,500-6,600 feet. Refer to Map 2-3 for details of the proposed borrow site disturbed area and soil mapping information.

The average annual precipitation in the area of the mine site is 12-14 inches with the majority of the precipitation occurring from October to March. The mean annual air temperature is 45-47 degrees F and the average frost-free period is 80 to 120 days.

No shallow water table is present as evidenced through the soil pits dug throughout the proposed mine site area. The ephemeral streams flow only in direct response to heavy rainfall events. Valley bottoms are narrow and comprised of sands and coarse alluvial soil materials with low organic matter content. Steep hillslopes and narrow benches have been formed in the alternating sedimentary lithologic units, primarily sandstones and shales. The majority of the soils are shallow and well drained.

APPENDIX 2-10

BEAR CANYON GVH SOILS INFORMATION

a) ORDER 1 SOILS SURVEY
LONG RESOURCE CONSULTANTS

b) TOPSOIL STORAGE AREA

Long Resource Consultants, Inc.

1960 W Deep Creek Road, Morgan, UT 84050-966, Office 801-829-6416, Cell 801-791-3447, Email lrcsoils@msn.com

Mr. Dave Shaver
Utah American Energy
West Ridge Mine
P.O. Box 1077
Price, Utah 84501

October 15, 2008

Dave,

Attached is the soils evaluation report for the Bear Canyon Gas Vent Hole location. It includes an assessment of existing soil conditions correlated to established soil series that are presently in use by the NRCS in either Carbon or Emery counties. An estimate of the potential topsoil salvage quantity is also included. All salvage operations should be closely monitored.

Thank you for the opportunity to conduct this soil resource evaluation for the Westridge Mine. Please contact me if you have any questions (801-791-3447).

Sincerely,

Robert E. Long, CPSS
President

Bear Canyon – Left Fork
Soils Evaluation

Gas Vent Hole

Location:	Easting	547580
	Northing	4387075
	Zone	12
	NAD	1983
	Township	14 South
	Range	13 East
	Section	3
	Meridian	Salt Lake
	USGS Quad: Mount Bartles, Utah	
Elevation:	7185 to 7240 feet	

Purpose of Soil Resource Assessment

The purpose of this soil resource assessment was to determine how closely the soils at the Bear Canyon Gas Vent Hole (GVH) site correlated with the Carbon County Soil Survey produced by the Natural Resource Conservation Service (NRCS, USDA 2007). Topsoil and subsoil salvage depths were estimated based on soil profile descriptions. Soil types vary across the site and monitoring should be part of the topsoil salvage operations.

The identification of hazardous or toxic materials was not part of this soil resource assessment.

Assessment Methods

This assessment was made by comparing the soil map unit delineated by the NRCS in the Carbon County Soil Survey with the soils actually identified at the site. Three soil profile descriptions were completed for the Bear Canyon GVH location using the Field *Book for Describing and Sampling Soils* (Schoeneberger, P.J., et. al., 2002).

The soil resource assessment was conducted by Robert E. Long, Certified Professional Soil Scientist (CPSS, No. 02346 ARCPACS) on October 7, 2008.

Taxonomic classification of the soil pedons was based on *Keys to Soil Taxonomy*, Tenth Edition (USDA 2006). The pedons were correlated to established soil series (USDA 2008) currently in use in Carbon and Emery Counties, Utah.

Soil colors were compared with color chips in the *Munsell Soil Color Charts* (Munsell 2000).

Soil pH was measured with field indicator dyes (phenol red and thymol blue).

Percent calcium carbonate was determined with a field calcimeter.

Digital photographs were taken at each soil profile location to document current conditions.

The *Soil Pit Location Map* was drawn to scale by Westridge mine staff. Elevations for each soil profile location were based on the soil map topographic lines. Soil area delineations were estimated in the field by visual observation of the cutbank.

Dominant vegetation was identified. A separate quantitative vegetation assessment is being prepared by Mt. Nebo Scientific.

Site locations were recorded with a Garmin GPSmap 60CSX in UTM, NAD 1983. The UTM location listed at the beginning of this report is for soil pit BC-GVH-02 which is located near the center of the Bear Canyon GVH evaluation area.

General Site Description

A soil resource evaluation was conducted at the Gas Vent Hole location in the right fork of Bear Canyon on October 7, 2008. The access road leading to the site had been upgraded just prior to the soils evaluation. The road upgrade exposed an 8 to 12 foot cutbank along the north side of the proposed GVH site. The Bear Canyon GVH location is 0.24 acres (*Soil Pit Location Map*).

The proposed GVH site is at the footslope of a very steep north-northwest facing mountain sideslope. Slopes on the GVH site range from 6 to 10 percent on the footslope and 25 to 40 percent above the footslope. Soils developed from alluvial and colluvial deposition.

Elevation at the site ranges from 7,185 to approximately 7,240 feet.

Estimated annual precipitation ranges from 20 to 35 inches based on the official soil series descriptions (USDA 2008).

Sandstone rock outcrops occur on the upslope perimeter and are shown on the *Soil Pit Location Map* as rock ledges.

NRCS Soil Map Unit

The south side of the right fork of Bear Canyon was delineated (NRCS 2007) as map unit 21 by the NRCS (Croydon loam, 8 to 30 percent slopes). Croydon soils are very deep with a thick mollic (dark) surface and an argillic horizon (Pachic Argicryoll, fine-loamy, mixed, superactive). Soils identified at the Bear Canyon GVH site were similar to Croydon, but they have calcic horizons and contain large amounts of subangular sandstone fragments. Descriptions of the soils identified at the Bear Canyon GVH site are in the *Topsoil Resource* section of this report.

The north side of the right fork of Bear Canyon was delineated (NRCS 2007) as map unit 84 (Podo – Rock outcrop complex, 50 to 70 percent slopes) by the NRCS. Disturbance is not anticipated on the north side of the right fork of Bear Canyon.

Soil Resource

Three soil pedons were evaluated along the access road cutbank. Soil pedon BC-GVH-01 was trimmed back with shovels, while pedons BC-GVH-02 and BC-GVH-03 were dug approximately 6 to 8 feet into the cutbank with a backhoe. Table 1 lists the taxonomic classification and correlated soil series for the described soil pedons. The location of each soil pedon is shown on the *Soil Pit Location map*.

Table 1. Taxonomic classification of Bear Canyon GVH soil profiles.

Pedon	Soil Series	Taxonomic Classification
1	Aagard skeletal taxadjunct	Calcic Pachic Argicryoll, loamy-skeletal, mixed, superactive
2	Northorn	Calcic Argicryoll, fine-loamy, mixed, superactive
3	Aagard	Calcic Pachic Argicryoll, fine-loamy, mixed, superactive

Coarse fragments ranging in size from gravels to stones and some boulders were observed in all three soil pedons. Percent, size, and location of sandstone fragments varied between and within the pits.

Each of the three soil pedons exhibited evidence of multiple episodes of alluvial and colluvial deposition. This determination was based on irregular changes in soil color, texture, carbonates, and rock fragments (size and percent).

Pedon BC-GVH-01 was located near the east end of the Bear Canyon GVH evaluation area, photos 1 through 3. This pedon is pachic with mollic soil colors extending to a depth of 17 inches. Rock fragments were approximately 40 percent in the surface 12 inches and none in the buried A horizon (2A, 12-17 inches). Rock fragment content below 17 inches ranged from 5 to 45 percent. Calcium carbonate percent increased significantly below 17 inches. The amount of calcium carbonate present in the soil met the requirements for a calcic horizon from 17 to 44 inches. This soil was correlated to a skeletal taxadjunct of the Aagard soil series.

Pedon BC-GVH-02 was located near the center of the Bear Canyon GVH evaluation area, photos 4 through 6. Mollic soil colors only extended to 12 inches in this pedon. Rock fragments ranged from 18 to 30 percent in the surface 12 inches; and from 10 to 70 percent below 12 inches. Calcium carbonate percent began to increase significantly at 12 inches. Two calcic horizons were present at 20 to 38 inches and from 51 to 84 inches. This soil was correlated to the Northorn soil series.

Pedon BC-GVH-03 was located near the west end of the Bear Canyon GVH evaluation area, photos 7 through 9. This pedon is pachic with mollic soil colors extending to a depth of 17 inches. Rock fragments were approximately 15 percent in the surface 17 inches; and ranged from 40 to 70 percent below 17 inches. Calcium carbonate percent ranged from 18 to 25 percent below 17 inches and met the requirements of a calcic horizon. This soil was correlated to the Aagard soil series.

Topsoil Salvage

The depth of topsoil salvage varies across the Bear Canyon GVH location. The GVH location was divided into three soil areas to describe the potential topsoil salvage depths. Table 2 illustrates the range of soil characteristics within each pedon that have an effect on topsoil suitability. The depth of suitable topsoil corresponds directly with the depth of mollic soil colors.

Large stones and boulders should be removed from the salvaged topsoil, as much as may be feasibly possible, during the salvage operations.

Table 2. Soil characteristics influencing topsoil suitability (Utah DOGM 2005).

Depth	Horizon	Mollic Soil Colors	pH[1]	$CaCO_3$ [2]	Rock Fragments[3]	Topsoil Salvage Depth	Topsoil Salvage Depth Determining Feature(s)
inches				%	%	inches	
BC-GVH-01							
2-0	Oi		Leaves, needles & twigs				
0-3	A1	Yes	7.6	6	40		
3-12	A2	Yes	7.6	11	40		
12-17	2A	Yes	7.9	8	0	17	
17-34	2Btk	No	8.4	16	45		Alkaline soil pH (>8.2), CaCO3% (>15), rock fragments (>35%).
34-44	3A	No	8.2	15	30		
44-56	3Bw	No	8.2	10	5		
56-84	4Bk	No	8.4	8	40		
BC-GVH-02							
2-0	Oi		Leaves, needles & twigs				
0-3	A	Yes	7.8	2	18		
3-12	Bt	Yes	7.9	8	30	12	
12-20	BC	No	8	12	40		Alkaline soil pH (>8.2), CaCO3% (>15), rock fragments (>35%).
20-38	2CA	No	8.1	19	10		
38-45	3Bk	No	8.2	15	70		
45-51	4A	Yes	7.9	5	10		
51-72	5Bk	No	8.4	15	70		
72-84	6C	No	8.1	9	15		
BC-GVH-03							
2-0	Oi		Leaves, needles & twigs				
0-4	A	Yes	7.6	3	15		
4-17	Bt	Yes	7.9	7	15	17	
17-30	BC	No	8.2	18	40		Alkaline soil pH (>8.2), CaCO3% (>15), rock fragments (>35%).
30-57	2CA	No	8.4	18	40		
57-90	3Bk	No	8.4	25	70		

1. Soil pH was measured with indicator dyes; good (6.2-8.2), fair (8.2-8.5), and poor (8.6-9.0).
2. Percent CaCO3 was measured with field calcimeter; good (<15%), fair (15-30%), and poor (>30%).
3. Percent rock fragments was estimated visually in the field; good (<35%), fair (35-65%), poor (>65%).

Topsoil suitability: Good Fair Poor

Table 3 lists the potential topsoil salvage depths and estimated quantities for the Bear Canyon GVH location. Topsoil depths may decrease as the slope increases. Topsoil salvage operations should be monitored by a Certified Professional Soil Scientist. The estimated total topsoil salvage quantity of 514.2 cubic yards will allow approximately 15 to 16 inches of topsoil to be spread evenly over the final graded surface of 0.24 acres.

Table 3. Potential topsoil salvage depths and estimated quantities by soil area and total GVH project location.

Soil Area	Soil Pedon	Potential Topsoil Depth[1]	Area[2]	Estimated Topsoil Quantity[3]
		inches	acres	cubic yards
A	1	17	0.08	182.8
B	2	12	0.05	80.7
C	3	17	0.11	251.4
Total			0.24	514.2

1. Potential topsoil salvage depth is based on depths observed in representative soil pedons evaluated in each soil area.
2. Area is based on acres measured by Westridge Mine staff and delineated on the *Soil Pit Location Map*.
3. Estimated topsoil salvage quantity is based on potential topsoil salvage depth and measured area.

Vegetation

The dominant vegetation community consists of an overstory of Douglas fir, bigtooth maple, and quaking aspen. The understory shrub community is dominated by mountain snowberry. The vegetation report written by Mt. Nebo Scientific contains a more detailed quantitative description of the site vegetation.

Reclamation Potential

The potential for successfully reclaiming the Bear Canyon GVH location is good based on the estimated quality and quantity of topsoil that may be salvaged.

Site Photos

Photo 1. Soil profile BC-GVH-01 located at the east end of the Bear Canyon GVH evaluation area. This soil was correlated to be a skeletal taxadjunct of the Aagard soil series (Calcic Pachic Argicryoll, loamy-skeletal, mixed, superactive).

Photo 2. Location of soil profile BC-GVH-01 at east end of Bear Canyon soils evaluation area. Description was done in cutbank on convex knoll of mountain footslope.

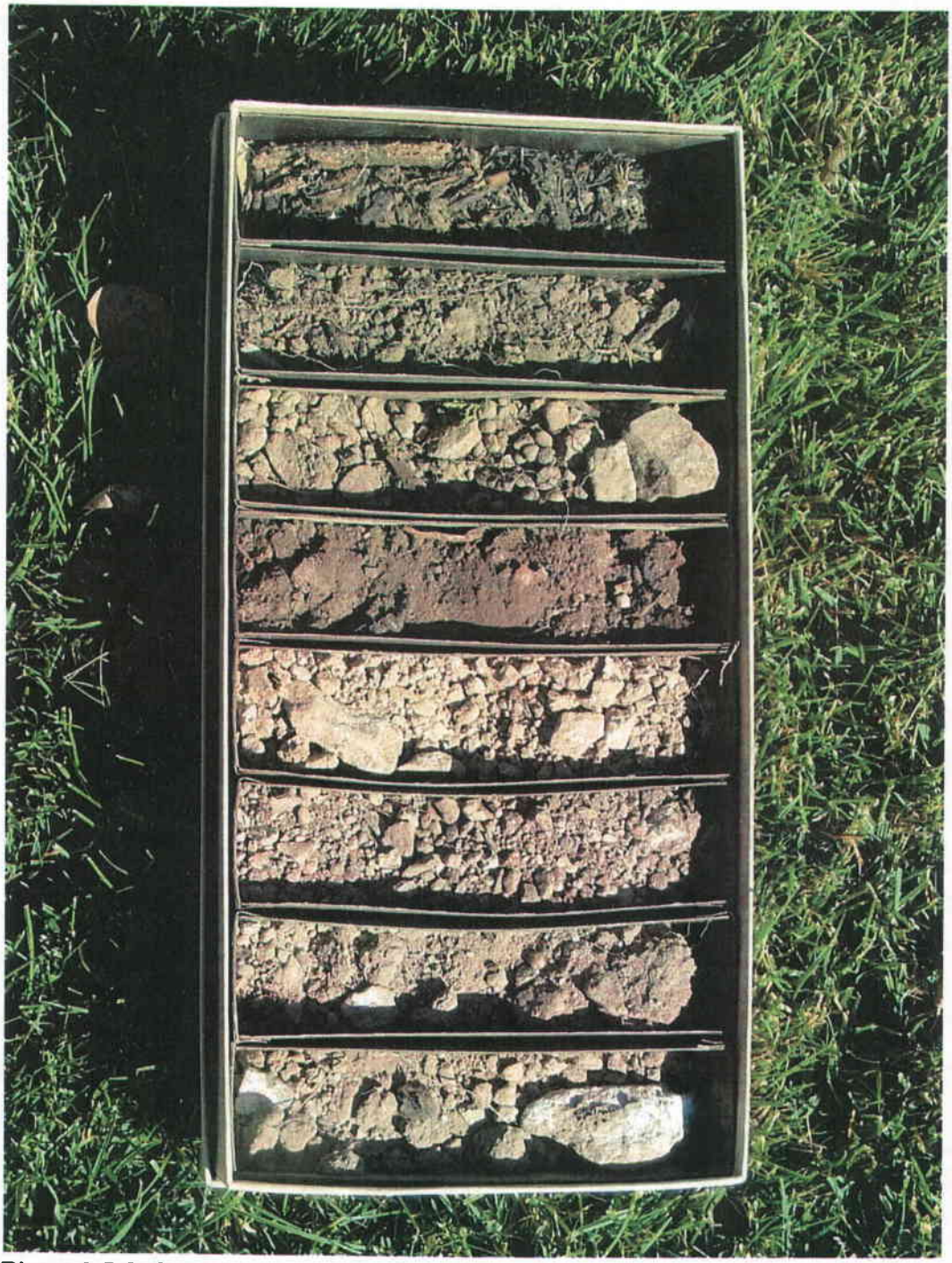

Photo 3. BC-GVH-01 pedon sample box. Top tray contains the Oi horizon (needles, leaves, and twigs). Potential topsoil salvage depth (0-17 inches) is limited to trays 2 (A1, 0-3 inches), 3 (A2, 3-12 inches), and 4 (2A, 12-17 inches) from top. The calcic horizon is contained in trays 5 (2Btk, 17-34 inches) and 6 (3A, 34-44 inches) from the top. Tray 8 (4Bk, 56-84 inches) has poor soil pH and poor percent rock fragments.

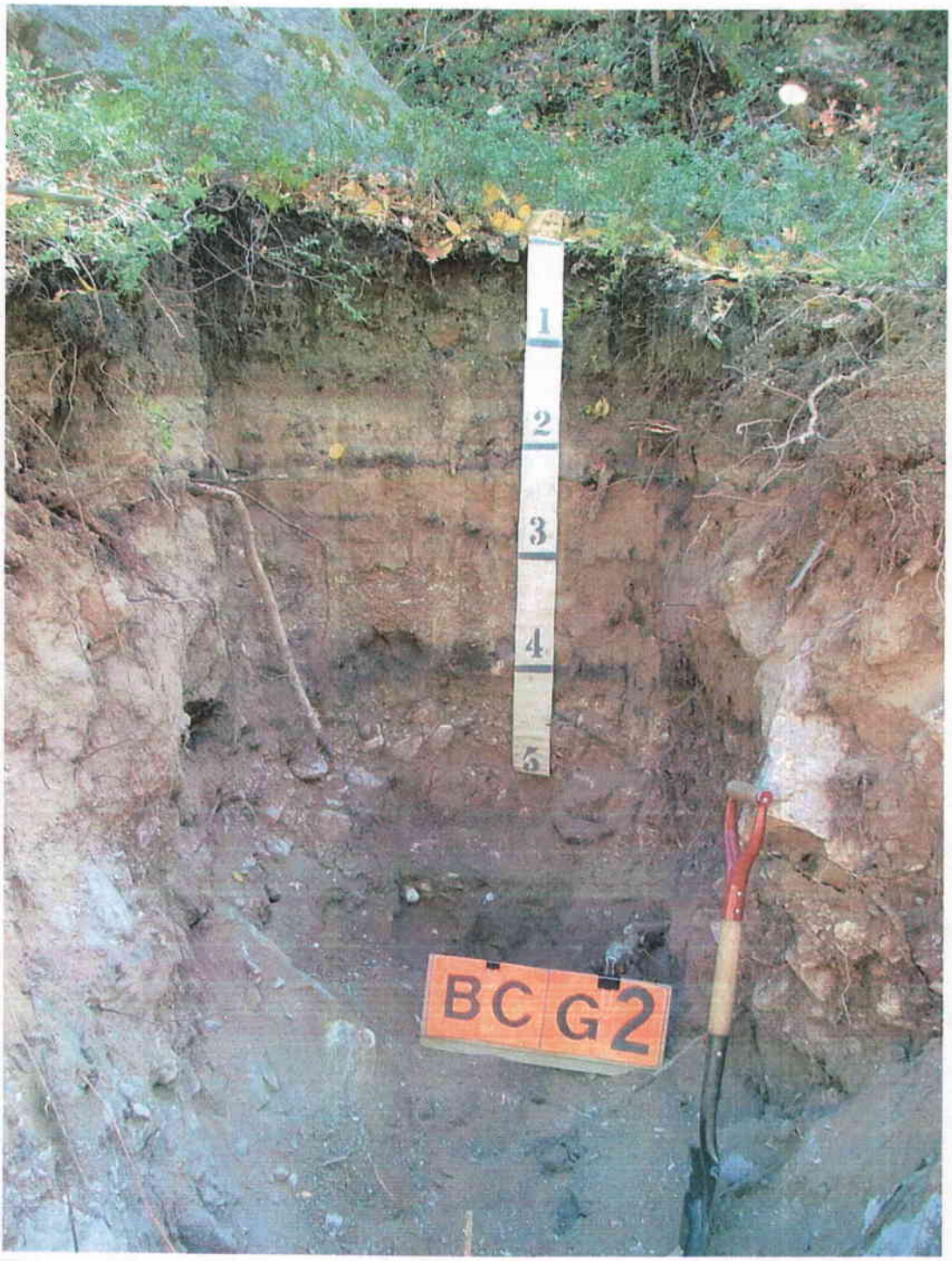

Photo 4. Soil profile BC-GVH-02 near center of Bear Canyon GVH evaluation area. Soil was correlated to Northorn series (Calcic Argicryolls, fine-loamy, mixed, superactive).

Photo 5. Location of soil profile BC-GVH-02 near center of Bear Canyon GVH soils evaluation area. Pit was on cutbank on concave mountain footslope near sandstone rock outcrop (at right in photo).

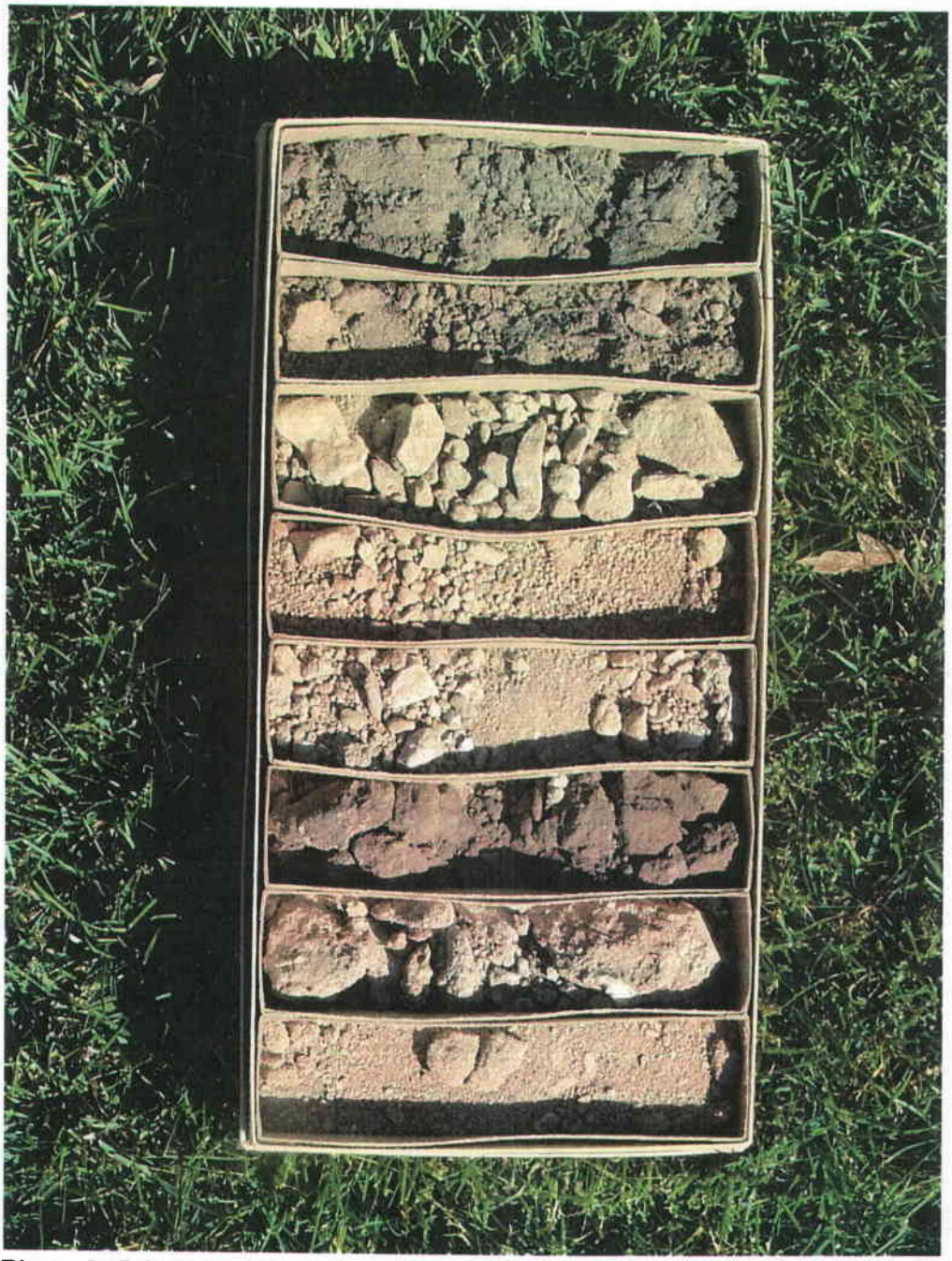

Photo 6. BC-GVH-02 soil pedon box. The Oi horizon is not displayed in box. Potential topsoil salvage depth is limited to the top trays 1 (A, 0-3 inches) and 2 (Bt, 3-12 inches) at the top of box. Soil material in tray 3 (BC, 12-20 inches) has 12 percent calcium carbonate with 40 percent rock fragments and was determined to not be suitable for topsoil salvage. The upper calcic horizon is contained in trays 4 (2CA, 20-38 inches) and 5 (3Bk, 38-45 inches) from the top. Tray 5 (4A, 45-51) inches contains a buried surface. The lower calcic horizon is in trays 7 (5Bk, 51-72 inches) and 8 (6C, 72-84 inches).

Photo 7. Soil profile BC-GVH-03 located near west end of Bear Canyon soils evaluation area. This soil was correlated to the Aagard series (Calcic Pachic Argicryoll, fine-loamy, mixed, superactive). Large boulders can be seen on the right next to the shovel and in the lower right.

Photo 8. Location of soil profile BC-GVH-03 on convex portion of a mountain footslope. This site is located between two sandstone outcrops (one is at left in photo).

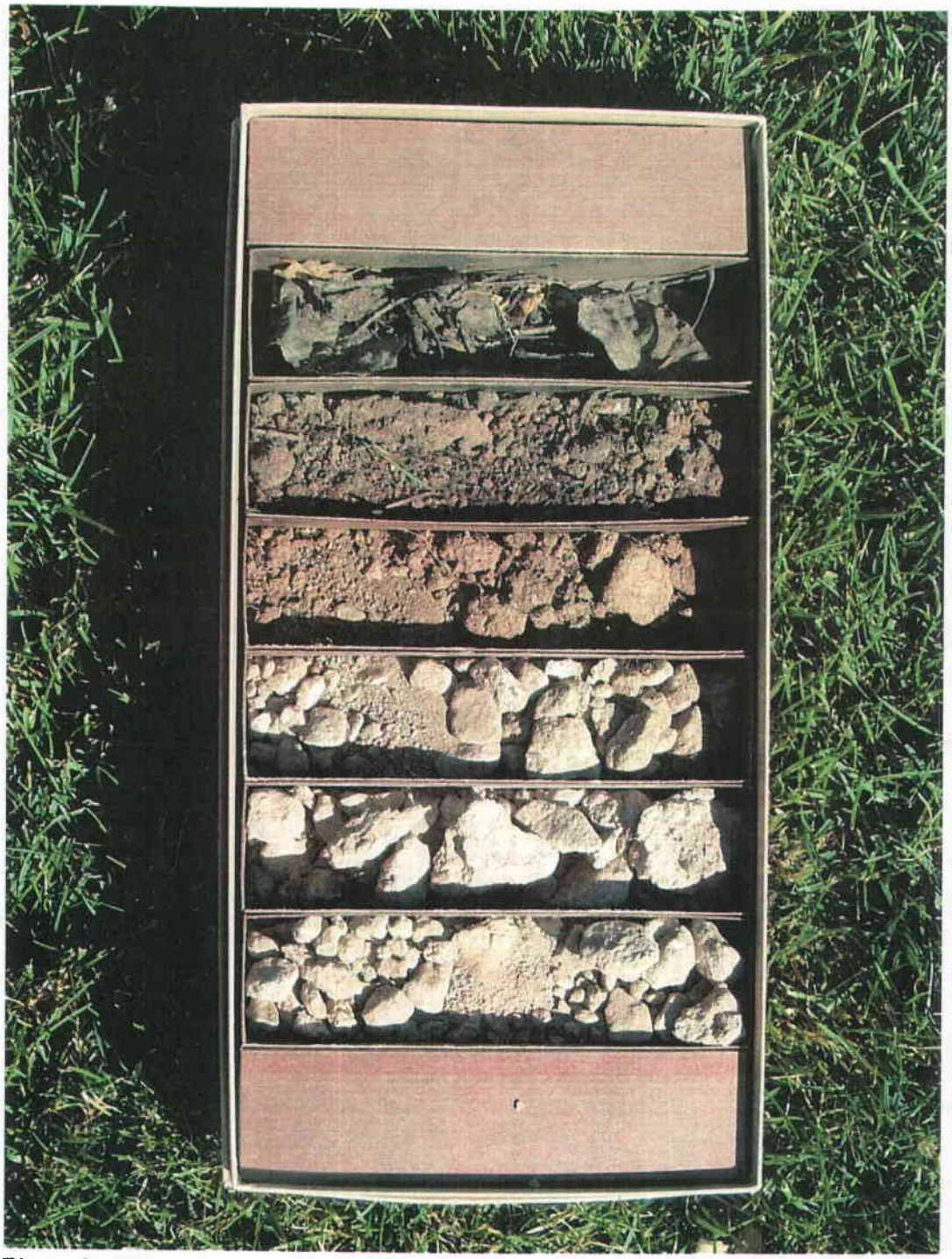

Photo 9. BC-GVH-03 soil pedon box. The Oi horizon (needles, leaves, and twigs) is in the top tray. Potential topsoil salvage depth is limited to trays 2 (A, 0-4 inches) and 3 (Bt, 4-17 inches) from the top. The calcic horizon is contained in trays 4 (BC, 17-30 inches), 5 (2CA, 30-57 inches), and 6 (3Bk, 57-90 inches) from the top. Soil texture in tray 6 is extremely stony loamy sand.

Literature Cited

Munsell Soil Color Charts, 2002.

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 Resource Conservation Service, National Soil Survey Center, Lincoln, NE.

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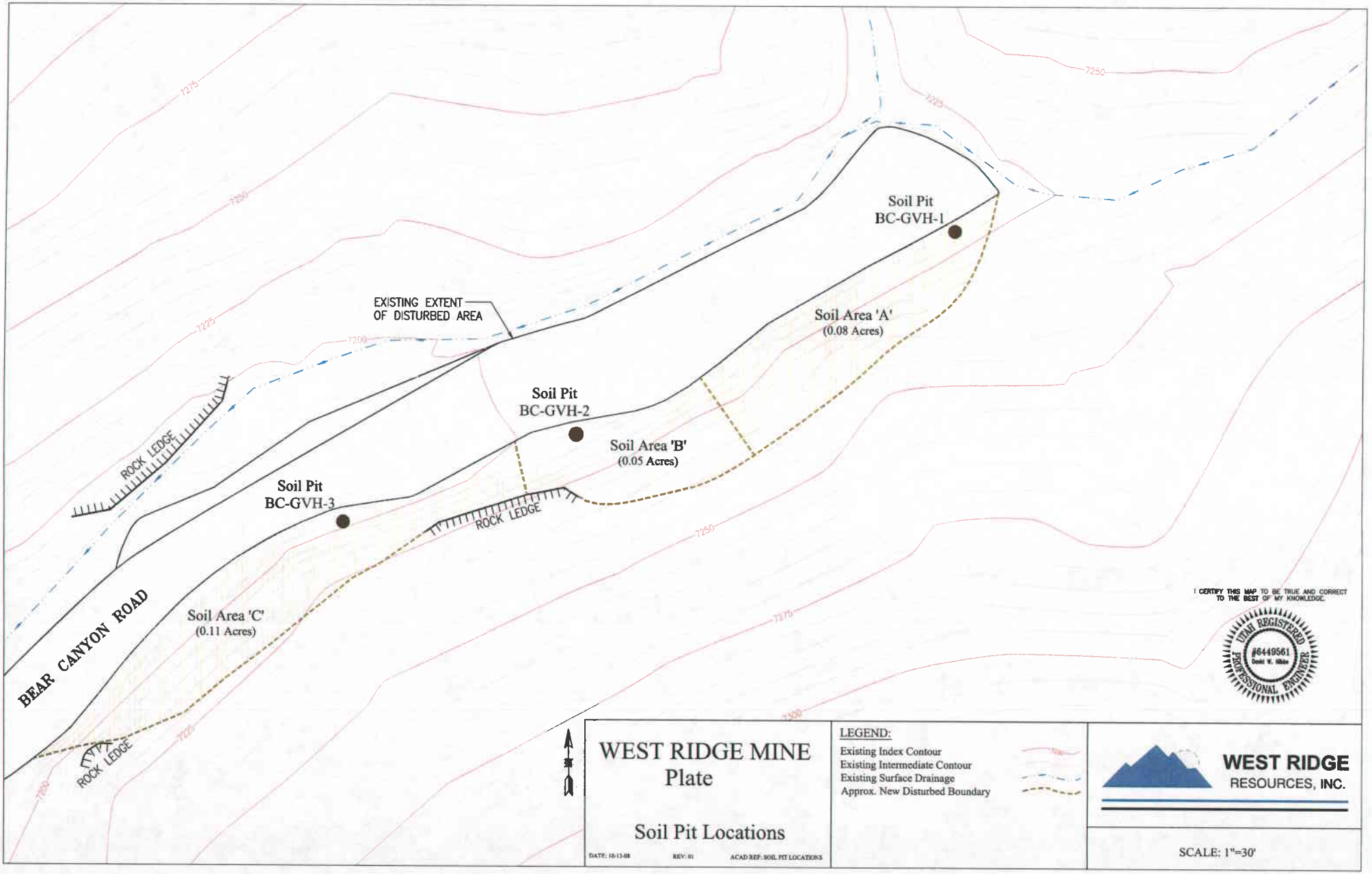
USDA – Natural Resource Conservation Service, 2008. Official Soil Series Descriptions (http://soils.usda.gov/technical/classification/osd/).

Utah Division of Oil, Gas, and Mining, October 2005. Guidelines for Management of Topsoil and Overburden.



7275
7250
7225
7200
7250
7225
7250
7275
7300
7225
7200
EXISTING EXTENT OF DISTURBED AREA
Soil Pit BC-GVH-1
Soil Area 'A' (0.08 Acres)
Soil Pit BC-GVH-2
Soil Area 'B' (0.05 Acres)
Soil Pit BC-GVH-3
Soil Area 'C' (0.11 Acres)
ROCK LEDGE
ROCK LEDGE
ROCK LEDGE
BEAR CANYON ROAD
I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.
UTAH REGISTERED PROFESSIONAL ENGINEER
#6449561
David W. Hibbs
WEST RIDGE MINE
Plate
Soil Pit Locations
DATE: 10-13-08
REV: 01
ACAD REF: SOIL PIT LOCATIONS
LEGEND:
Existing Index Contour
Existing Intermediate Contour
Existing Surface Drainage
Approx. New Disturbed Boundary
WEST RIDGE RESOURCES, INC.
SCALE: 1"=30'

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: BC-GVH-1 DRAFT 3/2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):
Skeletal - Aagaard	A		Calcic Pachic Argicryoll Lo-skel, mix, super,	Ustic

Describer(s):	Date:	Weather:	Temp.: Air: / Soil: / Depth:	Latitude: / Longitude:	Datum:	Location:
Bob Long	10-7-08	Clear	Air: 56	° ' " N / ° ' " W	1983	Sec. 3 T. 14S R. 13E

UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:
12/547614/4387082	Mt. Bartles UT		Westridge		

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity:	Slope Shape: (Up & Dn / Across)
Mo	Mo			7215	NNW 350	8 40	Simple	Concave / Convex

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:
Footslope	Lower 1/3						Bear Canyon

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability:	Land Cover / Use:
Well	No	No	SM	K_{sat}: mod slow	Mixed Conifer Maple

Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:
colluvium/residuum	sandstone	Castlegate

Erosion: Kind: Degree:	Runoff:	Surface Frag %: Kind: GR: CB: ST: BD: CN: FL:	Diagnostic Horz. / Prop.: Kind: Depth:
None	mod slow	— — 5 15 — —	Mollic 0-17"

P. S. Control Section: Depth Range:	Ave. Clay %:	Ave. Rock Frag %:	
17-34"	30	45	Argillic 17-34" Calcic-1 17-44" Calcic-2 56-84"

VEGETATION:

SYMBOL	COMMON NAME	
	Douglas Fir	
	Mtn Snowberry	
	Bigtooth maple	
	Aspen	

MISCELLANEOUS FIELD NOTES / SKETCH:

Component Name: Agard - skeletal | Map Unit Symbol: A | Date: 10-2-06

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Structure Kind % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	cut	2-0"	Oi	CS	Leaves, needles & twigs									
2		0-3"	A1	CS	10YR 4/2	10YR 3/1	GRV L	GR 30 SAng CB 10 SS	1 vfm sbk 2 mgr	so	so	ss	sp	—
3		3-12"	A2	gw	10YR 4/3	10YR 3/2	GRV L	GR 30 SAng CB 10 SS	2fm sbk	sh	vfr	ss	sp	—
4		12-17"	2A	gs	10YR 3/2	10YR 2/1	L	—	2fm sbk	sh	vfr	ss	sp	—
5		17-34"	2 Btk	gw	10YR 6/3	10YR 5/3	GRV CL	GR 40 SAng CB 3 ST 2 SS	3m sbk	h	fr	s	p	—
6		34-44"	3A	CS	10YR 5/3	10YR 4/2	GRV SCL	GR 25 SAng CB 3 ST 2 SS	2f sbk	h	vfr	ss	sp	—
7		44-56"	3 Bw	gs	10YR 5/3	10YR 4/3	SCL	GR 4 SAng CB 1 SS	1fm sbk	sh	vfr	so	sp	—
8		56-84	4 Bk		10YR 5/2	10YR 4/2	GRV SCL	GR 25 SB 10 SS	2fm sbk	h	vfr	ss	sp	—
9														
10														

BC-G'H-1

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Det Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH Effer (meth) (agent)	Clay %	CCE %	Notes
1	—	—							—
2	—			2vff 2mc	2vff 2mc	7.6 NE	22 40	6	M
3	—			2vff 2mc	2vff 2mc	7.6 VS	23 40	11	M
4	—	—		2vff 2mc	2vff 2mc	7.9 SL	24 30	8	M
5	—	15 CAC BRF/5f 1-2 mm/CAM Pf		2vff 1mc	2vff 1mc	8.4 ST	30 35	16	SM
6	—	10 CAC BRF 0-1 mm	—	2vff 1mc	2vff 1mc	8.2 SL	26 50	15	SM
7	—	2 CAC BRF 1-2 mm	—	2vff 1mc	2vff 1mc	8.2 SL	20 60	10	SM
8	—	40 CAC ARF 1-2 mm	—	2vff 1mc	2vff 1mc	8.4 ST	24 50	8	Dry
9									
10									

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: BG-GVH-2 DRAFT 3/2002

Series or Component Name: Northorn	Map Unit Symbol: B	Photo #:	Classification: Calcic Argicryolls fine-loamy, mix, super		Soil Moist. Regime (Tax.): Ustic
Describer(s): Bdo Long	Date: 10-7-08	Weather: clear Temp.: Air: 50 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W	Datum: 1983	Location: Sec. 3 T. 14S R. 13E
UTM: Zone: 12 mE: 547580 mN: 4382075	Topo Quad: Mt Bauldy	Site ID: Yr: State: County: Pedon #:	Soil Survey Area: Westridge	MLRA / LRU:	Transect: ID: Stop #: Interval:
Landscape: Mo	Landform: Mo	Microfeature:	Anthro:	Elevation: 7205	Aspect: N
Slope (%): 24	Slope Complexity: Complex	Slope Shape: (Up & Dn / Across) concave / convex			
Hillslope Profile Position: Footslope	Geom. Component: Lower 1/3	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:
State Physio. Area:	Local Physio. Area: Bear Canyon				
Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status: Sor -	Permeability: K_{sat}: mod	Land Cover / Use: Mixed Conifer
Parent Material: Alluvium over colluvium	Bedrock: Kind: Sandstone	Fract.:	Hard.:	Depth:	Lithostrat. Units: Castlegate
Group:	Formation:	Member:			
Erosion: Kind: No	Degree:	Runoff: Mod	Surface Frag %: Kind: GR: — CB: — ST: 5 BD: 10 CN: — FL: —		Diagnostic Horz. / Prop.: mollic Kind: Depth: 0-12"
P.S. Control Section: Depth Range: 3-12"	Ave. Clay %: 26%	Ave. Rock Frag %: 30%			argillic 3-12" calcic-1 20-45" calcic-2 51-72"

VEGETATION:

SYMBOL	COMMON NAME	
	Douglas fir	
	Aspen	
	Mtn snowberry	
	Bigtooth maple	

MISCELLANEOUS FIELD NOTES / SKETCH:

Topsoil 0-12"

North end of Rock outcrop

Component Name: Northern | Map Unit Symbol: B | Date: 10-2-08

BC-GVH-2

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Structure Kind % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	Pit	2-0"	Oi	as	Leaves, needles & twigs									
2	Pit	0-3"	A	as	10YR 4/3	10YR 3/2	ST SIL	GR 5 CB 3 ST 5 SS	2 m sbk 2 fgr	sh	vfr	ss	sp	—
3	Pit	3-12"	Bt	cw	10YR 5/3	10YR 3/3	GR SCL	GR 20 GR 5 ST 5	2 m sbk	h	fr	ss	sp	—
4	Pit	12-20"	BC	as	10YR 6/3	10YR 3/3	GR SCL	GR 40	2 fm sbk	sh	vfr	so	po	—
5	Pit	20-38"	2CA	as	10YR 6/2	10YR 4/3	SL	GR 10	m	sh	vfr	so	po	—
6	Pit	38-45	3Bk	as	10YR 6/3	10YR 4/3	GRX SCL	GR 60 CB 10	m	h	fir	ss	sp	—
7	Pit	45-51	4A	as	10YR 4/2	10YR 3/2	SiL	CB 10	2 m sbk	h	fr	s	sp	—
8	Pit	51-72	5Bk	cs	10YR 6/3	10YR 4/3	GRX CL	GR 25 ST 5	2 m sbk	h	fr	s	p	—
9	Pit	72-84	6C		10YR 6/3	10YR 5/3	GR LS	GR 40 CB 5	SG	lo	lo	so	po	—
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay 3and %	CCE	Notes
1	—	—	—							—
2	—	—	—	2 vf f 2 m 1 c	1 vf f	7.8	VS	20 20	2	
3	—	—	45 CLF PF/BR	3 vf 2 f 1 m c	1 vf f	7.9	VS	26 54	8	
4	—	40 CAC 1-3 mm BRF	—	2 vf f 1 m c	2 vf i	8.0	ST	22 50	12	
5	—	10 1-2 mm CAC ARF	—	2 vf f 1 m c	2 vf i	8.1	ST	14 55	19	1-2" A at 24"
6	—	70 1-2 mm CAC ARF	—	2 vf if	1 vf f	8.2	VE	24 55	15	
7	—	—	—	1 vf f	2 vf i	7.9	SL	24 15	5	
8	—	25 f CAM TH 70 1-4 mm CAC ARF	—	2 vf if 1 m c	1 vf f	8.4	VE	32 32	15	
9	—	—	—	1 vf f	3 vf i	8.1	ST	8 84	9	
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: BC-GVH3 DRAFT 3/2002

Series or Component Name: Aagard	Map Unit Symbol: C	Photo #:	Classification: Calcic Pachic Argicryoll fine-loamy, mixed, super		Soil Moist. Regime (Tax.): USTIC
Describer(s): Bob Long	Date: 10-7-08	Weather: Clear Temp.: Air: 48 Soil: Depth:	Latitude: ° ' "N Longitude: ° ' "W	Datum: 1983	Location: Sec. 3 T. 14S R. 13E
UTM: Zone: mE: mN: 12/547545/4387050	Topo Quad: Mt Bartles	Site ID: Yr: State: County: Pedon #:	Soil Survey Area: Westridge	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape: Mo	Landform: Mo	Microfeature:	Anthro:	Elevation: 7195	Aspect: N 6°	Slope (%): 8	Slope Complexity: complex	Slope Shape: (Up & Dn / Across) Convex / convex

Hillslope Profile Position: Footslope	Geom. Component: Lower 1/3	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area: Bear Canyon

Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status: 0-17" moist 17-30" Sl. M	Permeability: K_{sat}:	Land Cover / Use:

Parent Material: Colluvium	Bedrock: Kind: Fract.: Hard.: Depth: Sandstone	Lithostrat. Units:	Group: Castlegate	Formation: Member:

Erosion: Kind: None Degree:	Runoff: Mod	Surface Frag %: Kind:	GR: -	CB: -	ST: 5	BD: 15	CN:	FL:	Diagnostic Horz. / Prop.: Mollic 0-17"		Kind:	Depth:

P. S. Control Section : Depth Range: 4-24	Ave. Clay %: 25	Ave. Rock Frag %: 15	Argillic 4-30 Calcic 17-90"

VEGETATION :

SYMBOL	COMMON NAME	
	Douglas Fir	
	Aspen	
	Rocky Mtn Juniper	
	Mtn Snowberry	
	Bigtooth maple	

MISCELLANEOUS FIELD NOTES / SKETCH :

Dry below 30"

Topsoil 0-30"

South end of Rock Outcrop

calcic below 30"

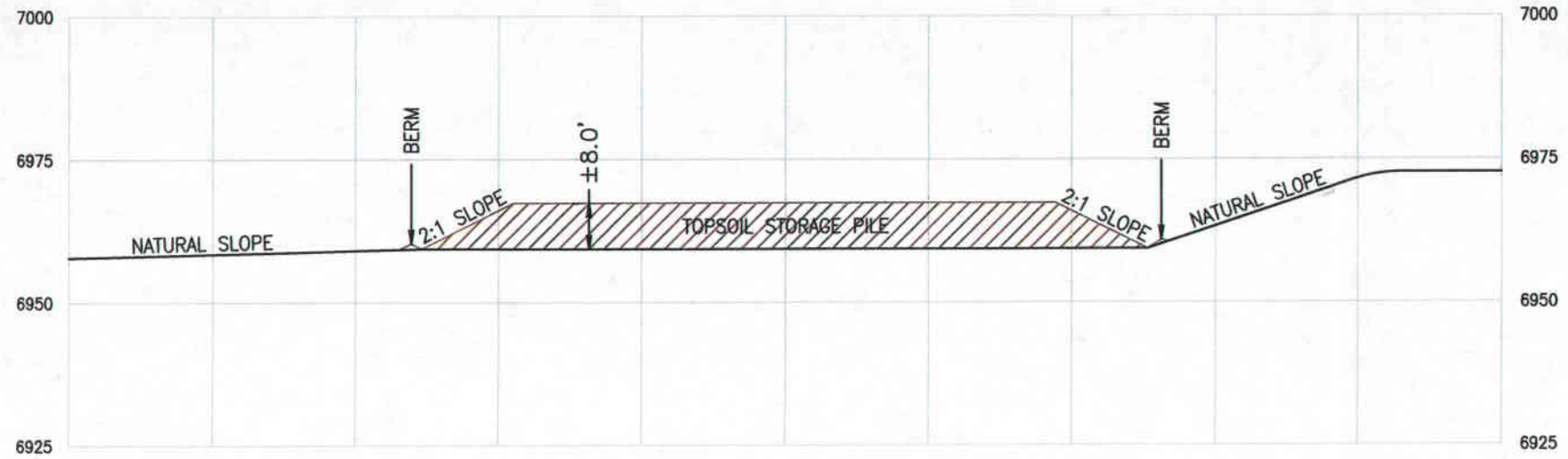
K stony below 30"

Component Name: AAGARD | Map Unit Symbol: C | Date: 10-7-2008

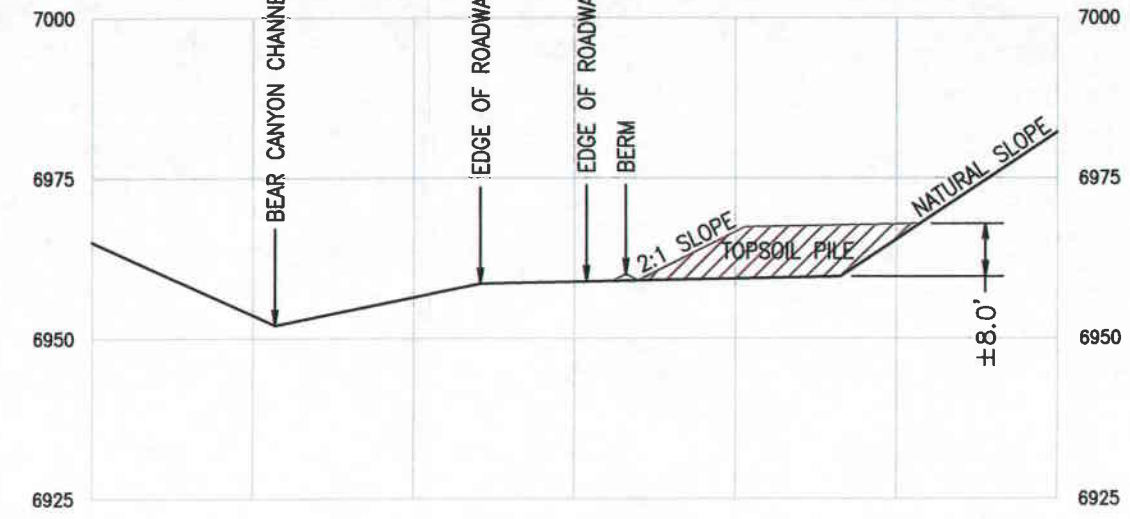
BC-GVH-3

	Obser. Method	Depth (in) ~~(cm)~~	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Kind % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	Pit	2-0"	Oi	cs	leaves, needles, & twigs									—
2	Pit	0-4"	A1	cs	10YR 4/3	10YR 3/2	GR L	GR 10 S-ang ST 5 SS 0	1 m sbk ~~2f~~ gr	sh	vfr	ss	sp	—
3	Pit	4-17"	Bt	cw	10YR 5/3	10YR 3/3	GR L	GR 10 CB 3 ST 2	2 m sbk	sh	vfr	ss	sp	—
4	Pit	17-30"	Btk	cw	10YR 6/2	10YR 5/3	GRV SCL	GR 30 CB 5 ST 5	3 m sbk	h	fr	ss	sp	—
5		30-57"	2BK1	gs	10YR 6/3	10YR 5/4	STV CL	GR 10 CB 10 ST 20	3 m sbk	h	fr	s	p	—
6		57-90"	3BK2		10YR 7/3	10YR 6/3	STX SCL	GR 30 CB 10 ST 30	2 m sbk	h	fr	ss	sp	—
7														
8														
9														
10														

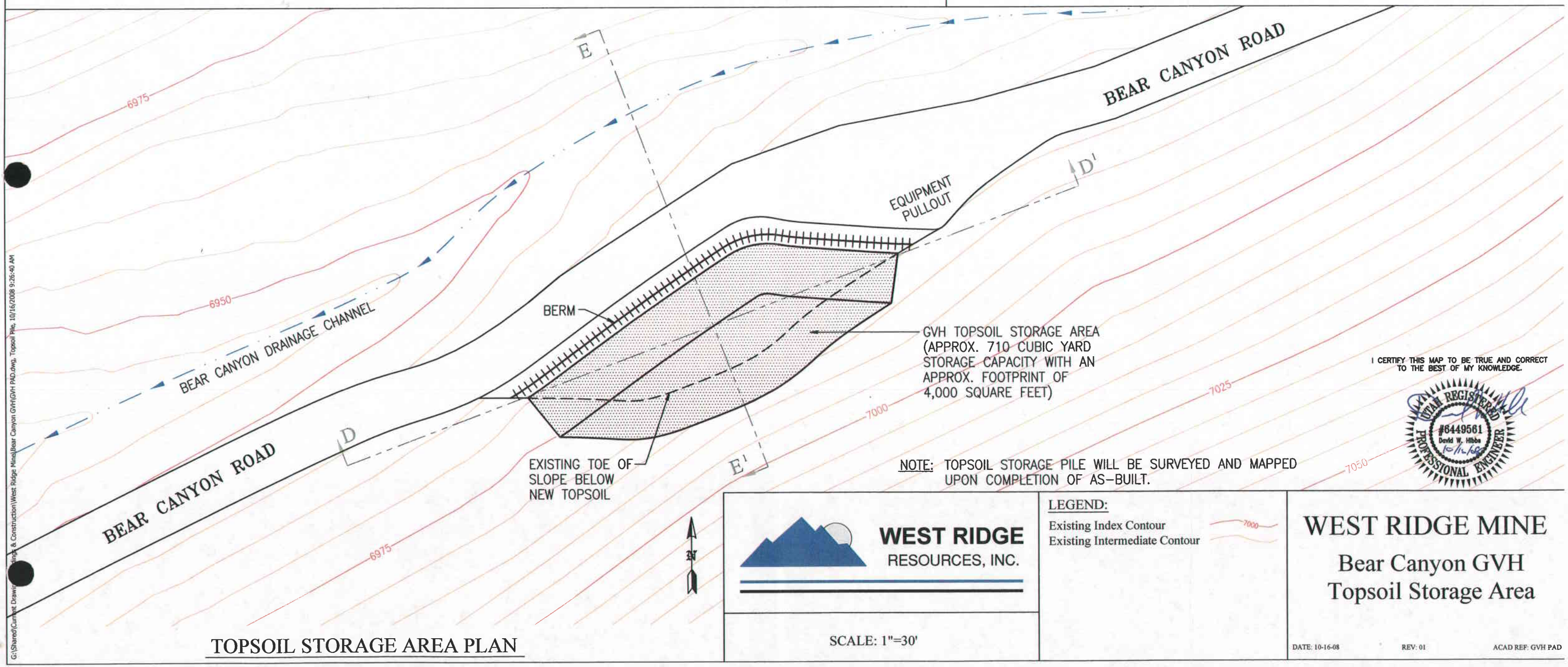
	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	—	—			—				—
2	—	—	—	3vf 2f 1mc	2vfi	7.6	NE	21 40	3	
3	—	—	40 CLF PF/BG	2vff 1mc	2vffi	7.9	VS	25 40	7	
4	—	40 CAC BRF 1-2mm	35 CLF BG	2vf 1f 2mc	1ft	8.2	ST	26 50	18	
5	—	50 mc CAM PF 40 CAC ARF 2-4mm	—	2vf 1fm	1vft	8.4	VE	30 30	18	
6	—	50 mc CAM PF 70 CAC ARF 2-4mm	—	1vff	1vft	8.4	VE	24 56	25	
7										
8										
9										
10										



SECTION D-D[1]



SECTION E-E[1]



TOPSOIL STORAGE AREA PLAN

NOTE: TOPSOIL STORAGE PILE WILL BE SURVEYED AND MAPPED UPON COMPLETION OF AS-BUILT.

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

WEST RIDGE RESOURCES, INC.

SCALE: 1"=30'

LEGEND:

Existing Index Contour 7000

Existing Intermediate Contour

WEST RIDGE MINE

Bear Canyon GVH Topsoil Storage Area

DATE: 10-16-08 REV: 01 ACAD REF: GVH PAD

G:\Shared\Current Drawings & Construction\West Ridge Mine\Bear Canyon GVH\GVH PAD.dwg, Topsoil Pile, 10/16/2008 9:26:40 AM

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APPENDIX 3-3	Wildlife Inventory
APPENDIX 3-4	Correspondence - Threatened and Endangered Species
APPENDIX 3-4A	Updated T & E Species List (2002)
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CHAPTER 3
R645-301-300 BIOLOGY

R645-301-320 ENVIRONMENTAL DESCRIPTION

The West Ridge Mine is located on the western escarpment of the Book Cliffs about 25 miles east of Price and 5 miles northwest of the town of East Carbon. The Book Cliffs consist of steep canyons and high mountains east of the mine site. Topographic elevations within the permit area range from 6,500 to over 8,800 feet. The highest point located above West Ridge is approximately 8,866 feet. Because of the rugged topography in the region, the present land uses are limited to wildlife habitat, rangeland and recreation. A large portion of the surface area is public land managed by the Bureau of Land Management (BLM).

The permit area lies within the cool, semiarid climatic zone characterized by warm, moist springs and summers and by cold, dry winters. The mean annual precipitation is about 12 inches in the vicinity of the mine site, with most of the annual precipitation occurring during the summer months. Temperatures range from summer highs in the 90's to below zero during the winter months. The average frost free period is 141 days per year.

Habitat types in the canyons range from mixed mountain conifer on north and east-facing slopes and pinyon-juniper woodland on south and west-facing slopes to rock outcrops which form multi-layered barren cliffs. Where barren rock outcrop is present, little or no vegetation exists. On the ridges above the canyons, mixed mountain brush and sage/grass plateau dominate with some extensive aspen woodland below West Ridge to the northeast of the permit area. Pinyon-juniper woodland occurs at the mouths of the canyons with interspersed patches of sagebrush shrubland, such as the area around the proposed borrow site. An area of Pinyon-Juniper adjacent to the mouth of B and C Canyons was chained in the late 1960's, however, the trees have now regrown at this site.

Vegetation types for the permit and surrounding area were mapped on color aerial photos at a scale of 1" = 2,000', with six primary vegetation types being identified. The information was then field checked for accuracy of mapping. The regional vegetation map is included as Map 3-1 General Vegetation Communities

NOTE: The following discussion for the remainder of R645-301-320 applies specifically to the Gob Gas Vent Hole (GVH) installation proposed in Bear Canyon. In order to facilitate the review it is presented here in its entirety rather than interspersed throughout the chapter. A more detailed and complete discussion of the Bear Canyon GVH proposal can be found in Appendix 5-14. Unless specifically noted in this following discussion, nothing related to the Bear Canyon GVH proposal affects the contents of the existing approved MRP as described hereinafter.

The GVH site is located in the bottom of Bear Canyon at an elevation of 7200'. The site is located less than 6000 feet (straight-line) from the main surface facilities which are located one canyon over to the southeast in C Canyon, which also sits at an elevation of 7200'. Both canyons face in the same direction, i.e., to the northeast. The canyons are nearly identical in terms of elevation, lithology, orientation, exposure, rainfall, etc. Therefore, the vegetation at the Bear Canyon GVH site is basically identical to that found at the C Canyon minesite. The vegetation at the Bear Canyon site is classified as Douglas Fir/Maple Community. Much of the minesite in C Canyon is also identified as Douglas Fir/Maple Community. Dr. Patrick Collins of Mt. Nebo Scientific, conducted a vegetation survey of the GVH site and concluded that, given the similarities in the locales, the existing vegetation reference source for the mine in C Canyon is appropriate to represent the GVH site as well as a basis for determining final reclamation performance. According to the report, Dr Collinss is of the opinion that *"...the Douglas Fir/Maple Reference Area (1998) would be an appropriate area for revegetation success standards at the time of final reclamation...."*. A copy of Dr. Collins' report is included in Appendix 3-13, and also in Attachment 4 of Appendix 5-14. Also refer to Appendix 3-1 for a description of the Dougas Fir/Maple Community nearby in C Canyon, and to Appendix 3-1A for a discussion of the existing Douglas Fir/Maple vegetation reference are in C Canyon.

The sensitive plant species Canyon Sweetvetch (Hydysarum occidentale var. canone) exists in Bear Canyon, as well as all other outward-facing Book Cliff canyons within the permit area, including C Canyon where the minesuite is located.. The Canyon Sweetvetch generally occurs in the canyon bottom in and adjacent to the stream channel. As a pro-active mitigation measure, however, West Ridge employees, working on species identification from Dr. Patrick Collins of Mt. Nebo Scientific, have collected a significant amount of Sweetvech seed from the surrounding area in September, 2008. This seed will be included in the seed mix for interim cutslope revegetation, and/or topsoil pile revegetation, if requested by the Division. A similar commitment was included previously in the MRP prior to the construction of the West Ridge Mine surface facilities in C Canyon, which occurs in R645-341.100, and is reprinted herein for ready reference:

Canyon sweetvetch seed was collected by Dr. Patrick Collins (Mount Nebo Scientific) in C Canyon in 1999 prior to construction of the minesite. This seed was later used to re-seed the topsoil pile. This constitutes the on-going field test to determine the viability of using canyon sweetvetch in the seed mix for final reclamation. Dr. Collins is presently monitoring the success of the sweetvetch population on the topsoil pile. If it appears that the sweetvetch is successful and can be added to the reclamation seed mix, seed will be collected from the topsoil population, as well as other populations in C Canyon and/or nearby canyons, at the time of final reclamation.

At the location of the GVH site, Bear Canyon is an ephemeral stream, and there is no riparian habitat located at or near the GVH site. The GVH site is located close to the area where the depth of cover over the longwall panels is the shallowest within the permit area. As a result, this area has been an area of interest in previous MRP amendments, and a more detailed discussion of the biology and hydrology can be found in R645-301-322.100 of the approved MRP. It should be noted that the area has been now been completely undermined since November, 2006, and subsidence has stabilized at about 3'. No adverse affects to biologic or hydrologic resources has been observed. The area is subject to on-going hydrologic and subsidence monitoring under the presently approved MRP.

After the topsoil has been removed and the GVH pad area constructed, the new cutslopes will be prepared for interim reclamation. This will be done by pocking the newly exposed surface (roughening) and re-seeding with the previously approved interim seed mix as shown in Table 3-3 (reprinted in Attachment 13 of Appendix 5-14 for ready reference), or with an alternate seed mix approved by the Division subject to availability. (Attachment 13 of Appendix 5-14 includes a seed mix which was used on the Crandall Canyon East Mountain drillhole reclamation project and is readily available, subject to Division concurrence.) A layer of wood straw will then be scattered over the surface. 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.

On final reclamation, the pad area and cutslopes will be backfilled to approximate original contour, and topsoil will be re-applied to the reclaimed slope (see Attachment 1) The slope will be re-vegetated according to the same existing approved plan for the minesite in nearby Canyon, as specified in R645-301-341. For completeness, the reclamation plan elements are included herein as taken directly from the currently approved plan:

a) *Fill will be placed in the cut in 18" lifts until approximate original contour is achieved. The fill will be obtained from the adjacent pad fill.*

b) *A certified noxious weed-free alfalfa hay mulch will be blown over the topsoiled surface at a rate of 2000 pounds per acre. Fertilizer, if determined necessary by soil testing, would also be applied at this time.*

c) *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.*

d) *The appropriate seed mix (Table 3-2B, for Douglas Fir/Maple Community) will be either broadcast by hand or hydroseeded on the area at the rate specified on the table. (Table 3-2B is reprinted in Attachment 13 for ready reference.)*

e) *A certified noxious weed-free straw mulch will be applied to the surface at a rate of 2000 pounds per acre and held to the surface with a wood fiber mulch and tackifier applied to the surface at a rate of 500 pounds per acre.*

The revegetation monitoring schedule for the Bear Canyon GVH site will be the same as for the minesite reclamation, and is reprinted in Table 3-4 in Attachment 13 of Appendix 5-14 for ready reference.

Revegetation success standards for the GVH site will be the same as for the C Canyon minesite, as presented in R645-341.250. The revegetation timetable for the GVH site will also be the same as the minesite, as presented in Table 3-1, reprinted in Attachment 13 of Appendix 5-14 for ready reference.

There are no threatened or endangered species in the Bear Canyon GVH area. Refer to Appendix 3-4B for current (2008) T&E information. Various species of concern during previous amendments, such as the Mexican Spotted Owl and the Yellow-Billed Cuckoo have been adequately addressed in the presently approved MRP and are not a factor.

An annual raptor survey was conducted for the permit area, including Bear Canyon, by Division of Wildlife Resources (DWR) in the spring of 2008, and is included in Appendix 3-2B, and also in Attachment 5 of Appendix 5-14. The survey shows no raptor nests in the Bear Canyon area, neither at the GVH site nor the topsoil storage area.

As shown on Maps 3-4A,3-4B and 3-4C, wildlife range for deer, elk, and antelope is basically the same at the GVH site as for the minesite, which is to be expected given their proximity and many similarities.

There will be no additional water consumption, nor disruption of flow, from the West Ridge Mine as a result of the GVH installation. Therefore, construction and operation of the GVH facility will have no affect on the Colorado River Endangered Fish Recovery Program.

APPENDIX 3-2B

DWR RAPTOR SURVEY, 2008

NOTE: THIS APPENDIX IS LOCATED IN THE CONFIDENTIAL BINDER

APPENDIX 3-4B

UPDATED T&E SPECIES LIST (2008)
MT. NEBO SCIENTIFIC

MT NEBO SCIENTIFIC, INC.
research & consulting

October 29, 2008

Dave Shaver
ANDALEX RESOURCES
P.O. Box 902
Price, Utah 84501

Dear Mr. Shaver:

In conversations with Joe Helfrich from the State of Utah, Division of Oil, Gas & Mining (DOGM), it was brought to my attention that more information is needed regarding potential threatened and endangered species within the proposed Bear Canyon GVH study site. Accordingly, I have prepared a table with the federally listed threatened, endangered and candidate plant and animal species for Carbon County, Utah (attached). The table also includes information about each species, their habitats and possible impacts (if any) that could occur as a result of construction of the proposed GVH site.

Additional information regarding sensitive species can be found in my report called:

Vegetation of the
GVH Site in
Bear Canyon,
Book Cliffs, Utah

for the
West Ridge Mine,
Carbon County, Utah
(October 2008)

Please call me if you have any questions or comments. Furthermore, biologists from DOGM may also call me regarding our studies in Bear Canyon.

Sincerely,

Patrick D. Collins, Ph.D.
Biologist/Environmental Consultant

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

Attachment (2 pages)
Letter Report to D. Shaver
October 29, 2008

Federally listed threatened, endangered & candidate species in Carbon County, Utah and notes regarding potential impacts as a result of the Bear Canyon GVH site.

Scientific Name	Common Name	Status*	Site-Specific Notes
Empidonax traillii extimus	Southwestern willow flycatcher	E	This species breeds in southwestern U.S. and winters in southern Mexico and Central America. It is a rare visitor of southern Utah. Its habitat is primarily riparian, most frequently occuring in dense willow stands. Although near a drainage, a well-defined riparian habitat is non-existent in the Bear Canyon study area. There should be no impacts to this species as a result of the Bear Canyon GVH site.
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 Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.
Gila elegans	Bonytail	E	The bonytail is a very rare minnow originally native to the Colorado River system. These rivers do not occur in Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.
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. This habitat and food source does not occur in the study area. There should be no impacts to this species as a result of the Bear Canyon GVH site.
Phacelia argillacea	Clay phacelia	E	The habitats of clay phacelia are usually found in pinyon-juniper and mountain brush plant communities, and typically in clay soils of the Green River formation. Although these plant communities occur near the study area, they are not within the area proposed for disturbance. Furthermore, the geologic formations of the study area are well below the Green River formation in geologic strata. There should be no impacts to this species as a result of the Bear Canyon GVH site.

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

Federally listed threatened, endangered & candidate species in Carbon County, Utah and notes regarding potential impacts as a result of the Bear Canyon GVH site.

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 Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.
Sclerocactus glaucus	Uinta Basin hookless cactus	T	*Sclerocactus glaucus* generally occurs on cobblely, gravelly, or rocky surfaces on river terrace deposits along the White and Green Rivers of Utah.. *S. glaucus* occurs on varying exposures, but is more abundant on south facing exposures, and on slopes to about 30 percent grade; it is most abundant at the point where terrace deposits break from level tops to steeper side slopes. Plant communities and species associated with this species are bud sage, shadscale, black sagebrush and horsebrush. These plant communities nor habitats associate with them occur in the study area, therefore, there should be no impacts to this species as a result of the Bear Canyon GVH site.
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 Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.

* Status
C = Candidate
E = Endangered
T = Threatened
Ex = Extirpated

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

APPENDIX 3-13

VEGETATION OF THE GVH SITE IN THE RIGHT FORK OF BEAR CANYON WEST RIDGE MINE

MT. NEBO SCIENTIFIC

MT NEBO SCIENTIFIC, INC.
research & consulting

October 15, 2008

Dave Shaver
ANDALEX RESOURCES
P.O. Box 902
Price, Utah 84501

Dear Dave:

Enclosed please find one bound copy of the following report for the West Ridge Mine.

Vegetation of the
GVH Site in
Bear Canyon,
Book Cliffs, Utah

For the
West Ridge Mine,
Carbon County, Utah

An electronic file of the report was also submitted in an email to you previously. Please call if you have questions or comments.

Sincerely,

(Transmitted Electronically)

Patrick D. Collins, Ph.D.
Biologist/Environmental Consultant

Enclosures

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

Vegetation of the GVH Site in Bear Canyon, Book Cliffs, Utah

For the
West Ridge Mine,
Carbon County, Utah

Right Fork of Bear Canyon

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

ANDALEX RESOURCES
Post Office Box 902
Price, Utah 84501

October 2008

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INTRODUCTION

Operations at the West Ridge Mine has found it necessary to construct a gas vent hole (GVH) as a safety measure to continue mining activities in their underground coal mine. The proposed GVH site is located in the right (east) fork of Bear Canyon within the Book Cliffs plateau in Carbon County, Utah. The site is less than one-quarter acre in size (0.24 acre).

This report provides the results from quantitative sampling the plant community that will be disturbed as a result of the drilling activities necessary to construct the GVH. The native plant community that will be disturbed is a Douglas Fir/ Maple community. This report also provides data from a "reference area" that could be used for future revegetation success standards following final reclamation of the site. Results from threatened, endangered and sensitive plant survey as well as a vegetation and sample location map of the area have also been provided herein.

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 GVH site on September 24, 2008. The reference area proposed for this site was sampled in the growing season of 1998.

Sampling Design and Transect/Quadrat Placement

Transect lines for vegetation sampling were placed randomly within the boundaries of the proposed disturbed and reference areas. 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 notes such as: slope, exposure, grazing use, disturbance and/or other appropriate notes. Plant nomenclature follows "A Utah Flora" (Welsh et al., 2003).

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

Statistical Analyses

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

Photographs

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

Threatened & Endangered Plant Species

Prior to recording quantitative data on the plant communities, a sensitive plant species survey was conducted. To initiate the study, appropriate agencies had been consulted and other sources were reviewed (sensitive species files at *Mt. Nebo Scientific, Inc.*) for potential plant species that are known to be rare, endemic, threatened, endangered or otherwise sensitive in the study area.

Raw Data

The raw data for cover and density have been summarized on a spreadsheet and is available upon request.

RESULTS

Proposed Disturbed Douglas Fir/Maple Community

The plant community proposed for disturbance by construction of the GVH site is that of a

Douglas Fir/Maple community. Dominants, and equally represented in the understory cover estimates, were Douglas fir (*Pseudotsuga menziesii*) and bigtooth maple (*Acer grandidentatum*). These tree species also dominated the overstory cover. Grasses and forbs played a relatively minor role in the plant cover of the community. For a list of all species present in the sample quadrats along with their cover and frequency values, refer to Table 1.

The total living cover including overstory and understory cover of the proposed disturbed Douglas Fir/Maple community was estimated at 82.25 %; 46.00% of this value was comprised of understory and 36.25% was from overstory cover (Table 2-A). The understory composition consisted of 91.74% woody species (Table 2-B).

Woody species density was also sampled at the site. As shown on Table 3, the total density of the area was 2,254 individuals per acre and was dominated by Douglas fir, bigtooth maple and Rocky Mountain juniper (*Juniperus scopulorum*).

Douglas Fir/Maple Reference Area ("New")

A Douglas Fir/Maple plant community was sampled in 1998 and was established as a reference area to be used for future revegetation success standards for specific areas at the West Ridge mine site following final reclamation. This reference area was called "new" because there was another Douglas Fir/Maple Reference area established earlier, but because it was necessary to later disturb this reference area due to changes to the surface facilities of the mine site, the "new"

reference area was later established.

Cover and frequency by species are shown on Table 4. Overstory dominant species by cover and frequency were bigtooth maple and Douglas fir. The most common understory woody species were bigtooth maple, mountain lover *(Pachistima myrsinites)* and Oregon grape (*Mahonia repens*). Most common forbs were aster (*Aster* sp.) and pinnate tansy mustard (*Descurainia pinnata*). Finally, the most common grasses by cover and frequency were muttongrass (*Poa fendleriana*) and smooth brome (*Bromus inermis*).

The mean total living cover of this community was estimated to be 63.63%, 31.38% of which was overstory and 32.25% was understory cover (Table 5-A). Trees and shrubs were the dominant lifeform of the understory species and comprised 61.57% of the cover, whereas, forbs and grasses comprised 25.33% and 13.11%, respectively (Table 5-B).

Woody species density measurements resulted in 2,256 individuals per acre (Table 6). The dominant woody species by density were bigtooth maple, mountain lover and Douglas fir.

Threatened, Endangered & Sensitive Plants

A threatened, endangered and sensitive plant survey was conducted at the GVH site. A small population of the sensitive plant species called canon sweetvetch (*Hedysarum occidentalis* var. *canone*) was located at the site and will likely be disturbed by the proposed construction activities.

DISCUSSION

Statistical analyses were employed to compare the cover and woody species density of the proposed disturbed GVH site in Bear Canyon with the reference area. The total living cover, or overstory and understory cover combined, was significantly greater in the area proposed for disturbance when compared to the Douglas Fir/Maple Reference Area (Figure 1). Interestingly, the woody species densities of the two areas were nearly identical; a Student's t-test analysis reflects this similarity by showing a t-value of -0.005 (Figure 2).

Because there was a significant difference in the cover values of the two areas, there are some options and considerations for establishment for standards of revegetation success for the GVH site in Bear Canyon. One idea is that the West Ridge Mine operator could have another reference area sampled later and compared to the GVH site. Next, representatives from DOGM and the West Ridge Mine could agree that the proposed reference area would be appropriate for final revegetation success standards, even though the cover value is less than that of the area proposed for disturbance.

The author of this report favors the later scenario. I believe the Douglas Fir/Maple Reference Area (1998) would be an appropriate area for revegetation success standards at the time of final reclamation for the following reasons.

1. Because the GVH site was quite small (0.24 acres), sample quadrats were placed relatively close to each other as compared to larger sample areas. This meant localized "patches" for the cover of plants were weighted higher in this sample area. When larger areas are sampled using random methods, distances between quadrats are greater, differences from these isolated patches are minimized, and variability between quadrats usually reflect a sample mean closer to the true mean for the entire plant community.

2. Several areas with this same plant community have been sampled previously in the West Ridge Mine area, all of which had cover values closer the Douglas Fir/Maple Reference Area (1998). A summary of these results have been provided in Table 7 below.

Table 7: A comparison of mean percent total living cover value in several Douglas Fir/Maple plant communities near the West Ridge Mine site.

	PERCENT TOTAL LIVING COVER
Proposed Disturbed Douglas Fir/Maple Community (1997)	55.50
Douglas Fir/Maple Reference Area (1997)	65.75
Douglas Fir/Maple Community "New" Reference Area (1998)	63.63
Proposed Disturbed Douglas Fir/Maple Community in Bear Canyon's Left Fork (2008)	69.75
Proposed Disturbed Douglas Fir/Maple Community for Bear Canyon GVH Site (2008)	82.25

SUMMARY

A small area has been chosen for construction of a gas vent or GVH site for the West Ridge Mine as a safety measure for underground mining conditions. Construction of this site will result in disturbance to a native plant community, a Douglas Fir/Maple community. A reference area to represent future revegetation success standards for this same plant community had already been established prior to any surface disturbance for construction of the mine facility (1997-98). This same reference area has been proposed to be used for the revegetation standard for the GVH site in Bear Canyon with final approval required by biologists from the State of Utah, Division of Oil, Gas & Mining.

SUMMARY TABLES
&
FIGURES

Table 1. West Ridge Mine: Proposed Disturbed Bear Canyon GVH Site. Total Cover, Standard Deviation and Frequency by Species (2008).

Douglas Fir / Maple Community	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
Acer grandidentatum	9.25	19.38	20.00
Juniperus scopulorum	4.50	13.59	10.00
Populus tremuloides	5.75	14.94	15.00
Pseudotsuga menziesii	16.75	22.38	40.00
UNDERSTORY			
TREES & SHRUBS			
Acer glabrum	0.75	2.38	10.00
Acer grandidentatum	10.50	16.35	40.00
Juniperus scopulorum	8.75	14.39	30.00
Pachistima myrsinites	4.50	8.79	30.00
Populus tremuloides	1.75	5.76	10.00
Pseudotsuga menziesii	10.50	13.31	45.00
Purshia tridentata	1.00	4.36	5.00
Symphoricarpos oreophilus	4.50	8.50	30.00
FORBS			
Apocynum canabinum	0.25	1.09	5.00
Fragaria vesca	0.25	1.09	5.00
Hedysarum occidentalis canone	0.75	3.27	5.00
Solidago sp.	1.50	4.77	10.00
GRASSES			
Bromus carinatus	1.00	2.55	15.00

Table 2. West Ridge Mine: Proposed Disturbed Bear Canyon GVH Site. Total Cover, Standard Deviation and Sample Size (2008).

Douglas Fir/ Maple Community	Mean Percent	Standard Deviation	Sample Size
A. TOTAL COVER			
Overstory (O)	36.25	19.74	20
Understory (U)	46.00	14.37	20
Litter	26.00	20.16	20
Bareground	10.25	7.98	20
Rock	17.75	13.65	20
O + U	82.25	16.69	20
B. % COMPOSITION			
% COMPOSITION			
Trees & Shrubs	91.74	14.20	20
Forbs	5.94	14.10	20
Grasses	2.32	5.53	20

Table 3. West Ridge Mine: Proposed Disturbed Bear Canyon GVH Site Woody Species Densities (2008).

Douglas Fir/ Maple Community	
Species	Individuals Per Acre
Acer glabrum	197.21
Acer grandidentatum	422.59
Cercocarpus montanus	28.17
Juniperus scopulorum	338.07
Pseudotsuga menziesii	760.66
Pachistima myrsinites	225.38
Populus tremuloides	28.17
Purshia tridentata	28.17
Ribes cereum	28.17
Rosa woodsii	28.17
Symphoricarpos oreophilus	169.03
Sambucus caerulea	
TOTAL	2253.80

Table 4. West Ridge Mine: Reference Area. Total Cover, Standard Deviation and Frequency by Species (1998).

Douglas Fir/ Maple Community Reference Area (New)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY COVER			
Acer grandidentatum	15.88	21.30	50.00
Juniperus scopulorum	1.38	6.22	5.00
Pseudotsuga menziesii	14.13	20.67	45.00
UNDERSTORY COVER			
TREES & SHRUBS			
Acer grandidentatum	6.18	11.30	47.50
Juniperus scopulorum	1.30	2.90	20.00
Mahonia repens	3.33	5.82	40.00
Pachistima myrsinites	5.73	11.04	35.00
Pseudotsuga menziesii	1.95	6.19	6.00
Symphoricarpos oreophilus	1.43	3.35	20.00
FORBS			
Antennaria parvifolia	0.25	1.09	5.00
Artemisia dracunculus	0.88	3.33	10.00
Aster sp.	3.13	7.65	30.00
Circium sp.	0.13	0.78	2.50
Descurania pinnata	1.78	7.12	10.00
Erigeron engelmannii	0.25	1.09	5.00
Erysimum asperum	0.13	0.78	2.50
Fragaria vesca	0.38	1.73	5.00
Mitella stauropetala	0.05	0.31	2.50
Senecio pudicus	0.15	0.79	5.00
Smilacina racemosa	0.33	1.03	10.00
Stellaria jamesiana	0.03	0.16	2.50
Taraxicum officinale	0.13	0.78	2.50
Thalictrum fendleri	0.13	0.78	2.50
Viola adunca	0.13	0.78	2.50
GRASSES			
Bromus inermis	1.25	5.67	7.50
Poa fendleriana	2.90	4.15	45.00
Poa pratensis	0.38	1.73	5.00

Table 5. West Ridge Mine: Reference Area. Total Cover, Standard Deviation and Sample Size (1998).

Douglas Fir/ Maple Community Reference Area (New)	Mean Percent	Standard Deviation	Sample Size
A. TOTAL COVER			
Overstory Cover (O)	31.38	25.69	40
Understory Cover (U)	32.25	19.27	40
Cryptogams	0.25	1.09	40
Litter	18.20	12.80	40
Bareground	8.20	9.39	40
Rock	9.73	9.67	40
O+U	63.63	13.51	40
B. % COMPOSITION			
Trees & Shrubs	61.57	33.67	40
Forbs	25.33	29.49	40
Grasses	13.11	19.14	40

Table 6. West Ridge Mine: Reference Area. Woody Species Densities (1998).

Douglas Fir/ Maple Community Reference Area (New)	
Species	Individuals Per Acre
Acer grandidentatum	874.13
Cercocarpus ledifolius	28.20
Juniperus scopulorum	141.00
Juniperus osteosperma	14.10
Pseudotsuga menziesii	310.18
Pachistima myrsinites	549.86
Rosa woodsii	14.10
Symphoricarpos oreophilus	296.08
Sambucus caerulea	28.20
TOTAL	2255.83

Figure 1. A statistical comparison (Student's t-tests) of the **total living cover** between the proposed disturbed GVH site and the reference area.

	$\bar{x}$	s	n	t	df	SL
Bear Canyon GVH						
Proposed Disturbed:	82.25	16.69	20			
DF/M Reference Area:	63.63	13.51	40			
t-test				4.648	58	p<0.01

$\bar{x}$ = mean
s = standard deviation
n = sample size
t = Student's t-value
df = degrees of freedom
p = probability
SL= Significance Level
N.S.=Non-Significant
DF/M = Douglas Fir/Maple

Figure 2. A statistical comparison (Student's t-tests) of the **woody species density** between the proposed disturbed GVH site and the reference area.

	$\bar{x}$	s	n	t	df	SL
Bear Canyon GVH						
Proposed Disturbed:	2253.80	853.56				
DF/M Reference Area:	2255.83	1548.09				
t-test				-0.005	58	N.S.

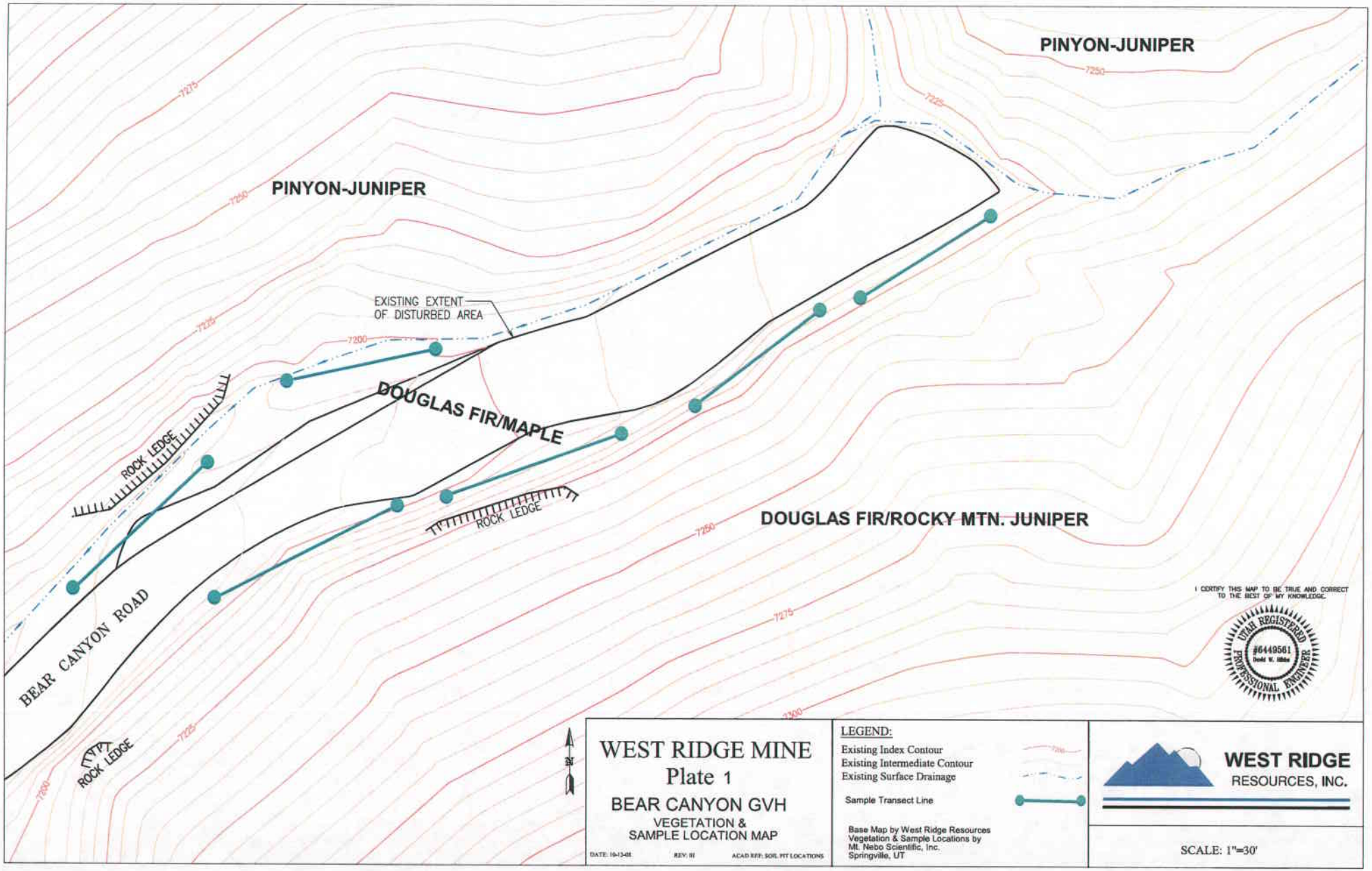
$\bar{x}$ = mean
s = standard deviation
n = sample size
t = Student's t-value
df = degrees of freedom
n/a = not applicable
p = probability
SL= Significance Level
N.S.=Non-Significant
DF/M = Douglas Fir/Maple

COLOR PHOTOGRAPHS OF THE SAMPLE AREAS

Bear Canyon GVH: Proposed Disturbed Douglas Fir/Maple Community

Douglas Fir/Maple Reference Area

VEGETATION &
SAMPLE LOCATION MAP


PINYON-JUNIPER
PINYON-JUNIPER
EXISTING EXTENT OF DISTURBED AREA
DOUGLAS FIR/MAPLE
ROCK LEDGE
ROCK LEDGE
ROCK LEDGE
DOUGLAS FIR/ROCKY MTN. JUNIPER
BEAR CANYON ROAD
7275
7250
7225
7200
7250
7225
7250
7275
7300
7225
7200
I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.
UTAH REGISTERED #6449561 PROFESSIONAL ENGINEER
WEST RIDGE MINE
Plate 1
BEAR CANYON GVH
VEGETATION & SAMPLE LOCATION MAP
DATE: 10-13-08
REV: III
ACAD REF: SOIL PIT LOCATIONS
LEGEND:
Existing Index Contour
Existing Intermediate Contour
Existing Surface Drainage
Sample Transect Line
Base Map by West Ridge Resources
Vegetation & Sample Locations by
Mt. Nebo Scientific, Inc.
Springville, UT
WEST RIDGE RESOURCES, INC.
SCALE: 1"=30'

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R645-301-400 CHAPTER 4

APPENDIX NUMBER	DESCRIPTION
APPENDIX 4-1	An Intensive Cultural Resources Survey and Inventory of the Proposed West Ridge Prospect Mine Site and Borrow Area (Confidential Report)
APPENDIX 4-2	Correspondence Concerning Archeological Clearances
APPENDIX 4-3	Summary of Archeological Studies Performed On Federal And State Land For The Proposed West Ridge Project Area (Confidential Report)
APPENDIX 4-4	Postmining Land Use Comments
APPENDIX 4-5	Air Quality Approval Order
APPENDIX 4-6	C Canyon Road Gate Amendment
APPENDIX 4-7	Cultural Resource Survey of the Bear Canyon GVH Site, and Cultural Resource Survey, Bear Canyon GVH Topsoil Storage Area
APPENDIX 4-8	SITLA Correspondence regarding Bear Canyon Road

CHAPTER 4
R645-301-400 LAND USE AND AIR QUALITY

R645-301-410 LAND USE

Pre-mining land use of the C Canyon/West Ridge region in and around the permit area includes grazing, wildlife habitat, coal mining and recreational activities such as hunting. No agricultural activities have been or are currently being conducted in or around the proposed permit area.

Post-mining land use will be the same as those which existed prior to construction of the mine. Land use will include grazing, wildlife habitat, and recreational activities such as hunting.

NOTE: The following discussion for the remainder of R645-301-410 applies specifically to the Gob Gas Vent Hole (GVH) installation proposed in Bear Canyon. In order to facilitate the review it is presented here in its entirety rather than interspersed throughout the chapter. A more detailed and complete discussion of the Bear Canyon GVH proposal can be found in Appendix 5-14. Unless specifically noted in this following discussion, nothing related to the Bear Canyon GVH proposal affects the contents of the existing approved MRP as described hereinafter.

The site is located in the Bear Canyon grazing allotment, and no change in grazing activity will result from the GVH installation. (Refer to Map 4.1)

The GVH site is located at the site of previous coal exploration drilling done in the early 1950's.

The site is located at the end of the Bear Canyon Road. This is a pre-existing road constructed in the early 1950's, and is a public road located on public land. The road has been upgraded to provide better year-around access to the GVH site. The improved road access will facilitate existing public uses of the area such as grazing management, big-game hunting, and other recreational pursuits, and on-going environmental monitoring associated with the West Ridge Mine operation. The road will be used on a daily basis by mine maintenance personnel.

It is SITLA's position that the road will be left in place (i.e., not reclaimed) to facilitate grazing management, hunting and other recreational use, mineral development, and other public multiple use (refer to correspondence in Appendix 4-8 and Attachment 9 of Appendix 5-14)

Class 3 (intensive) cultural resources surveys have been completed for both the GVH site and the topsoil storage site by Senco-Phenix Archeological Consultants. These surveys conclude that, for both sites, *"no cultural resources were located and the potential for undetected remains is remote. A finding of no effect is appropriate and archeological clearance without stipulation is recommended."* Copies of these reports are included in Appendix 4-7 and also in Attachment 6 of Appendix 5-14, and will be transferred to the Confidential Binder after Division review.

Operational areas that are used by mobile equipment will be water sprayed to control fugitive dust. The application of water will be of sufficient frequency and quality to maintain the surface material in a damp/moist condition unless it is below freezing.

R645-301-411 ENVIRONMENTAL DESCRIPTION

411.110 Land use of the C Canyon/West Ridge region in and around the permit area consist primarily of grazing, wildlife habitat, coal mining and recreational activities such as hunting. No agricultural activities (other than grazing) are currently being conducted in or around the proposed permit area. This is primarily because of lack of an available water source and the steep, rugged terrain. Refer to Map 4-1, Existing Land Use, for the grazing allotment boundaries and existing land uses.

There is no evidence that the land use in this area has changed within the last five years prior to the submittal of this permit application.

Grazing allotments in the West Ridge region have remained the same for the last ten years or more. The permit area is located primarily within the Bear Canyon Allotment and, to a smaller extent, in the Grassy Trail and Mud Springs Allotments. The Mud Springs Allotment lies along the western sloping pediment surfaces of the Book Cliffs. The vegetation consists of native Pinyon-Juniper close to the cliff face and Grassland on the lower pediment surfaces. About 338 cattle use the allotment from October 20 - December 20 and April 10 - June 10, for a total of 2,314 AUM's. Water for the cattle is hauled to the northeast portions of the allotment. The Grassy Trail allotment lies to the south and east of the Bear Canyon allotment. The allotment is active from November 1 to March 31, with a total of 50 AUM's. The Bear Canyon allotment lies to the north and east of the Mud Springs Allotment. The allotment is used to graze 42 cattle from June 10 to October 31. This allotment contains 100 AUM's.

411.120 The land surface of the permit area consists of rugged, southwest-facing cliffs which are deeply dissected by steep ephemeral drainages. The elevation ranges from 6,800 near the minesite to 8,800 feet on top of the ridge two miles to the northeast. Large boulders and sandstone slabs from cliff weathering lie along the sides of the canyon bottoms. Given the rugged terrain and lack of available water in the region, this area has limited historical usage other than for wildlife habitat, grazing and coal mining.

The SCS performed a range capacity survey of the mine site area in 1985 and found the range condition to be fair with an estimated vegetation yield of about 300 pounds per acre of forage per year.

Due to the topography, limited available water resources, limited access and remote location, the capability of the land to support a variety of uses is limited. The narrow, steep topography of this area as well as lack of available water limits its use for agricultural or residential purposes. The greatest variety of compatible uses for this land is a combination of recreation, wildlife habitat, grazing and coal mining.

411.130 Carbon County's zoning classification for the mine area is Mining and Grazing. Carbon County has also issued a Conditional Use Permit to WEST RIDGE Resources, Inc. for a Major Underground And Surface Mine Development for the West Ridge mine in C Canyon. Grazing is the most pervasive existing use of the land in the West Ridge area. Previous mining activity also has taken place in B and C Canyons. The road along the bottom of C Canyon was first constructed in the mid-1950's for a drill site in the right hand fork. The road was improved again in 1985 to facilitate drilling equipment for a drill hole site also in the right hand fork. A road also leads up the left hand fork to the coal outcrop where the coal seam was exposed and coal was mined for testing purposes.

The BLM and SITLA are the land managers for most of the area. Within the permit area, most of the permit acreage is managed by the BLM and SITLA.. There is a small area of privately owned land (surface only) in the permit area on the east side. Also, the surface and subsurface of the proposed topsoil borrow area is owned by the School and Institutional Trust Lands Administration. Refer to Map 5-2.

411.140 Archeological investigations have been performed in the vicinity of the permit area in the past. Refer to Map 4-2, Archeology Map, for the locations of previous survey work. Appendix 4-3 includes information from previous survey work as well as a compilation of previously known archeological sites within and adjacent to the permit area. Detailed archeological ground surveys have been conducted at the mine site and topsoil borrow area by Senco-Phenix personnel. The surveys found no evidence of cultural resources within either of these proposed disturbed areas. Refer to the Senco-Phenix report which is included as Appendix 4-1. No sites eligible for the National Register of Historic Places were found within the proposed disturbed areas. Clearance letters from SHPO to the BLM and State School Trust can be found in Appendix 4-2. Senco-Phenix has also prepared a cultural survey for the site of the GVH installation in the right Fork of Bear Canyon (see Appendix 4-7 and Attachment 6 of Appendix 5-14).

411.141.1 The locations of cultural and historical resources listed in the National Register of Historic Places and known archeological sites within and adjacent to the permit area are presented in Appendix 4-3. The file search was prepared by Senco-Phenix.

411.141.2 No cemeteries are located in or within 100 feet of the proposed permit area.

411.141.3 No land within the proposed permit area is within the boundaries of any units of the National System of Trails or the Wild and Scenic Rivers System.

411.142 As discussed under 411.140, no cultural resources of significance were located. SHPO has issued a determination of No Historic Properties for the proposed minesite and the topsoil borrow area.

No publicly owned parks or places listed on the National Register of Historic Places would be adversely affected by the proposed coal mine.

411.200 Previous Mining Activity

Previous mining and exploration activities have occurred with the proposed permit area within the last 20 years. In the mid-1950's, the road along the bottom of C Canyon was constructed to a drill site located in the right fork. The road was improved again in 1985 to facilitate drilling equipment for a water monitoring drill hole site in the right fork. Another road also leads up the left fork to the coal outcrop where the coal seam was exposed and bulk coal samples were collected for testing purposes. Coal was probably removed from the outcrop with hand tools or a front-end loader. The excavation indicates only a small amount of coal was previously removed. Coal was removed from the Lower Sunnyside Seam. Only a small amount of coal (less than one ton) was removed for testing purposes. The exact date of the coal outcrop excavation is unknown, but done sometime in the late 1960's or early 1970's. The land use prior to the outcrop excavation was the same a currently exists in the area, which is: wildlife habitat, grazing, and coal exploration and mining.

Mining has also occurred underground within this lease from the Sunnyside No. 2 mine. During 1959 and 1960 Kaiser Coal mined a two entry exploration section northwestward into the center of the coal lease (SL-068754), for a total distance of 11,000 feet along the strike of the Lower Sunnyside coal seam. A section was developed off from this main entry in which mining proceeded in an up-dip direction to the west for approximately 2,000' feet before breaking out in B Canyon. This breakout was utilized as an intake air portal until 1991 when the portal was sealed and backfilled. This mining was conducted utilizing continuous mining equipment, no longwall mining was done in this lease. Only development work was performed, no pillars were pulled. The land use in B Canyon prior to portal development was wildlife habitat, grazing and coal exploration and mining.

R645-301-412 RECLAMATION PLAN

412.100 Post mining land use will be the same as currently exists today, that being: wildlife habitat, grazing and limited recreational activities.

412.110 After all mining activity has been completed and the disturbed area regraded and reseeded, the site will enter a post reclamation phase. During the first ten years the site will be monitored for vegetative success and erosion control. The reclaimed, revegetated area may be fenced to discourage livestock grazing until final reclamation has been achieved and the reclamation bond released.

Support activities to achieve the postmining land use plan include: site monitoring, remedial actions including regrading, reseeding, remulching and replanting; and fencing as necessary to restrict access and grazing on the site until the reclamation bond has been released.

412.120 After the reclamation bond has been released, the property will be returned to the care of the surface land owner which in this case is the BLM and SITLA. Management of the site will be according to the BLM and SITLA's current range management plan for the region existing at that time.

412.130 Not applicable.

412.140 This postmining program is in accordance with the Carbon County and BLM management framework plans.

Based on the desire expressed by the BLM, SITLA or Carbon County, at the time of reclamation of the mine site, WEST RIDGE Resources, Inc. would agree to work with the BLM, SITLA and/or Carbon County to achieve future land use objectives.

412.200 Resumption of the original land use at the mine site should not need approval of the land management agency.

412.300 WEST RIDGE Resources, Inc. does not propose to leave fills containing excess spoil.

R645-301-413 PERFORMANCE STANDARDS

413.100 All disturbed areas will be restored to the conditions equal to or better than existed prior to disturbance.

413.200 Wildlife habitat and grazing will resume following reclamation activities of the mine site.

413.300 No alternative postmining land use is being proposed at this time.

R645-301-420 **AIR QUALITY**

R645-301-421 Coal mining and reclamation activities will be conducted in compliance with appropriate state and federal air quality regulations.

R645-301-422 The applicant is in the process of applying for an air quality permit from the Utah Division of Air Quality. The Air Quality Approval Order is included in Appendix 4-5.

R645-301-423 All mining will be conducted by underground mining methods. Efforts will be made through seeding, mulching and erosion control technologies to eliminate excessive fugitive dust resulting from erosion.

Areas where rills and gullies have formed will be repaired and reseeded as soon as possible with an interim or permanent seed mix.

Fugitive dust will be controlled by establishing temporary vegetative coverage where possible and by watering road and other unpaved surfaces frequently used by mine vehicles.

The air quality permit for the West Ridge Mine is included in Appendix 4-5. Mining activities will meet the requirements of the air quality permit issued by the State of Utah in accordance with applicable State and Federal air quality regulations.

Climatological Information

The U.S. Geological Survey's "Final Environmental Statement, Development of Coal Resources in Central Utah" (1979) provides climatological information for the region as well as for the C Canyon area. Daily climatic information is also collected at a National Weather Service station in Sunnyside, Utah.

Precipitation in the permit area consists of occasional winter snow, with an average annual accumulation of about one foot of snow and summer thundershowers which occur during July, August and September. Figure 7-1 in Chapter 7 shows the mean annual precipitation for the Sunnyside area to be about thirteen inches. Snow accumulation over the permit area varies with elevation, topography and aspect. At the mouth of Whitmore Canyon, elevation 6750, snow accumulations range from 0 to 21 inches during October through March

while snow accumulations at an elevation of 7,280 ranged from 0 to 50 inches. Mean, minimum and maximum daily snow accumulations have been collected and compiled for a 10 year period for years 1973 through 1983 and are presented below.

SNOW ACCUMULATION 1973-1983 (Inches)

	Maximum	Mean Maximum	Mean Daily
October	6.5	1.35	0.73
November	6.0	1.69	0.28
December	14.00	4.42	1.73
January	21.00	9.86	4.01
February	21.00	6.44	2.84
March	15.00	5.30	0.60

Ground accumulations of snow are characteristically of short duration due to melting and sublimation.

Temperature ranges of the permit area are typical for the semi-arid region. Colder temperatures would be encountered above 8,000 feet above the mine site.

The pan evaporation rate for the area is 0.69.

Wind

Canyon topography dominates both wind direction and speed. The wind high in the atmosphere tend to be strong but decease toward the surface where obstructions and surface friction come into play. Thus high ridges and plateaus will generally have stronger winds than the valleys. Upper level winds, 1,600 feet or more above the ground level, are generally from the southwest during most of the year. During the winter, air flow from the northeast is more common.

Night air flow in the region is primarily drainage controlled, generally following the canyon bottoms from the mountains down to the valleys. Wind speed is induced by decent of colder air and is generally light. The daytime flow is strongly influenced by surface heating effects which result in mixing between the surface and upper flows. There is a general air flow toward the north and northeast during the day, and movement toward the southwest away from the high surface elevations during the night. Winds are usually light to moderate (less than 20 mph) unless influenced by localized thunderstorms or moving frontal systems.

The area around the permit area has been designated as a Class II air area for the purpose of determining significant air quality deterioration. The mine will not have a wash plant or coal processing plant. The conveyor belt leading across the yard to the coal pile will be covered. Parking areas and roads will be paved to control dust. Gravel areas will be sprayed with a chemical surface stabilizer, such as potassium chloride, or sprayed with water to control dust during prolonged dry spells. Refer to R645-301-526.400 for a complete discussion of the air quality control measures proposed for the West Ridge Mine.

APPENDIX 4-7

a) CULTURAL RESOURCE SURVEY
BEAR CANYON GVH SITE

b) CULTURAL RESOURCE SURVEY
BEAR CANYON TOPSOIL STORAGE AREA

SENCO-PHENIX ARCHEOLOGICAL
CONSULTANTS

SENCO-PHENIX

An Intensive Cultural Resource Survey and Inventory of the Block Area for the Proposed Gob Vent Hole in the Right Fork of the Bear Creek Canyon Area

SITLA Land (ML 49287)

Carbon County, Utah

PERFORMED FOR
West Ridge Mine of
UtahAmerican Energy, Inc.

In Accordance with
Utah State Guidelines
Antiquities Permit #**U08SC0871s**

SPUT-582
September 30, 2008

John A. Senulis

Direct Charge of Fieldwork

ARCHEOLOGICAL CONSULTING SERVICES • 1405 West 620 North • Price, Utah 84501 • PHONE 435.613.9091 • FAX 435.613.9116

UTAH SHPO

COVER SHEET

Project Name: An Intensive Cultural Resource Survey and Inventory of the Block Area for the Proposed Gob Vent Hole in the Right Fork of the Bear Creek Canyon Area, SITLA Land (ML 49287)

UTAHAMERICAN Energy, Inc.
West Ridge Mine

State # U08SC0871s

Report Date: September 30, 2008 County (ies): Carbon,

Principal Investigator/ Field Supervisor: John A. Senulis/John Senulis

Records Search/Location/Dates: September 10, 2008, Price River Field Office of the BLM

Acreage Surveyed: 8 acres
Intensive Acres: 8 Recon/Intuitive Acres: 0

U.S.G.S. 7.5 Quads: Mt. Bartles, UT (1972)

Sites Reported	Number	Smithsonian Site #(s):
Archeological Sites:	0	
Revisit (No IMACS update)	0	
Revisit (IMACS update attch.)	0	
New Sites (IMACS attached)	0	
Archeological Site Total:	0	
Historic Structures:		
(USHS Site Form Attached)		
Total NRHP Eligible Sites,		

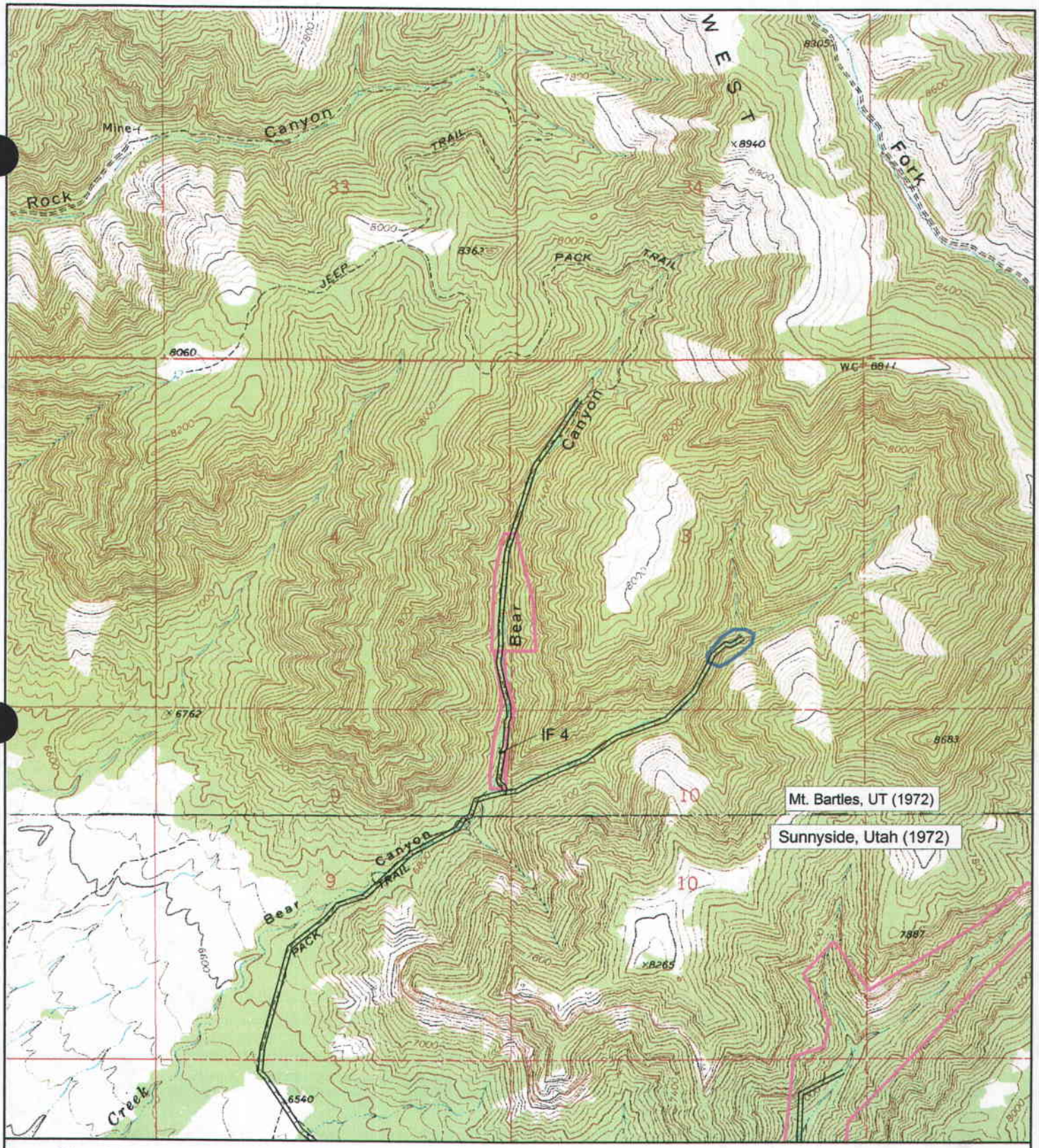
Checklist of Required Items:

1. X 1 Copy of Final Report
2. X Copy of U.S.G.S. 7.5' map showing surveyed/excavated area
3. Completed IMACS Site Inventory Forms Including
   - _____Parts A and B or C
   - _____IMACS Encoding Form
   - _____Site Sketch Map
   - _____Photographs
   - _____Copy of USGS 7.5' Quad with Smithsonian site Number
4. X Completed Cover Sheet

Abstract

The West Ridge Mine of UtahAmerican Energy, Inc. has proposed a gob vent hole in the Right Fork of Bear Creek Canyon. SENCO-PHENIX performed an intensive cultural resource survey on the proposed project. 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** without stipulations is recommended.



SENCO-PHENIX

N

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

Current Survey

Previous Survey

Eligible Sites

Ineligible Sites

Gob Vent Hole Block
West Ridge Mine
UtahAmerican Energy
Carbon County, Utah
Section 3, T14S, R13E
September 2008
SPUT-582
(ML 49287)

Project Location

The proposed gob vent hole will be in the Right Fork of Bear Creek Canyon at the end of an existing road in the SW/SE ¼ of Section 3, T14S, R13E, Carbon County, Utah. The survey was on lands managed by SITLA. The proposed project is noted on the enclosed copy of U.S.G.S. 7.5' composite Quad: Mount Bartles, Utah (1972) & Sunnyside, Utah (1972).

Environment

The project area is along an intermittent branch of the Bear Creek drainage. Elevation ranges from 7200 to 7300 feet. The general topography is extremely rugged with huge boulders and rock ledges lining the perimeter of the narrow and steep canyon. Soils are light tan sandy clay loam with gravels and boulders. Vegetation falls within the Ponderosa Pine community. In addition to Ponderosa Pine, trees included Douglas fir, Rocky Mountain Maple, and Rocky Mountain Juniper. In the narrow canyon bottom, understory vegetation included sagebrush, rabbit brush, bitterbrush and various grasses and forbs. There was very little evidence of deer or elk utilizing the dry canyon. There is no permanent water in the project area.

Previous Research

A file search by John Senulis of SENCO-PHENIX at the Price River Field Office of the BLM on September 10, 2008 revealed that the following projects are reported for the general project area. There are no studies in the specific project area:

- 1980-1986, Asa Neilson for various organizations, primarily BYU Museum of Peoples and Cultures, surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (81-31, 83-959, 86-597)
- 1997-1998, SENCO-PHENIX surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (97-016, 98-027)
- 2007, Montgomery Archeological Consultants surveyed a well pad and access corridor south of the current project area. No cultural resources were located. (07-1112)
- 2008, SENCO-PHENIX surveyed a block and access corridor in the Left Fork of Bear Creek Canyon. No significant cultural resources were located. (08-737)

Methodology

John & Jeanne Senulis of SENCO-PHENIX performed a Class III intensive walkover survey on September 29, 2008. An approximate eight acre block was surveyed for the proposed project. Transect spacing was variable due to the steep terrain. Special attention was given to those areas of subsurface soil exposure from animal burrowing 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** without stipulations is recommended.

These recommendations are subject to modification and review by the SITLA land managers and the Utah SHPO.

SENCO–PHENIX

An Intensive Cultural Resource Survey and Inventory of the Block Areas for the Proposed Topsoil Storage Areas in the Right Fork of Bear Creek Canyon

BLM and SITLA Land (ML 49287)

Carbon County, Utah

PERFORMED FOR
West Ridge Mine of
UtahAmerican Energy, Inc.

In Accordance with BLM and
Utah State Guidelines
Antiquities Permit **#U08SC0909bs**

SPUT–583
October 8, 2008

John A. Senulis

Direct Charge of Fieldwork

UTAH SHPO
COVER SHEET

Project Name: An Intensive Cultural Resource Survey and Inventory of the Block Areas for the Proposed Topsoil Storage Areas in the Right Fork of Bear Creek Canyon

UtahAmerican Energy, Inc.
West Ridge Mine

State # U08SC0909bs

Report Date: October 8, 2008 County (ies): Carbon,

Principal Investigator/ Field Supervisor: John A. Senulis/John Senulis

Records Search/Location/Dates: September 10, 2008, Price River Field Office of the BLM

Acreage Surveyed: 8 acres
Intensive Acres: 8 Recon/Intuitive Acres: 0

U.S.G.S. 7.5 Quads: Mt. Bartles, UT (1972)

Sites Reported	Number	Smithsonian Site #(s):
Archeological Sites:	0	
Revisit (No IMACS update)	0	
Revisit (IMACS update attch.)	0	
New Sites (IMACS attached)	0	
Archeological Site Total:	0	
Historic Structures:		
(USHS Site Form Attached)		
Total NRHP Eligible Sites,		

Checklist of Required Items:

1. X 1 Copy of Final Report
2. X Copy of U.S.G.S. 7.5' map showing surveyed/excavated area
3. Completed IMACS Site Inventory Forms Including
   - _____Parts A and B or C
   - _____IMACS Encoding Form
   - _____Site Sketch Map
   - _____Photographs
   - _____Copy of USGS 7.5' Quad with Smithsonian site Number
4. X Completed Cover Sheet

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE

Summary Report of Cultural Resources Inspection

State Proj. No: # U08SC0909bs.

1. Report Title: **An Intensive Cultural Resource Survey and Inventory of the Block Areas for the Proposed Topsoil Storage Areas in the Right Fork of Bear Creek Canyon**

2. Report Date: October 8, 2008 3. Date(s) of Survey: October 8, 2008

3. Development Company: UtahAmerican Energy, Inc. (West Ridge Mine)
4. Responsible Institution: SENCO-PHENIX

6. Responsible Individuals
   Principal Investigator: John Senulis
   Field Supervisor: John Senulis
   Report Author(s): John Senulis

7. BLM Field Office: Price River Field Office

8. County (ies): Carbon

9. Fieldwork Location:
   USGS Map: **Mt. Bartles, Utah (1972)**

   Twn: 14S Range: 13E Section: 10

   Twn: Range: Section:

   Twn: Range: Section:

10. Record Search:
    Location of Records Searched: Price Field Office

    Date of Record Search: September 10, 2008

11. Description of Examination Procedures: Class III walkover inventory with transects spaced no further than 15 meters

12. Area Surveyed:

		BLM	OTHER FED	STATE	PRIVATE
Linear Miles	Intensive:				
	Recon/Intuitive:				
Acreage	Intensive:	4		4	
	Recon/Intuitive:				

13. Sites Recorded:

		BLM		OTHER FED		STATE		PRIVATE	
		#	Smithsonian Site Numbers	#	Smithsonian Site Numbers	#	Smithsonian Site Numbers	#	Smithsonian Site Numbers
Revisits (no IMACS form)	NR Eligible								
	Not Eligible								
Revisits (updated IMACS)	NR Eligible								
	Not Eligible								
New Recordings (IMACS)	NR Eligible								
	Not Eligible								

Total Number of Archeological Sites: 0

Historic Structures (USHS Form):

Total National Register Eligible Sites: 0

14. Description of Findings:
15. Collection Yes___ No x_

(If Yes) Curation Facility: Accession Number(s):

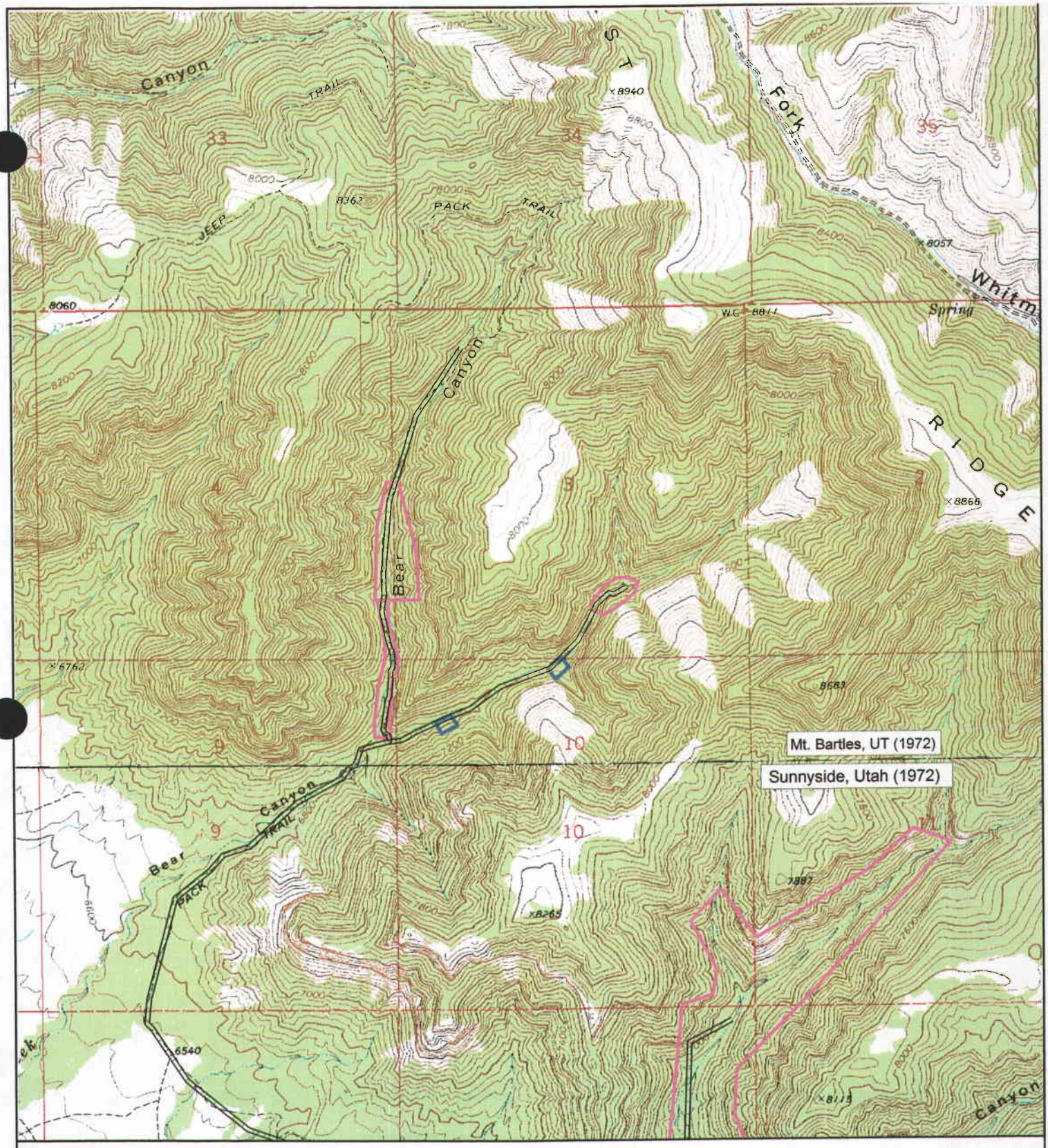
16. Conclusion/Recommendations: Archeological Clearance without stipulations

8100-3 Form

Abstract

The West Ridge Mine of UtahAmerican Energy, Inc. has proposed two topsoil storage areas in the Right Fork of Bear Creek Canyon. SENCO-PHENIX performed an intensive cultural resource survey on the proposed project. 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** without stipulations is recommended.



SENCO-PHENIX

N

Current Survey

Previous Survey

Eligible Sites

Ineligible Sites

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

Topsoil Storage Blocks
West Ridge Mine
UtahAmerican Energy
Carbon County, Utah
Section 10, T14S, R13E
October 2008
SPUT-583
(ML 49287)

Project Location

The proposed topsoil storage areas will be in the Right Fork of Bear Creek Canyon along an existing road in the NE/NW (BLM) and NW/NW (SITLA) ¼s of Section 10, T14S, R13E, Carbon County, Utah. The survey was on lands managed by the BLM and SITLA. The proposed project is noted on the enclosed copy of U.S.G.S. 7.5' composite Quad: Mount Bartles, Utah (1972) & Sunnyside, Utah (1972).

Environment

The project area is along an intermittent branch of the Bear Creek drainage. Elevation ranges from 7100 to 7200 feet. The general topography is extremely rugged with huge boulders and rock ledges lining the perimeter of the narrow and steep canyon. Soils are light tan sandy clay loam with gravels and boulders. Vegetation falls within the Ponderosa Pine community. In addition to Ponderosa Pine, trees included Douglas fir, Rocky Mountain Maple, and Rocky Mountain Juniper. In the narrow canyon bottom, understory vegetation included sagebrush, rabbit brush, bitterbrush and various grasses and forbs. There was very little evidence of deer or elk utilizing the dry canyon. There is no permanent water in the project area.

Previous Research

A file search by John Senulis of SENCO-PHENIX at the Price River Field Office of the BLM on September 10, 2008 revealed that the following projects are reported for the general project area. There are no studies in the specific project area:

- 1980-1986, Asa Neilson for various organizations, primarily BYU Museum of Peoples and Cultures, surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (81-31, 83-959, 86-597)
- 1997-1998, SENCO-PHENIX surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (97-016, 98-027)
- 2007, Montgomery Archeological Consultants surveyed a well pad and access corridor south of the current project area. No cultural resources were located. (07-1112)
- 2008, SENCO-PHENIX surveyed a block and access corridor in the Left Fork of Bear Creek Canyon. No significant cultural resources were located. (08-737)
- 2008, SENCO-PHENIX surveyed a block for a gob vent hole in the Right Fork of Bear Canyon. No cultural resources were located. (08-871)

Methodology

John & Jeanne Senulis of SENCO-PHENIX performed a Class III intensive walkover survey on October 8, 2008. Two approximate four acre blocks were surveyed for the proposed project. Transect spacing was variable due to the steep terrain. Special attention was given to those areas of subsurface soil exposure from animal burrowing 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 without stipulations is recommended.

These recommendations are subject to modification and review by the BLM and SITLA land managers and the Utah SHPO.

APPENDIX 4-8

SITLA CORRESPONDENCE REGARDING BEAR CANYON ROAD

Shaver, Dave

From: John Blake [jblake@utah.gov]
Sent: Wednesday, October 15, 2008 8:42 AM
To: Shaver, Dave
Cc: Daron Haddock; Tom Faddies
Subject: Re: West Ridge Mine, GVH installlation, ML 49287

Dear Mr. Shaver,

The Trust Lands Administration received fee simple title to the lands described below in your E-mail through the 1998 Utah Schools and Federal Land Exchange Act, P.L. 105-335. Andalex Resources, Inc. and Intermountain Power Agency obtained coal lease ML 49287 covering the subject lands on April 1, 2004. West Ridge Resources is the operator of the leasehold estate.

Section 8.1 of the lease agreement provides that the Lessee may use the surface estate to the extent reasonably necessary for the economic operation of the leasehold. Your request to construct a GVH and stockpile area as described below in your E-mail appear to meet that criteria and are hereby granted approval to proceed by the Lessor. This approval applies only to the specific operations described below in Sections 3 and 10, T14S, R13E, SLB&M. Any other permits, access, rights of way or operations upon or across any other lands as may be necessary to achieve such operations shall be the sole responsibility of the Lessee.

I note that the lands within ML 49287 are not presently under lease for oil and gas. Andalex Resources, Inc. is hereby given approval from the Trust Lands Administration to vent non-economic quantities of methane gas from the leasehold estate pursuant to the proposed operations in an environmentally sound and safe manner. In the event that venting of the methane gas becomes economical then Andalex Resources, Inc. must obtain oil & gas rights and pay royalties the Trust Lands Administration upon such gas production. Non-economical venting of the gases, however, does not require the payment of royalties.

Thank you for your notification.

John T. Blake
Trust Lands Administration.

>>> "Shaver, Dave" <dshaver@coalsource.com> 10/14/2008 5:37 PM >>>
Dear Mr. Blake

As you are aware, West Ridge Resources is pursuing plans to permit and construct a gob gas vent hole (GVH) installation in the Right Fork of Bear Canyon over the worked out longwall cave area of the West Ridge Mine. This installation is required by MSHA as a safety concern for the underground workforce, due to the high rate of methane liberation from the longwall panel. Toward this end we are presently engaged in an emergency permitting submittal with DOGM for this installation. The purpose of this email is to obtain SITLA concurrence for our proposal.
The GVH installation is to be located on SITLA coal lease ML 49287 in NW1/4NE1/4SW1/4SE1/4 of Section 3, T14S, R13E. It will occupy an area of about 0.25 acres in a narrow strip immediately adjacent to the Bear Canyon Road. Associated with the installation will be a topsoil storage area, also located on ML 49287, in NW1/4SE1/4NW1/4NW1/4 of Section 10, T14S, R13E. It will occupy an area of about 0.1 acres. It also will be located immediately adjacent to the Bear Canyon Road. As you know, the Bear Canyon Road is an existing public road. Attached is a map showing the location of the proposed facilities. Please note that the affected surface area is owned by SITLA. We request your concurrence with this proposal in terms of lease surface activities, and in terms of mine-related facilities located within 100' of a public road. Please note that the methane gas will be vented to atmosphere, and we make no claims to associated gas rights. Our only purpose is to liberate the methane from the underground works for safety sake, as mandated by MSHA.
Also be advised that the GVH installation, and topsoil storage, will be permitted, constructed, operated, bonded and reclaimed under a SMCRA permit amendment to be approved

and issued by DOGM. Please call me if you have questions or comments. Your expedient review of this request is appreciated.

Dave Shaver
Project Engineer, Agent
West Ridge Resources, Inc.
435-888-4017

Shaver, Dave

From: John Blake [jblake@utah.gov]
Sent: Wednesday, September 17, 2008 4:06 PM
To: Shaver, Dave
Subject: Re: Bear Canyon road access

Mr. Shaver,

Thank you for your notice of intent to improve the access road into Section 3 and to drill a gob vent hole upon trust lands under Mineral Lease ML 49287-Coal. The lease provides that the lessee may use the surface of the leasehold estate as may be necessary to produce the leased substances. I understand that this is somewhat of an emergency situation in order to meet MSHA mine ventilation requirements for the continuation of mining.

Your E-mail is herewith accepted as meeting the lease requirement that Lessee notify the Lessor and obtain approval for operations under the lease, but only as pertaining to the action that you describe below. The Trust Lands Administration concurs with the proposed action and you may proceed upon first meeting such requirements as may be imposed under your DOGM Mine Permit. Please work with DOGM in this regard and contact me if I may be of any assistance.

Thank you,
John T. Blake
Trust Land Specialist

>>> "Shaver, Dave" <dshaver@coalsource.com> 9/17/2008 2:36 PM >>>
Dear Mr. Blake:

As you are aware, MSHA has notified West Ridge Resources that gob gas ventilation must be added at the West Ridge Mine before we can begin production from longwall panel 13. This issue involves the need to reduce explosive methane levels in the mine for the safety of the underground work force. We propose to meet this requirement by drilling a gob gas vent hole into the gob from the surface at a location in Right Fork Bear Canyon. This location is in Section 3, T14S, R13E which is owned in fee by SITLA, surface and mineral. We own SITLA coal lease
ML49287 in this section, and are currently producing off this lease.

There is presently an existing old road in the bottom of Bear Canyon which runs past the location of the proposed drillsite. This road is a continuation of a BLM road with assigned right-of-way UTU0001756 which we as a company own. In order to access the drillsite we would intend to upgrade this road through the Right Fork Bear Canyon on the surface of ML49287 for a distance of approximately 3000'. Upgrade on the BLM portion of road is already underway under the authority of the right-of-way. All disturbance associated with the upgrade would be within the footprint of the existing roadway. We are aware that the road is a public road and will continue to provide uninterrupted public access to SITLA and BLM lands in the vicinity. The purpose of this email is to apprise SITLA of our plans to upgrade this road on ML49287 and to seek your concurrence. Due to the importance of this gob gas venthole to the safety of our miners as determined by MSHA, and to keep the longwall running to supply existing contracts, we consider this a matter of great urgency, and request an expedited review of this request. The projected date to begin production from panel 13 is the end of October, so time is of the essence. Thank you.

Dave Shaver
Project Engineer
Wesr Ridge Resources, Inc.

State of Utah
School & Institutional
Trust Lands Administration

Jon M. Huntsman, Jr.
Governor

Kevin S. Carter
Director

675 East 500 South, Suite 500
Salt Lake City, UT 84102-2818
801-538-5100
801-355-0922 (Fax)
www.trustlands.com

Wednesday, October 22, 2008

Dave Shaver, Project Engineer/Agent
West Ridge Resources, Inc.
P.O. Box 910
East Carbon, Utah 84520-0910

RE: Bear Canyon Road Status, West Ridge Mine C0070041, lease ML 49827

Dear Mr. Shaver:

In response to your request regarding the status of the Bear Canyon road and upgrades to that road from the intersection of the C Canyon road up to the site proposed for the gob vent hole installation in the Right Fork of Bear Canyon.

Federal right-of-way U 01756 was issued on 9/3/1951 as a tramroad and was constructed and used in the 1950's for oil & gas and coal lease activities. See attached BLM Plat. SITLA is the surface owner and maintains jurisdiction over portions of that road which are on Trust Lands including portions of T 14S R13 E Sections 3, 10, and 16. SITLA maintains this public road for multiple land use including oil and gas leasing, coal and other minerals, industrial use and grazing.

SITLA approved the upgrading of the Bear Canyon road by West Ridge on September 17, 2008 in anticipation of the construction of a gob vent hole installation on Section 3, immediately adjacent to the existing road. SITLA maintains jurisdiction over the use, maintenance and upgrading of this road on Trust Lands. Such activities within this existing public road are not considered by SITLA to be surface coal mining activities subject to permitting by DOGM.

Any upgrades to the road or maintenance performed on the road will remain under the jurisdiction of SITLA regardless of the duration or use by West Ridge. The existing road will remain in place and under SITLA's jurisdiction to support other land use activities even following the use and eventual reclamation of the gob vent hole installation.

SITLA concurs that the gob vent hole installation facility is a coal mine related surface activity and should be under DOGM permit requirements. The existing road however will remain as a public use road where it exists on Trust Lands.

Please let us know if you have any other questions or concerns regarding use of the Bear Canyon road or construction of the gob gas vent hole installation.

Sincerely,

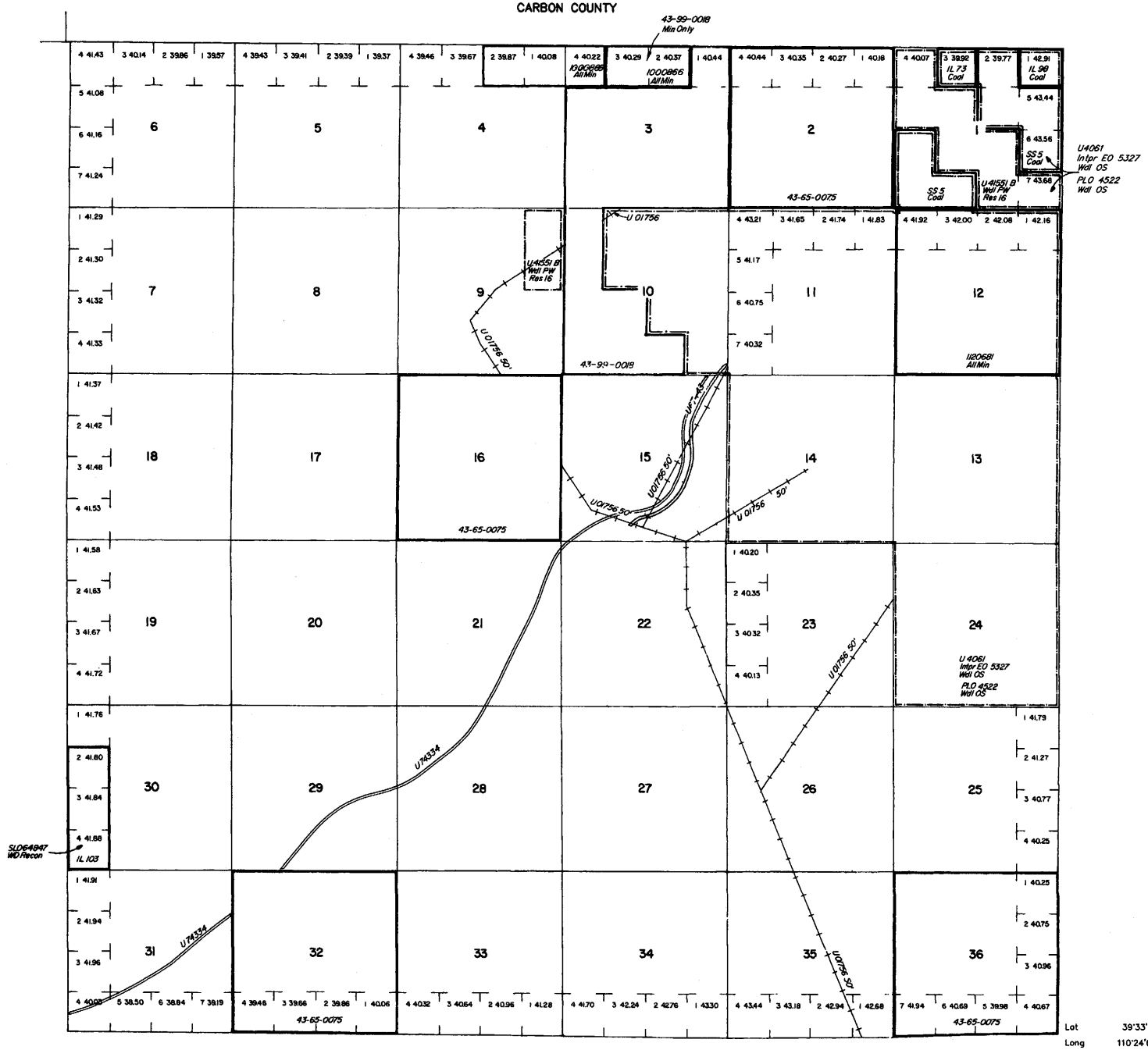
/S/

J. Randall Harden
Minerals Resource Specialist

CC: Tom Faddies, John Blake, Daron Haddock (DOGM)

TOWNSHIP 14 SOUTH RANGE 13 [illegible]ST OF THE SALT LAKE MERIDIAN, UTAH

PRICE FIELD OFFICE
CARBON COUNTY



STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

INDEX TO SEGREGATED TRACTS				
RESURVEY	ORIGINAL SURVEY			
TRACT NO	T	R	SEC	SUBDIVISION

FOR ORDERS AFFECTING DISPOSAL OR USE OF UNIDENTIFIED LANDS WITHDRAWN FOR CLASSIFICATION, MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES, REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.

Lat 39°33'24"N
Long 110°24'03"W

SCALE in chains
10 5 0 10 20 30 60

WARNING STATEMENT
This plat is the Bureau's Record of Title, and should be used only as a graphic display of the township survey data. Records hereon do not reflect title changes which may have been affected by lateral movements of rivers or other bodies of water. Refer to the cadastral surveys for official survey information.

CURRENT TO	
7-12-2007	PV VJ
	OG

T 14 S
R 13 E

Shaver, Dave

From: Randy Harden [randyharden@utah.gov]
Sent: Thursday, November 06, 2008 3:40 PM
To: Shaver, Dave; Daron Haddock
Cc: Chris Fausett; John Blake; Tom Faddies; Tom Mitchell
Subject: Bear Canyon Road
Attachments: Randy Harden.vcf

Daron/Dave,

As per our discussions, Dave Shaver will be submitting an application for an easement with Trust Lands for the Bear Canyon Road up to the gob vent hole. That easement will be assigned to Carbon County % Andalex Resources. Chris Fausett will be coordinating the easement and Trust Lands is willing to accept the assignment of the easement to the county.

Hopefully, the assignment of the lease can stipulated in the approval of the amendment so that there are no delays in drilling the necessary gob gas vent holes as required by MSHA to continue mining operations at West Ridge.

Thanks,

Randy Harden

TABLE OF CONTENTS- APPENDICES
R645-301-500 CHAPTER 5

APPENDIX NUMBER	DESCRIPTION
APPENDIX 5-1	Reclamation Bond Calculations
APPENDIX 5-2	Letter from Carbon County Commission
APPENDIX 5-3	Resource Recovery and Protection Plan (R2P2)
APPENDIX 5-3A	Amended R2P2 Approval Letter (BLM)
APPENDIX 5-3B	BLM R2P2, Approval of Full Extraction of Panel #7
APPENDIX 5-4	Stability Evaluation for Construction and Reclaimed Slopes, West Ridge Mine
APPENDIX 5-5	Construction/Reclamation Plan
APPENDIX 5-6	Spill Prevention Control and Countermeasure Plan (SPCC)
APPENDIX 5-7	Pump House Reclamation and Sediment Control
APPENDIX 5-8	Letter Regarding Pre-Subsidence Survey (Mayo and Associates)
APPENDIX 5-9	Alternate Highwall Reclamation Plan
APPENDIX 5-10	SITLA Mine Plan Approval State Lease ML-47711 and ML-49287
APPENDIX 5-11	Grassy Trail Dam and Reservoir Mining - Induced Seismicity Report (RB&G Engineering)
APPENDIX 5-12	Grassy Trail Dam and Reservoir - Phase II Dam Safety Study (RB&G Engineering)
APPENDIX 5-13	Grassy Trail Dam Monitoring/Inspection Plan, Panel #7
APPENDIX 5-14	Bear Canyon Gob Gas Vent Hole (GVH)

CHAPTER 5
R645-301-500 ENGINEERING

R645-301-511 GENERAL REQUIREMENTS

Chapter 5 contains information regarding the proposed coal mining operation and reclamation plans, a discussion of its potential impact to the environment and methods to achieve compliance with design criteria.

Reclamation plans and estimates are presented for postmining restoration of the area.

NOTE: The following discussion for the remainder of R645-301-511 applies specifically to the Gob Gas Vent Hole (GVH) installation proposed in Bear Canyon. In order to facilitate the review it is presented here in its entirety rather than interspersed throughout the chapter. A more detailed and complete discussion of the Bear Canyon GVH proposal can be found in Appendix 5-14. Unless specifically noted in this following discussion, nothing related to the Bear Canyon GVH proposal affects the contents of the existing approved MRP as described hereinafter.

The GVH facility will consist of three drillholes, four methane extractor units, and interconnecting piping. A detailed description of the drillhole installation, and the assembly and operation of the methane extractor units can be found in Attachment 7 of Appendix 5-14. The site pad will consist of a narrow strip (approximately 35' wide x 300' long) located adjacent to and parallel with the road. The drillholes will be located at the southern (down-canyon) end of the site pad. The extractor units will be located in a serial arrangement along the northern (up-canyon) end of the site pad. The total facility area will be about 0.24 acres, including the adjacent cutslopes.

Three angled holes will be drilled at angles ranging from 20 degrees to 45 degrees from vertical. Drilling will be conducted using tri-cone rotary and/or hammer. Drilling fluid will be primarily compressed air (600-800 psi) with water and Baroid Quick Foam and EZ Mud (see Attachment 15 for MSDS sheets for these products). Cuttings will pass up the annulus and be diverted to the reserve pit on the surface. Each hole will be spudded with a 19" diameter hole into which a 16" diameter conductor casing will be set and grouted to an approximate depth of 20'. Thereafter, a 12.25" hole will be drilled to within 200' of the Lower Sunnyside coal seam (an inclined depth of 200'-300'). A 9.625" T&C casing will be set and grouted to total depth of the 12.25" bore. An 8.75" bit will be tripped in to drill out the shoe and will continue about 175' to within 25' of the coal seam horizon. Sections of 7" slotted casing will be tripped in from bottom of hole to about 40' above the bottom of the upper casing, but will not be grouted so that it can move with any additional subsidence.

Before construction starts identification signs will be posted at the site. These signs will list the company name as permit holder, the permit number, address and phone number. During the initial phase of construction, topsoil will be salvaged. Based on a recent Order 1 soils survey the current estimate of topsoil to be salvaged is approximately 515 cubic yds. (See Appendix 2-10 and also Attachment 2 of Appendix 5-14.). After the topsoil has been removed, the slope will be excavated back for a distance of about 20', leaving a 1:1 cutslope against the hillside. Based on current surveys it is estimated that about 1,357 total yds of material will be excavated from the bank. This includes the estimated 515 yds of topsoil, so the remaining amount of excavated material will be about 842 yds (see Cut Slope Excavation Volumes, Attachment 1 of Appendix 5-14 for details). Material excavated from the cutslope will be used to level off the area for the drillhole (for the drilling operation) and for the individual methane extractor units. Excess material may be used to raise the grade of the adjacent roadway. All fill areas will then be compacted for stability.

During the drilling phase of the GVH installation, the pad area will be used as an equipment lay-down area for drill steel, drill casing, drilling mud, concrete, etc. The pad will also be used to accommodate the mud pits needed during the drilling operation. The mud pit will measure approximately 30' long x 10' wide x 10' deep, and will be located immediately down-canyon, i.e., southwest of, the drillholes, as shown in Attachment 1. The pit will be lined with a 12 mil plastic liner, with a 20 mil felt underlayment. Based on the diameter and total combined length of the drillholes, and assuming a swell factor of 40% for the cuttings, the estimated volume of cuttings is 1283 cubic feet, or 47 yds. This would result in a total depth of cuttings remaining in the bottom of the pit of 4.28 ft. After the drillholes have been completed the remaining cuttings will be mixed with native material until it can be handled with heavy machinery. It will then be removed from the pit and hauled off-site to an approved disposal facility.. After the cuttings have been removed, the pit will be backfilled and eliminated. The site will then be cleaned up and fine-graded prior to installing the methane extractor units (see Attachments 1 and 7 of Appendix 5-14 for details).

After the cutslopes have been excavated, the slopes with be reclaimed (interim reclamation) by pocking, re-seeding and applying a layer of wood straw as described above. A disturbed area drainage ditch will be constructed along the toe of the cut. This ditch will be designed to handle the flow from the up-slope undisturbed area, the reclaimed cutslope, the drillpad, and the adjacent section of road. Runoff from the ditch will be routed through a series of sediment-control structures (silt fences, excelsior logs, etc.) to effectively remove sediment. (A more detailed description of the sediment control measures associated with the site can be found in the Chapter 7, Hydrology discussion of Appendix 5-14.)

A security fence may be installed around the perimeter of the pad between the facilities and the road.. The facilities will not encroach upon nor affect the road nor the road turn-around, and neither will public use of the road be affected. The Company will provide

the Division with an as-built drawing of the facility upon completion of construction.

Operation of the GVH facility is expected to continue for the life of the West Ridge operation. Therefore, reclamation of the site will be done at the same time and under the same conditions as for the minesite surface facilities in C Canyon. However, if temporary cessation of mining operations occurs, the GVH well will continue to function.

Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations. The casings will be plugged at the bottom to hold the concrete. A lean concrete mixture will be poured into the casing until the concrete is within five (5) feet of the surface. At that time the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed. There will be three drillholes installed and therefore plugged at reclamation. (This commitment is identical to the currenty approved plan for the Tower (Centennial, C/007/014) GVH reclamation plan.) Based on current projections the holes will be drilled at 45 degree angles into the mine, and will have individual depths (lengths) of 504', 376', and 502', for a combined total depth of 1382'. Using 9-5/8" casing for all holes, the volume of concrete needed to plug all three holes would be 26 cu. yds.

On final reclamation, the pad area and cutslopes will be backfilled to approximate original contour (see Reclamation Contours, Attachment 1 of Appendix 5-14). Fill material will be obtained from the adjacent roadway and leveling pads. This is the exact same material that was excavated from the cutslope during initial construction. The cutslope will be backfilled in 18"-24" lifts and compacted with rubber-tired vehiclesand/or vibratory mechanical equipment. The reclaimed slopes, at approximate original contour, will average about 1.5: 1, so slope stability will not be an issue. Because of the compaction in lifts, and the rocky nature of the backfill material (one and the same as the original native material), stability of the reclaimed slopes is sufficient to achieve approximate original contour and eliminate the potential for remnant cutslope exposures. A slope stability analysis prepared by Blackhaek Engineering concludes that *"calculations show safety factors well in excess of the required 1.3 for the reclaimed cut slopes of 1.5H:1V and up to 30' in height. This is not inconsistent with the natural conditions of the area, and will allow for complete reclamation of all cut slopes created by the emergency drilling pads."* (See Attachment 8 of Appendix 5-14 for the complete slope stability analysis report.) The slope will then be re-topsoiled and re-vegetated according to the same existing approved plan for the minesite in nearby Canyon, as specified in R645-301-341, and as described in the Chapter 3, Biology discussion in Appendix 5-14.

The amount of backfill material is estimated to be up to 842 cubic yards, and the amount of replaced topsoil is estimated at about 515 cubic yards. Total reclaimed area, including both pad and cutslopes will be approximately 0.24 acres. Because the cutslopes are only

about 20' maximum high, all work, both backfilling and topsoil replacement, can easily be done from the existing adjacent road-pad surface, using trackhoes with sufficient boom reach. After the reclaimed slopes have been topsoiled and reseeded, a row of excelsior logs will be installed along the full length of the toe of the slope between the slope and the remaining road. The purpose of this row of excelsior logs is to control sediment of the site until the revegetation has become established.

Bonding and reclamation costs for the Bear Canyon GVH installation can be found in Appendix 5-14 in the Chapter 8, Bonding discussion.

R645-301-512 CERTIFICATION

512.100 Cross Sections And Maps

Maps, cross sections, figures and tables which require certification will be certified by a qualified, registered, professional engineer or land surveyor.

Cross sections, maps and drawings will be certified prior to determination of completeness for the permit application.

512.200 Plans And Engineering Designs

A qualified registered professional engineer will certify plans and designs for impoundments and primary roads. No excess spoil or durable rock fill designs are proposed.

R645-301-513 COMPLIANCE WITH MSHA REGULATIONS AND APPROVALS

513.100 MSHA regulations 30 CFR 77.216-1 & 30 CFR 77.216-2 do not apply as no coal processing dams or embankments are being proposed.

513.200 MSHA regulation 30 CFR 77.216 (a) does not apply because of the restricted size of the sediment ponds and low hazard potential.

513.300 No coal processing waste is proposed to be disposed of in underground workings. Refer to R645-301-528.321.

513.400 No refuse piles are being proposed.

CHAPTER 6
R645-301-600 GEOLOGY

R645-301-610 INTRODUCTION

R645-301-611 GENERAL REQUIREMENTS

Descriptions of the geology within and adjacent to the permit area are provided in R645-301-621 and R645-301-627. A description of the proposed operation plan for the casing and sealing of exploration holes and boreholes is provided in R645-301-630.

NOTE: The following discussion for the remainder of R645-301-611 applies specifically to the Gob Gas Vent Hole (GVH) installation proposed in Bear Canyon. In order to facilitate the review it is presented here in its entirety rather than interspersed throughout the chapter. A more detailed and complete discussion of the Bear Canyon GVH proposal can be found in Appendix 5-14. Unless specifically noted in this following discussion, nothing related to the Bear Canyon GVH proposal affects the contents of the existing approved MRP as described hereinafter.

The geology of the GVH site is essentially the same as at the West Ridge Mine surface facilities located nearby in C Canyon, as shown on Map 6-1. The primary difference is that the mine site is located in the upper part of the Blackhawk Formation where the Sunnyside coal seam outcrops, whereas the Bear Canyon GVH site is located stratigraphically about 384' above the coal seam within the part of the canyon where the Castle Gate Sandstone begins to outcrop. This results in the GVH site being situated in a narrow, ledgebound part of the canyon. The drillholes will reach down to near the top of the mined out coal seam horizon (see Attachment 7 of Appendix 5-14 for details). Because the coal seam in this area has been completely extracted by longwall mining, the GVH drillholes will penetrate through subsided and fractured strata. Based on previous subsidence monitoring the GVH site has subsided about 3 feet, but subsidence has now stabilized.

R645-301-612 CROSS SECTIONS, MAPS, AND PLANS

Certified cross sections, maps, and plans have been provided per R645-301-622 and R645-301-512.100.

R645-301-620 ENVIRONMENTAL DESCRIPTION

R645-301-621 GENERAL REQUIREMENTS

Regional Geologic Description

The Book Cliffs contain major coal beds of economic importance in central Utah. The rocks of this continuous, roughly horseshoe-shaped band of Cretaceous age rocks partly surround and dip gently away from the broad regional dome of the San Rafael Swell. Steep escarpments and deeply incised canyons are prominent features, above which are gently rolling plateaus. In the Book Cliffs coal field, of which the lease area is part, elevations range from 4,000 to 6,000 feet along the base of the Book Cliffs to nearly 10,300 feet at the highest point. The strike of the beds in the Book Cliffs is generally parallel to the face of the cliffs with a dip of 3 to 8 degrees to the northeast. Scattered faults of a west-northwest trend are limited to a few miles in length and from 25 to 200 feet in displacement.

Clark (1928) mapped the geology and coal outcrops in the western part of the Book Cliffs coal field from the Standardville 7 ½ minute quadrangle on the west

~WEST RIDGE MINE - PERMIT APPLICATION PACKAGE~

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CHAPTER 7
R645-301-700 HYDROLOGY

R645-301-711 General Requirements

This chapter includes a description of hydrology and hydrogeology of the West Ridge permit area. Specifically, this permit application includes:

711.100 Existing hydrologic resources according to R645-301-720.

711.200 Proposed operations and potential impacts to the hydrologic balance according to R645-301-730.

711.300 The methods and calculations utilized to achieve compliance with the hydrologic design criteria and plans according to R645-301-740.

711.400 Applicable hydrologic performance standards according to R645-301-750.

711.500 Reclamation activities according to R645-301-760.

NOTE: The following discussion for the remainder of R645-301-711 applies specifically to the Gob Gas Vent Hole (GVH) installation proposed in Bear Canyon. In order to facilitate the review it is presented here in its entirety rather than interspersed throughout the chapter. A more detailed and complete discussion of the Bear Canyon GVH proposal can be found in Appendix 5-14. Unless specifically noted in this following discussion, nothing related to the Bear Canyon GVH proposal affects the contents of the existing approved MRP as described hereinafter.

The GVH site will be located on the opposite side of the road (southeast side) from the primary canyon drainage channel. Therefore, construction and operation of the GVH facility will have no affect on the natural canyon drainage. Because of the limited size of the site (0.24 acres) and the narrow configuration within the confines of the narrow ledges of the canyon, there is insufficient room to construct a sediment control pond. Therefore the company intends to employ a combination of alternate sediment control methods at the site. During the construction phase of the pad site, adequate rows of excelsior logs will be placed downgrade from the site to prevent construction sediment from entering the channel. Once the pad site is finished, which should take less than two weeks, a disturbed area drainage ditch will be constructed along the toe of the cut. This ditch will be designed to handle the flow from the up-slope undisturbed area, the reclaimed cutslope, the drillpad, and the adjacent section of road. This ditch will discharge into the natural

drainage channel a short distance below the drillhole location. This ditch will be armored with adequately-sized rip-rap for its entire length. This rip-rap will decrease the potential for erosion in the ditch, and will also act initially as a siltation trap as a certain amount of sediment is allowed to settle into the rip-rap voids.

The total length of the drainage ditch will be approximately 350'. At 50' intervals along its length energy dissipaters will be installed in the ditch. These energy dissipaters will consist of excelsior logs laid in the ditch perpendicular to the flow direction, and anchored securely with stakes. These dissipaters will reduce the flow velocity to help reduce erosion, and will also serve as siltation filters to help remove sediment prior to reaching the natural channel. In addition, a terminal set of excelsior logs will be installed in the ditch immediately above the point where it discharges into the natural channel. The installation, consisting of four (4 ea.) closely-spaced rows of excelsior logs will serve primarily as sediment traps, rather than energy dissipaters. This set will be located conveniently close to the road to facilitate regular cleaning and maintenance. The sediment traps will be inspected routinely to make sure they are functioning properly. There will be mine personnel attending to the GVH units on a daily basis, and will be instructed to check the sediment traps on a regular basis, and especially after storm events. If they are in need of repair and/or cleaning such maintenance will be done immediately. Sediment cleaned from the traps will be hauled off-site and disposed of at an approved facility, such as the permitted Wildcat Loadout Coal Mine Refuse Disposal Site (DOGM permit C/007/033). All excelsior logs will be installed according to the manufacture's instructions.

Immediately after the cutslopes have been excavated to create the pad-site, the slopes will be pocked, and reseeded. A layer of woodstraw will then be spread over the reseeded slopes. This straw serves to not only provide microclimate conditions to encourage seed germination, it also absorbs some of the energy from falling raindrops, and therefore helps control erosion on the slopes until revegetation can become established. The pocking, which consists of irregular depressions measuring about 24" x 36" x 18" deep, helps revegetation by holding the seed and water in place, and thereby helps minimize erosion as well.

During the drilling phase of the GVH installation, the pad area will be used as an equipment lay-down area for drill steel, drill casing, drilling mud, concrete, etc. The pad will also be used to accommodate the mud pits needed during the drilling operation. The mud pit will measure approximately 30' long x 10' wide x 10' deep, and will be located immediately down-canyon, i.e., southwest of, the drillholes, as shown in Attachment 1. The pit will be lined with a 12 mil plastic liner, with a 20 mil felt underlayment. Based on the diameter and total combined length of the drillholes, and assuming a swell factor of 40% for the cuttings, the estimated volume of cuttings is 1283 cubic feet, or 47 yds. This would result in a

total depth of cuttings remaining in the bottom of the pit of about 4.28 ft. After the drillholes have been completed the remaining cuttings will be mixed with native material until it can be handled with heavy machinery. It will then be removed from the pit and hauled off-site to an approved disposal facility. After the cuttings have been removed, the pit will be backfilled and eliminated. The site will then be cleaned up and fine-graded prior to installing the methane extractor units (see Attachments 1 and 7 for details). A period of approximately two weeks will be required to construct the drillpad and to drill the holes. During this time interim sediment control will be provided by several rows of excelsior logs installed at the lower end of the construction site. Sediment is not expected to be a problem because of the short construction time involved (approx. 2 weeks), the low probability of rainfall events in late November at this elevation, and the temporary installation of the excelsior logs.

After the site has been constructed the entire operational pad area, as well as the adjacent road area and turnaround, will be graveled from the channel crossing up to the end of the road . This gravel will consist of a crushed rock 1.5" x 0" road base material, laid down and then compacted to a tight surface. This graveled surface will also serve to reduce erosion on the pad (and adjacent road segment) and thereby decrease sedimentation to the natural drainage.

In summary, the site will be an alternate sediment control area. Sediment will be controlled by the following combination of treatment methods:

1) Armoring the entire length of the drainage ditch with rip-rap.

2) Installation of energy dissipaters within the ditch to slow the flow velocity.

3) Installation of set of sediment control excelsior logs in the ditch ahead of the discharge point.

4) Pocking and revegetating the cutslope, including a layer of protective wood straw.

5) Graveling the pad-site and adjacent roadway

Refer to the site plan in Attachment 1 of Appendix 5-14 for the location of the drainage ditch, energy dissipaters, excelsior log siltation controls, and graveled area. See Attachment 11 of Appendix 5-14 for the drainage control calculations determined by Blackhawk Engineering. This report concludes that with *"....installation of the proposed sediment and erosion controls, there should be no adverse effects to the surface hydrology of this area."*

The GVH installation and operation should have no adverse affect on ground-water hydrology. The GVH site is located close to the area where the depth of cover over the longwall panels is the shallowest within the permit area. As a result, this area has been an area of interest in previous MRP amendments, resulting in enhanced water monitoring and subsidence monitoring requirements both above and below the GVH site. A more detailed discussion of the area hydrology can be found in R645-301-322.100 and R645-301-738 of the approved MRP. It should be noted that this area has been now been completely undermined since November, 2006, subsidence has stabilized, and no adverse affects to underground or surface hydrologic resources have been observed. Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations, as discussed in the Chapter 5 section of Appendix 5-14. See Attachment 10 of Appendix 5-14, prepared by Petersen Hydrologic, for a discussion of the potential hydrologic affects from the GVH installation and operation. This report concludes that *"adverse impacts to the hydrologic balance resulting from the installation and operation of the Bear Canyon GVH system are not anticipated."* The probable hydrologic consequences (PHC) section of the MRP (645-301-738) has been updated to include a discussion of the Bear Canyon GVH installation.

During drilling operations, as well as during the remainder of the operational life of the GVH installation, noncoal mine waste will be stored in suitable containers, and then disposed of off-site at an approved waste disposal facility. Hydrocarbons, including Diesel fuel, gasoline, oil and grease, will be stored in the factory supplied containment mounted within the machinery. If any stand-alone storage tanks are used they will be equipped with built-in containment capable of holding the entire contents of the tank. Absorbent pads and bags of absorbent granules will be kept on hand during the drilling operation, and later during the GVH operation, to be used in case of a spill of oil, fuel or grease. Used absorbent material will be disposed of at an approved disposal facility. All operations will be subject to the current Spill Prevention Control and Countermeasure Plan (SPCC) for the West Ridge Mine currently on file with the Division, and included in Attachment 14 for ready reference.

Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations, as discussed in the Chapter 5 section above. Upon final reclamation, any portion of the gravel surface that is stained or contaminated in any way with hydrocarbons will be dug up and hauled off the site to an approved waste disposal facility. After removing any contaminated gravel, the pad area and cutslopes will then be backfilled to approximate original contour, using fill material obtained from the adjacent roadway and leveling pads, and covering up the diversion ditch and the remaining gravel in the process. The slopes will then be re-topsoiled. The surface will then be pocked and re-seeded with an approved seed mix as described in the Chapter 2 discussion. A layer of

wood straw will also be spread over the reclaimed slopes to help minimize erosion, and promote vegetation growth. After the reclaimed slopes have been topsoiled and reseeded, a row of excelsior logs will be installed along the full length of the toe of the slope between the slope and the remaining road, as shown on the Reclamation Plan, Attachment 1. The purpose of this row of excelsior logs is to control sediment off the site until the revegetation has become established. These sediment control logs will remain in place until vegetation has been established adequate for Phase 2 bond release.

R645-301-712 Certification

All cross sections, maps, and plans have been prepared per R645-301-512.

R645-301-713 Inspection

Impoundments will be inspected as described under R645-301-514.300.

R645-301-720 Environmental Description

R645-301-721 General Requirements

The existing, pre-mining hydrologic resources within the permit and adjacent areas that may be affected by coal mining and reclamation operations are described by Mayo and Associates (1997; 7-1 "Groundwater Investigation of Proposed Mine Permit Area", 2001; 7-1A "Investigation of Surface-Water and Groundwater Systems in the Whitmore LBA Area") and summarized below.

Groundwater Resources

A spring and seep survey of the West Ridge area was conducted in 1985-86 by Kaiser Coal Corporation (1986). Locations of the springs and seeps in this area are shown on Map 7-6 "Hydrologic Monitoring Map (Historical Monitoring Locations)". No water supply wells exist in the permit and adjacent areas.

Within the permit and adjacent areas, groundwater naturally discharges from alluvium and colluvium, and the Colton, North Horn, and Price River Formations. Over 90% of springs in the permit and adjacent areas issue either from alluvium/colluvium or the Colton and North Horn Formations, which form the caprock of nearly the entire permit area. Springs that issue from the Price River Formation are uncommon. Groundwater does not naturally discharge from the Castlegate and Blackhawk Formations within the permit and adjacent areas. However, groundwater occurs in some permeable horizons of the Blackhawk Formation. Most notably, groundwater is present in well DH86-2, which is open to the entire thickness of the Sunnyside Sandstone member of the Blackhawk Formation.

Springs that discharge from alluvium and colluvium and the Colton and North Horn Formations on the east slope of West Ridge in Whitmore Canyon contribute base flow to Grassy Trail Creek. Discharge from springs on the west side of West Ridge is small and is consumed by evapotranspiration and infiltration before reaching perennial streams.

Surface Water Resources

The mine permit area drains into Grassy Trail Creek via two principal drainages. The region east of West Ridge and west of Patmos Ridge drains into Grassy Trail Creek through Whitmore Canyon. Numerous small ephemeral creeks drain the western face of West Ridge and flow westward toward lower Grassy Trail Creek. Grassy Trail Creek ultimately discharges into the Price River near Woodside, Utah, approximately 20 miles to the south.

R645-301-722 Cross Sections and Maps

722.100 As described by Mayo and Associates (1997; Appendix 7-1, 2001; Appendix 7-1A), groundwater systems in the permit and adjacent area have limited areal and vertical extent due to the heterogeneous lithology of the rock units containing and overlying the coal-bearing strata. No aquifers exist in the permit and adjacent areas. Therefore, no map has been prepared to show the location and extent of subsurface water.

722.200 The location of surface water bodies can be found on Map 7-3 "Water Rights", which shows Grassy Trail Reservoir and its location with respect to the permit area.

722.300 Baseline monitoring stations are shown on Map 7-6 "Hydrologic Monitoring Map (Historical Monitoring Locations)". This map shows the stations that were utilized to collect historical baseline information in earlier monitoring programs conducted between 1985 and 1996.

722.400 The location of water wells is also shown on Map 7-6. DH 86-2 was monitored during 1986, 1987, 1997 and 1998.

722.500 Map 5-1 shows contours of the proposed disturbed mineyard area.

R645-301-723 Sampling and Analysis

Water quality sampling and analyses have been and will be conducted according to the "Standard Methods for the Examination of Water and Wastewater" or EPA methods listed in 40 CFR Parts 136 and 434. Laboratory reporting sheets indicate the specific method used for each parameter.

R645-301-724 Baseline Information

Baseline groundwater, surface water, geologic, and climatologic data are described by Mayo and Associates (1997; 7-1, 2001; 7-1A).

724.100 Groundwater Information

The location of wells and springs are shown on Map 7-5, Seep/Spring Survey Map, and 7-6, Hydrologic Monitoring Map (Historical Monitoring Locations). Groundwater rights in and around the permit and adjacent areas are shown on Map 7-3 and tabulated in 7-5 "Water Rights Summary".

Kaiser Coal Company (a previous owner of the WEST RIDGE lease area) had identified and proposed monitoring for several other springs in the region. Review of their 1986 permit application to DOGM was interrupted by the sale of the coal leases to BP America in 1987. BP America retained JBR Consultants to proceed with baseline water monitoring. JBR Consultants renumbered previously monitored points into a different numbering system. In places of this WEST RIDGE Permit Application Package (such as Appendix 7-1, Table A-1) a cross-reference is made between the previous (Kaiser) spring numbers and the present (JBR) labels. Mining plans for both Kaiser Coal and BP America included a larger mining area. When WEST RIDGE acquired the property they did not acquire a portion of the coal lease area referred to as the north area. Therefore, in the WEST RIDGE PAP, those monitoring points that were north of Bear Canyon were eliminated from the baseline monitoring plan due to their distance from the current proposed mine workings and the low potential to be impacted by mining operations.

SP-1, SP-2 and SP-3 were spring monitoring points used by Kaiser Coal during the mid-1980's. These three points were located in Rock Canyon, several miles to the north of the WEST RIDGE permit area. They were eliminated from the monitoring program because they are quite a distance from the permit area and would not be affected by the WEST RIDGE mining operations.

Also, SP-4 and SP-5 (referred to in the Kaiser plan as S-40 and S-39) were eliminated from the monitoring plan because they occur about a mile north of Bear Canyon and are separated from the proposed mining area by several large drainages. The likelihood of impact to these sites is negligible since WEST RIDGE did not acquire coal leases in this area. SP-4 and SP-5 were monitored in 1988 and 1989 and found to be dry. These sites have been added to Map 7-6 for reference to historical monitoring locations.

SP-7 (Kaiser point S-22) is located about ½ mile north of the permit area. It was not included in the baseline monitoring program because access is poor and, during previous monitoring in the spring of 1986, flows were low (1-3 gpm). When this site was re-checked in 1988, 1989 and the fall of 1997 no flow could be found in the vicinity of the old spring. SP-10 (Kaiser S-1) is in the lower right-hand corner of the permit area was also eliminated from the baseline monitoring plan because of difficulty of access and low previous flow measurements. This site was also revisited in 1988, 1989 and 1997 and no flow or dampness could be located. No water rights exist on SP-4, SP-5, SP-7 or SP-10. SP-7 and SP-10 are included on Map 7-6 for reference to historical points.

Seasonal quality and quantity of groundwater and usage is described in the 1985-86 spring and seep survey (Appendix 7-6) and WEST RIDGE Resources, Inc.'s baseline monitoring during 1997 (Appendix 7-2 "Baseline Ground Water Monitoring &

Analyses"). These data have been analyzed by Mayo and Associates (1997; Appendix 7-1, 2001; Appendix 7-1A).

Drill Hole 90-1

DH90-1 was developed as a water supply well by Sunnyside Coal Company, East Carbon City, and Sunnside City. Sunnside City and East Carbon City have a water right (91-4960) for 31.621 ac-ft per year (19.6 gpm) from this well.

Information for the state engineer's office in Price (Mark Page, Personnal Communication) indicates that the well has a total depth of 500 feet. The well has a gravel pack from 207 to 500 feet below ground surface. According to Sunnyside Coal Company (1993), the well is completed in the Price River and North Horn Formations.

Because the well is located two thirds of a mile from the lease boundary, and is completed in the Price River and North Horn Formations, it is very unlikely that mining in the permit area will affect groundwater systems that contribute water to DH90-1.

724.200 Surface Water Information

The location of streams, reservoirs, and stock watering ponds are shown on Map 4-1. Surface water rights in and around the permit and adjacent area are shown on Map 7-3 and tabulated in Appendix 7-5 "Water Rights Summary".

WEST RIDGE Resources, Inc. anticipates that as mining progresses, it may become necessary to discharge water from the proposed mine. Mine water will be discharged to the ephemeral drainage in C Canyon. The location of the mine discharge point is shown on Maps 5-5 and 7-2, Mine Site Drainage Map.

Surface water quality and quantity is shown in WEST RIDGE Resources, Inc.'s baseline monitoring data (Appendix 7-3 "Baseline Surface Water Monitoring & Analyses") and is described in detail by Mayo and Associates (1997; Appendix 7-1, 2001; Appendix 7-1A). Additional surface and groundwater baseline data has been added to Appendix 7-1, Table A-1. Monitoring records from Kaiser Coal Company have been located and added to the data base. This includes monitoring of surface sites on ephemeral drainages around the area.

As described in R645-301-728.320, no acid drainage is expected from the proposed mining operation.

Upper Grassy Trail Creek Drainage

Most of the surface water flowing into Grassy Trail Creek in Whitmore Canyon above Sunnyside discharges from several ephemeral streams located on the western slopes Patmos Ridge (1998 Mayo and Associates report, Figure 15). These streams include Number Two Canyon, Pasture Canyon, Pole Canyon. Bear Canyon, Water Canyon, the Right and Left Forks of Whitmore Canyon, Graveyard Canyon, Hanging Rock Canyon, and Spring Canyon. No major streams flow into Grassy Trail Creek in Whitmore Canyon from the eastern slope of West Ridge due to the asymmetry of the ridge. Discharge in Grassy Trail Creek in Whitmore Canyon is regulated at Grassy Trail Reservoir.

Side tributaries to Grassy Trail Creek along the western slope of Patmos Ridge are characterized by steep gradients (greater than 25%), narrow canyons, and gravel streambeds with sand and silt where gradients are reduced. Tributary flow is intermittent and in response to precipitation events.

Above the reservoir, Grassy Trail Creek lies in a relatively broad canyon (30 to 100 yards wide) with a low gradient (3 to 4%). The channel bottom locally consists of boulders, gravel, sand, or mud. The Right and Left Forks of Grassy Trail Creek lie in narrow canyons with steep gradients. The Utah Supreme Court has determined that Grassy Trail Creek is an intermittent stream (Decree #3028). During wet periods, base flow above the reservoir is sustained by high elevation springs, mostly in the Colton Formation. During dry years, there is no sustaining groundwater baseflow to support flow in the creek. Below the reservoir Grassy Trail Creek is now a perennial stream due to the buffering effect of the reservoir.

Monitoring stations on Grassy Trail Creek have been established at ST-3, which is above Grassy Trail Reservoir near Hanging Rock Canyon, and below the reservoir at ST-8 near the confluence with Water Canyon (Mayo and Associates 1998 report, Figure 16). During May, June, August, and October of 1997, Andalex made stream flow measurements at these locations. On average, discharge between ST-3 and ST-8 increases by about 200 gpm during this time. In June, However, flow increased between these tow stations by 1,700 gpm. We suspect that this increase is the result of surface water inflows from ephemeral side drainages during the snowmelt period.

Visual observations during low-flow stream conditions suggest significant base flow gains in the reach between the reservoir and the mouth of Whitmore Canyon. Mayo and Associates observed Grassy Trail Creek between the confluence with Water Canyon and the mouth of Whitmore Canyon on 21 November 1997. The results of the observations are presented below.

Location	Discharge (gpm)
Confluence with Water Canyon	150[1]
Base of Blue Gate Sandstone	298
Mouth of Whitmore Canyon	275[1]

[1] Estimated values; the channel was frozen over and measurements were not possible.

Discharge in Grassy Trail Creek doubled in the reach from the confluence with Water Canyon (alluvium overlying North Horn Formation) to the base of the Bluecastle Member of the Price River Formation. Much of the increase comes from several small springs and seeps, which visibly discharge from the stream bank into the creek. In the reach from below the Bluecastle Member to the mouth of Whitmore Canyon flow remained relatively constant. Most of the increase in flow occurs as the stream flows over alluvial and colluvial deposits. The canyon widens substantially in this reach and the alluvial deposits appear to be thicker than in the higher elevations in the canyon. The increase in stream flow is likely the result of delayed drainage from the alluvial and colluvial deposits. However, it is possible, though less likely, that the increase in flow is the result of groundwater leakage from permeable sandstone horizons in the Price River Formation.

No increase in discharge in Grassy Trail Creek is observed as the creek flows over the Blackhawk Formation near the mouth of the canyon. This suggests that there is no appreciable discharge from the Blackhawk Formation to the creek. This finding is in agreement with many other stream gain-loss measurements performed by Mayo and Associates in the Book Cliffs and Wasatch Plateau coal fields.

In the mouth of Whitmore Canyon, streamflow in Grassy Trail Creek is lost to the alluvial sediments associated with the Mancos Shale. Waddell (1981) reports that the composition of groundwater in the alluvium near the mouth of Whitmore Canyon in Whitmore Spring (D-15-13)1ddc-S1 and well (D-15-13)2dad-1 have solute compositions and TDS concentrations that are similar to those in lower Grassy Trail Creek. This suggests that the creek and the thick alluvial deposits in the mouth of the canyon are probably in good hydraulic connection. Several springs with discharges of less than 10 gpm discharge from the alluvium near the mouth of the canyon. These springs are likely recharged from leakage from Grassy Trail Creek. During dry periods, Grassy Trail Creek dries up completely before reaching the confluence with Bear Creek and Rock Canyon Creeks west of the permit area. The reduction of flow in the creek in this reach is due primarily to infiltration into the thick alluvium and to losses to evapotranspiration.

Water Rights

Water rights on Grassy Trail Creek are shown on Map 7-3 and tabulated in Table 7-5

Water Quality

Surface water in upper Grassy Trail Creek is of the magnesium-calcium-bicarbonate type with considerable concentrations of sodium and sulfate. Average TDS concentrations are approximately 350 mg/l at ST-3 and 277 mg/l at ST-8. Below the confluence with Water Canyon Creek, the TDS and chemical character of Grassy Trail Creek changes. The TDS steadily increases to about 1,000 mg/l. Na^+ becomes the dominant cation and there are also substantial increases in SO_4^{2-} and HCO_3^-.

Bear Canyon Drainage

Flow Characteristics

The discharge from the Bear Canyon drainage (which is tributary to Dugout Creek) is described as ephemeral in the Mayo and Associates report (p. 53). However, historical monitoring location ST-2 in the left fork of Bear Canyon is considered an intermittent stream monitoring site (Mayo and Associates report, page 52).

Flow in the upper reach of the left fork of Bear Canyon is intermittent for about 500 feet. Water in this upper reach is supported by intermittent discharge from a spring complex (including historical monitoring location SP-6). Intermittent flow is not sustained below this stretch of the drainage due to infiltration and therefore does not reach the LBA boundary.

Data from monitoring sites ST-4 and M-2 indicate that discharge from the Bear Canyon drainage is ephemeral. In May 1988, no flow was observed at M-2 (refer to Table A-1). The PHDI (Figure 3a and 3b) indicates that 1988 was not a drought year. No flow was observed at ST-4 during 1989; however, this year was the beginning of a drought period in the region. At ST-4, no flow was observed in the drainage in March, May, June, July, August or September 1997, or May, June, July, August or September 1998.

M-1 (ST-1) was a monitoring point used by Kaiser Coal during the mid-1980's. The point was identified as M-1 by Kaiser Coal in their 1986 permit application package. It was later redesignated as ST-1 by JBR Consultants in a monitoring plan later submitted for BP America. This point was located in Rock Canyon (approximately 2 miles to the northwest of the WEST RIDGE permit area in T. 13 S. R 13 E. Section 32 NW1/4 SW1/4 on Rock Creek. When WEST RIDGE (Andalex) took over the monitoring program in 1997, they decided to utilize the same numerical designations of the monitoring points to minimize confusion over numbering and to maintain continuity in the baseline monitoring plan and facilitate utilization of previously collected hydrology information. Rock Creek was not included in the baseline monitoring plan for the WEST RIDGE mine because of the distance from the lease area and the low potential for mining operations to have any impacts. However, rather than renumbering the stations and causing confusion, it was decided to leave the existing numbering scheme in place but sample only those site important to the current mining proposal. The WEST RIDGE monitoring program does not include ST-1 and this point is not shown on the operational monitoring map (Map 7-7).

Water Rights

Surface water rights (91-1717 and 91-1722) for the intermittent reach of the left fork of Bear Creek have a period of use of March 15 to October 31. Data from ST-2 indicate that water is available in the upper left fork during this period in normal to wet years. During dry years, this stretch is dry.

All other surface water rights for Bear Creek below the intermittent reach have a year-round period of use. However, as discussed above, all of Bear Creek below the headwaters of the upper left fork only supports ephemeral flow.

Water Quality

Surface water at ST-2 is a Mg^{2+}-HCO^{-}_{3}-SO_4^{2-} type water with elevated TDS (1,100 mg/l) relative to surface water in upper Grassy Trail Creek. Only one surface water sample has been collected at the ephemeral monitoring location M-2. This water had a TDS of 1,820 mg/l indicating that the quality of water naturally degrades between ST-2 and M-2.

Hydrologic Resources of the Topsoil Borrow Area.

The 9.6 acre area identified as the topsoil borrow site is a gently, westward sloping bench. The surface is covered with sagebrush and pinyon juniper. No seeps or springs exist in or around the borrow site. What little surface runoff occurs would flow to ephemeral drainages downstream from the borrow site. Surface runoff is minimized by the vegetative cover and relatively deep soil horizons in this area. Due to the limited areal extent of the borrow area, it does not appear to contribute a significant amount of runoff to adjacent drainages. There are no known aquifers in this area that would be recharged by this watershed area.

During reclamation, if it is determined that topsoil resources from this potential borrow site are needed to achieve reclamation of the mine site, silt fencing would be placed around the outer limits of the borrow area to be disturbed. Topsoil would be stripped and stockpiled. The required amount of topsoil would then be removed from the borrow site. Care would be taken to contour the borrow pit such that runoff would be utilized to the fullest extent in the disturbed area. This would include gouging the regraded surface with pits approximately 24" wide, 36" long and 18" deep as well as sloping the regraded slopes inward to encourage precipitation infiltration on-site.

724.300 Geologic Information

Geologic information in sufficient detail to determine the probable hydrologic consequences of mining and determine whether reclamation can be accomplished, as required by R645, is provided in Chapter 6 of this permit application package and in Mayo and Associates (1997; Appendix 7-1, 2001; Appendix 7-1A).

724.400 Climatological Information

724.411 Seasonal precipitation

Average annual precipitation at Sunnyside is 13.3 inches (NCDC, 1997) while estimated potential evaporation is over 60 inches (Sunnyside Coal Company, 1993). Mean monthly precipitation at Sunnyside is shown on Figure 7-1 "Hydrologic Monitoring Protocols and Locations". On average, the area receives the greatest quantity of moisture in the late summer and early fall (August-October). The driest months are November to February.

The precipitation and temperature data described above is typical of the lowland areas at the base of the Book Cliffs. Although data are not available for the higher elevations of the permit area, average precipitation likely increases and average temperatures likely decreases with elevation.

The Palmer Hydrologic Drought Index (PHDI; NCDC, 1997; Karl, 1986; Guttman, 1991) indicates long-term climatic trends for the region. The PHDI is a monthly value generated by the National Climatic Data Center (NCDC) that indicates the severity of a wet or dry spell. The PHDI is computed from climatic and hydrologic parameters such as temperature, precipitation, evapotranspiration, soil water recharge, soil water loss, and runoff. Because the PHDI takes into account parameters that affect the balance between moisture supply and moisture demand, the index is a useful for evaluating the long-term relationship between climate and groundwater recharge and discharge. Figures 7-2 Palmer Hydrologic Drought Index for Utah Division 6 and 7-3 Palmer Hydrologic Drought Index for Utah Division 7 show the PHDI for Utah Division 6 (Uintah Basin) and Division 7 (Southeastern Utah), respectively. The permit area lies at the boundary of these two regions. These graphs indicate extremely wet years between the early and late 1980s, followed by several years of drought in the late 1980s and early 1990s. Since about 1993, wet and dry cycles have been shorter.

724.412 Winds direction and velocity

Wind data have been collected by SCA (Sunnyside Cogeneration Associates) during 1982 and 1983 for permitting of the power plant. These data (Sunnyside Coal

Company, 1993) were collected in Dragerton (near East Carbon, Utah) atop a 45-meter tower. The data show that the majority of the winds are from the north-northeast clockwise through the south-southwest. The average annual wind speed is 6.2 mph.

Upper level winds, over 1,600 feet above the ground level, are generally from the southwest during most of the year. During the winter, air flow from the northeast is common. Local airflow patterns are primarily influenced by stream and river drainages. Wind speeds induced by the descent of dense cold air is generally light. The daytime flow is strongly influenced by surface heating effects which result in mixing between surface and upper level flows. In the permit area there is a general air flow toward the north and northeast during the day (high elevations) and toward the southwest (lower elevation) during the night. Wind speeds are usually light to moderate (below 20 mph). Higher wind speeds are generally associated with storm systems and higher elevations such as ridge tops.

724.413 Seasonal temperature ranges

Temperatures in the permit area vary greatly both daily and seasonally. Temperature data collected at the Sunnyside Mine engineering office (Sunnyside Coal Company, 1993) indicate that average temperatures are generally below freezing in the winter months and summertime temperatures range from 50 - 90°F.

724.500 Supplemental Information

Adverse impacts to the hydrologic balance either on or off the permit area are not expected to occur based on the probable hydrologic consequences determination in R645-301-728. Acid- and toxic-forming materials present in mining materials will not cause contamination of groundwater or surface-water supplies. Consequently, information regarding remedial and reclamation activities has not been prepared.

724.600 Renewable resource lands

Aquifers or areas for the recharge of aquifers do not exist within the permit and adjacent areas. As described by Mayo and Associates (1997; Appendix 7-1), groundwater systems in the permit and adjacent area have limited areal and vertical extent due to the heterogeneous lithology of the rock units containing and overlying the coal-bearing strata.

Limited groundwater recharge occurs on the land surface within the permit area because of the steep slopes and cliffs. Springs that discharge in the permit area are most likely associated with shallow alluvial and colluvial materials. Mining should not affect the recharge or discharge of these springs. Groundwater recharge to the

Colton and North Horn Formations within the permit area may discharge as springs in Whitmore Canyon because of the northeasterly dip of the rocks. Due to abundant claystone and mudstone in these formations and the thickness of the interburden between these formations and the mining horizon, mining will not impact groundwater in these horizons.

Adjacent to the permit area, the upper slopes of the east side of West Ridge are the recharge area for Colton Formation groundwater systems that discharge as springs in Whitmore Canyon and contribute base flow to Grassy Trail Creek. These groundwater systems occur in the shallow subsurface and will not be undermined. Mining will have no impact on the recharge and discharge of these springs.

724.700 Not applicable.

R645-301-725 Baseline Cumulative Impact Area Information

Mayo and Associates (1997; Appendix 7-1, 2001; Appendix 7-1A) have analyzed geologic and hydrologic information and prepared a document describing the surface-water and groundwater systems of the permit and adjacent areas. This report contains the information to assess the probable cumulative hydrologic impacts of coal mining and reclamation operations as required by R645-301-729.

The hydrology and geology of the area around Grassy Trail reservoir is discussed in a seismic analysis report (see Appendix 5-11) and the Phase II dam safety report (see Appendix 5-12). These reports conclude that it is unlikely that mining induced seismicity or subsidence will impact the performance of the Grassy Trail Dam and Reservoir. Based on the conclusion of this study the BLM has approved the R2P2 to allow full extraction longwall mining of Panel #7.

R645-301-726 Modeling

No numerical models have been created for the permit area.

R645-301-727 Alternative Water Source Information

The determination of the probable hydrologic consequences (R645-301-728) indicates that the proposed coal mining activities will not result in the contamination, diminution, or interruption of groundwater or surface-water sources within the proposed or adjacent areas. Therefore, WEST RIDGE Resources, Inc. has not prepared information regarding alternative water sources.

R645-301-728 Probable Hydrologic Consequences (PHC) Determination

This section describes the probable hydrologic consequences (PHC) of underground coal mining in the permit area. This determination is based on the data and information presented previously in this chapter and by Mayo and Associates (1997; Appendix 7-1, 2001; Appendix 7-1A). The PHC will be updated, if needed, following the collection and analyses of information gathered during the 1998 field season.

728.310 Potential adverse impacts to the hydrologic balance

Longwall coal mining may result in land subsidence and bedrock fracturing. Subsidence and fracturing have the potential to impact the hydrologic balance if fracturing increases the vertical hydraulic conductivity of overburden rock. Possible consequences of fracturing include decreasing discharge rates of near-surface groundwater while increasing the recharge rates of deeper groundwater systems.

Mining will occur in the Lower Sunnyside Seam of the Blackhawk Formation. Over 90% of the springs in the West Ridge area discharge from near-surface groundwater systems in alluvial/colluvial materials and the Colton and North Horn Formations. The thick interburden between the mined horizon and the near-surface groundwater systems and the presence of swelling clays in the North Horn Formation will prevent fracturing and subsidence from increasing vertical hydraulic conductivities and decreasing spring discharge rates.

Groundwater that is encountered by mining operations will likely be old, meaning that recharge occurred thousands of years in the past. Well DH86-2 encountered water in the Sunnyside Sandstone below the coal seam to be mined. This water has a radiocarbon age in excess of 11,000 years.

Groundwater systems encountered in the Blackhawk Formation occur in isolated sandstone paleochannels, fractures, and faults. These groundwater systems are not in active hydraulic communication with the surface and have limited areal and vertical extent. Mining could dewater some of these systems if they are intercepted during mining operations. Because of the limited spatial extent of these systems, discharge from these isolated groundwater systems will cease soon after interception by mine workings.

Mining could also encounter water impounded in the old Sunnyside mine workings. In order to avoid accidentally mining into flooded workings, the West Ridge mine will perform exploratory drilling ahead of development when active mine works are within 500 feet of the projected Sunnyside workings. Face drills will be used to drill at least 100 feet out in advance of the actual mine face development. The exploratory face drill will be a small diameter and if water is encountered from the old works the drill hole

can easily be plugged and sealed. The West Ridge mine plan assumes that development will proceed to within 300 feet of the old works. West Ridge mine intends to stay away from the old works but will drill ahead as a precautionary measure in the event that the mine maps or surveying has a margin of error.

Based on the analysis of the probable hydrologic consequences (PHC), it has been concluded that it is highly unlikely that mining in the West Ridge area will result in the decrease of groundwater discharge rates.

Grassy Trail Creek above Grassy Trail Reservoir flows across the WEST RIDGE permit area. The stream channel in this area is underlain by approximately 2,000 feet of cover, which includes the entire thickness of relatively unfaulted and unfractured North Horn Formation, which is known to form an effective barrier to vertical groundwater migration (Mayo and Associates, 1998) and is known to contain hydrophillic clays that swell when wetted to seal any fractures that may form. Therefore, the potential for the interception and diminution of surface water flows in Grassy Trail Creek as a result of mining induced subsidence is minimal. Where differential subsidence may potentially occur beneath Grassy Trail Creek, such as along longwall panel ends or above gate roads, there is the potential for localized increases or decreases in stream gradients. These changes can result in minor changes to the stream morphology, including changes in the number of pools, runs, glides, etc. Differential subsidence of the channel substrate also has the potential to result in temporary increases or decreases in sediment yield. However, because a steep, mountain stream flowing on alluvial or soft bedrock substrate has the tendency to rapidly erode elevated areas and deposit sediment in lowered areas, these effects are commonly short-lived, as the stream system is rapidly brought back into equilibrium.

In order to assess the impacts of full extraction mining beneath perennial streams in the Utah Coal District, several comprehensive investigations of the Burnout Canyon drainage above Canyon Fuel's Skyline Mine have been conducted (Forest Sciences Laboratory, 1998; Sidel, 2000). The findings of these investigations indicated that 1) baseflow discharge rates during and after subsidence of the drainage were not statistically different at the 0.05 level, 2) there was no indication that water was lost from Burnout Creek as a result of longwall undermining of the drainage, and 3) some minor changes in stream morphology, including changes in the pool/riffle ratio of the stream channel were noted; however, similar changes in the study's control area (James Canyon) were also noted, indicating that the observed morphological changes could have been at least in part the result of non-mining-related factors. They found that the changes in channel morphology were generally short lived. Subsequent to the publication of these investigations, the Burnout Canyon drainage has been further subsided as a result of multiple seam extraction beneath the creek. No perceptible or quantifiable impacts to the drainage have been detected as a result of this mining activity (USFS, 2001).

Burnout Creek and upper Grassy Trail Creek, both being relatively steep-gradient mountain streams, are in many senses generally comparable. However, while overburden thicknesses in the Burnout Canyon area range from about 600 to 850 feet, overburden thicknesses beneath Grassy Trail Creek are approximately 2,000 feet. Therefore, it is reasonable to assume that the hydrologic impacts to upper Grassy Trail Creek, where only single seam extraction under significantly greater cover, will be similar to (or lesser than) the minimal impacts experienced in the Burnout Canyon area.

For the reasons discussed above, it is believed that the impacts to Grassy Trail Creek above Grassy Trail Reservoir as a result of longwall mining beneath the creek will be negligible.

No mining is proposed beneath or within the angle of draw of Grassy Trail Reservoir. Therefore, the potential for loss of water from reservoir leakage is believed to be negligible.

Bear Canyon is situated in the northwest portion of the permit area within the SITLA lease area. This canyon is unique because it is within the right fork of this drainage that the cover over the longwall subsidence zone is the shallowest of anywhere in the entire permit area. In one part of the bottom of the (right fork) Bear Canyon drainage the cover over the longwall panes is approximately 325'. Due to the increased potential for the effects of subsidence to reach the surface in this area special attention has been focused on the hydrologic character of the Bear Canyon drainage.

Bear Canyon is typical of the canyons draining the southwest-facing front slopes of the Book Cliffs in this area. These canyons are generally shorter and drier than those drainages on the back-side of the Cliffs. Several baseline surveys of Bear Canyon right fork done in the late 1980's showed the drainage to be mostly dry and the canyon was identified as ephemeral along with other similar front-facing canyons in the permit area, such as "C" Canyon, "B" Canyon, and "A" Canyon. However, during site visits in June and July of 2005, substantial stream-flow was observed in the drainage. This occurrence of flow, along with the observation of riparian vegetation in the lower stretches of the canyon, has led to a re-evaluation of the classification of the drainage as intermittent. Also, because the area of the Bear Canyon watershed is greater than one square mile the drainage is classified as intermittent under DOGM regulations.

Historical observation of Bear Canyon shows the streamflow in the bottom of the drainage to be a combination of surface flow and subsurface flow. In those areas where bedrock is at or close to the surface, flow is forced up to the surface. In other

areas where the alluvium in the channel is thick and porous the flow is subsurface and the stream channel is often dry. The stretches of channel exhibiting surface flow as opposed to subsurface flow will vary from season to season, and year to year depending on prior precipitation trends in the watershed. There are times when the entire length of the channel could be expected to exhibit surface flow, and other times when surface flow is confined to certain segments. And, according to past monitoring observations, there are often times when there is no flow in the stream channel. In order to better define the hydrologic character of the canyon WEST RIDGE Resources will expand the monitoring program in Bear Canyon by adding two new monitoring sites and relocating a third site (see Map 7-7 and Table 7-1).

As mentioned previously, there is a point in the right fork of Bear Canyon where cover over the longwall panel will be about 325' which is the shallowest surface cover of any place within the current WEST RIDGE mine plan. This, along with the fact that there are state-appropriated surface water rights in this drainage (refer to Appendix 7-5), makes this an area of special interest. There is reason to expect that full-extraction longwall mining will not adversely affect the hydrologic resources of the canyon in this area. According to Syd S. Peng, ("Coal Mine Ground Control", 1978, Wiley, New York) a general rule-of-thumb is that subsidence-related fractures can be expected for a distance above the coal seam equal to 50 times the mining height, which works out to be 316' for the shallow point in Bear Canyon, which is slightly less than the cover in that area. Therefore due to the shallowness of cover in this area there could be subsidence fractures which reach the surface in the bottom of the canyon, and mitigation will be done to protect the resource.

The shallow overburden point coincides with the inflection point of the longwall subsidence profile. Based on a 22 degree angle of draw the tension zone will extend along the surface from the inflection point (shallow point) downstream approximately 130'. Areas upstream from the inflection point will be in compression as the longwall panel are extracted in progression from the southwest to the northeast according to the approved mining plan. Cracks are more likely to open up in the tension zone as compared to the compression zone where lateral forces are pushing toward each other rater than pulling apart. As mining progresses to the northeast, cover increases rapidly because of the gradient of the channel bottom and the dip of the coal seam, and surface effects of subsidence should diminish in that direction. Therefore, it is expected that any cracking which might reach the surface should most likely appear in the canyon bottom in the 130' (plus/minus) tension zone down-canyon from the inflection point. Special subsidence monitoring will be focused on this area.

WEST RIDGE will establish two new hydrologic monitoring sites in the right fork

of Bear Canyon. The first site (ST-11) will be located within the tension zone described above. This site was chosen because this location should be well-suited to determine if tension cracks have affected stream flow. It is also, coincidentally, one of the areas where the bedrock nature of the channel bottom forces water to the surface, thereby making streamflow measurements more accurate. The second site (ST-12) will be located about 2400' farther up-canyon in another area where, again, the bedrock nature of the channel allows for a more accurate streamflow measurement. A third monitoring site (ST-13) will be located below the forks of Bear Canyon just outside the permit area boundary. This site will replace the existing monitoring site ST-4.

During the flow season of 2005 and 2006 (that is, May 15 through September 15) site ST-11 will be monitored monthly as long as flow is present. This monthly monitoring will help better define the nature of streamflow prior to longwall extraction in the area, which is presently scheduled for May, 2007. Thereafter, monitoring will be done on the regular quarterly basis. Site ST-12 is more inaccessible, and could be dangerous to reach in the winter. Therefore this site will be monitored twice a year, once during late spring/early summer (expected peak flow) and once in late summer/early fall, when the canyons are normally much drier. Site ST-13 will be monitored quarterly.

The longwall is presently scheduled to pass under Bear Canyon in the spring of 2007. Prior to that, WEST RIDGE will complete a survey of a series of subsidence monitoring points established up the bottom of the drainage on either side of the inflection point. After the longwall has passed under the drainage these points will be re-surveyed and an accurate account undermined WEST RIDGE will visually inspect the area to determine if any effects of subsidence are apparent. Within thirty days of the inspection WEST RIDGE will submit a written report to the Division outlining the results of this inspection .

Recent site visits have determined the existence of riparian type vegetation in the lower reaches of Bear Canyon below the forks. WEST RIDGE commits to preparing a detailed vegetation survey and mapping of the canyon bottom with emphasis on the existence of riparian specie. This survey will be conducted during the growing season of 2005 or 2006. The survey will be done in consultation with Division biologists and the completed report will be added to the Mining and Reclamation Plan as an appendix.

If it is determined that mining-related subsidence has adversely impacted the hydrologic resources of Bear Canyon, including and state-appropriated water rights, WEST RIDGE will mitigate the damage. The first option would be to seal any cracks with the application of bentonite clay. Bentonite sealing compounds are

available commercially made specifically for such applications. If bentonite sealing proved ineffective, WEST RIDGE would propose the installation of piping to transport stream water across the fracture zone to continue the flow downstream. Any work done in the stream channel would most likely require the issuance of a channel alteration permit from the Utah Division of Water Rights.

Adverse impacts to the hydrologic balance resulting from the installation and operation of the Bear Canyon gob vent holes (GVH) are not anticipated. The basis for this conclusion is summarized below.

The gob vent holes will be constructed in a manner that minimizes the potential for adverse impacts to groundwater and surface-water resources and the hydrologic balance in the area. The proposed construction designs for the GVH holes include a nominal 20 foot length of 16-inch non-perforated steel surface casing that will be cemented in place. The surface casings will isolate the wells from surface-water, soil moisture, and any shallow groundwater potentially present in the upper 20 feet and will prevent shallow water from entering the GVH wells. From approximately 20 to 200 feet below the surface, the proposed well construction plans call for the placement of 9.625-inch non-perforated steel casing that will be cemented into place. The cemented steel well casing will isolate groundwaters that may be present in bedrock groundwater systems in the upper 200 feet from the GVH wells and prevent the inflow of groundwater into the wells.

Proposed construction plans call for the lower approximately 150 feet of the GVH wells to be cased with 8.75-inch slotted steel casing that will be left open to the rock strata and will not be cemented. The purpose of the slotted steel casing is to allow the drainage of gob gasses into the well bore in the fractured rock strata overlying the Panel 8 gob. While there is the potential for drainage of some Blackhawk Formation groundwater into the GVH holes in the 150 feet interval overlying the longwall gob, the potential for appreciable or sustained groundwater drainage through these wells is minimal. This is because 1) groundwater systems in the Blackhawk Formation occur in hydraulically isolated groundwater partitions that are not in hydraulic communication with adjacent groundwater partitions, which limits the amount of groundwater that could potentially be drained, 2) the GVH holes are situated near the up-dip ends (outcrop locations) of the Castlegate Sandstone and Blackhawk Formation which limits groundwater recharge potential and the potential for the interception of regional groundwater systems, and 3) the 150-foot interval of the Blackhawk Formation overlying the gob area was likely intensely fractured as a result of the longwall mining prior to the construction of the wells which would likely have drained the groundwater partitions immediately overlying the gob area at the time of mining. For these reasons, the potential for drainage of appreciable groundwater or surface-water resources through the GVH drill holes is considered

low.

The potential for detrimental impacts to the ephemeral Bear Canyon Creek drainage or any associated alluvial groundwater systems is considered remote. Appreciable baseflow alluvial groundwater systems were not identified near the GVH location during the 7 October 2008 site visit. Additionally, because the GVH well bores will be hydraulically isolated from the upper approximately 200 feet, the potential for impacts to water quality in the drainage are unlikely. The implementation of appropriate sediment control management practices will minimize the potential for increased sediment yield from the GVH site during the construction and operational phases of the GVH system.

Prior to final reclamation, the GVH drillholes will be plugged and sealed in accordance with State and Federal regulations. The casings will be plugged at the bottom to hold the concrete. A lean concrete mixture will be poured into the casing until the concrete is within five feet of the surface. At that time the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed. In this manner, the potential for any long-term impacts to the hydrologic balance resulting from the GVH system will be minimized.

Spring Canyon is located in the northern part of the permit area in SITLA lease 44771. There are no state-appropriated water rights on this lease. (Refer to Appendix 7-5 for additional details.) The surface is privately owned by Penta Creek with whom WEST RIDGE maintains coal mining rights. Longwall mining in this area is not scheduled until the year 2014. In this area the coal seam is 2500' deep under the bottom of the Canyon. Spring Canyon, as the name would imply, contains several springs. The drainage area of Spring Canyon is well in excess of one square mile. The canyon supports a number of beaver dams indicative of perennial flow. WEST RIDGE will add three additional monitoring points to collect baseline water monitoring data in Spring Canyon, namely ST-15 located upstream from the junction of Grassy Trail Creek, SP-101 located on a channel-bottom spring a short ways up Little Spring Canyon (a fork of Spring Canyon), and SP-102 located about 1000' upstream from the junction of Little Spring Canyon. This spring emanates from the west side of the canyon approximately 200' up from the canyon bottom. Refer to Map 7-7 and Table 7-1 for details. For the first two years (starting with the third quarter of 2005) these sites will be monitored on a quarterly basis for baseline data according to the field measurements and laboratory measurements outlined in Table 7-2 (Surface Monitoring) and Table 7-3 (Groundwater Monitoring). Thereafter, all sites will be monitored for flow and field parameters on a quarterly basis.

The Grassy Trail Dam and Reservoir is located immediately outside the eastern

boundary of the permit area. This dam/reservoir is owned and operated by the cities of East Carbon and Sunnyside, has a storage capacity of 916 acre-feet, and provides most of the culinary water supply to these municipalities. The dam lies approximately 1664' vertically and 995' horizontally away from the nearest point of projected underground mining (longwall panel #7). This equates to 31 degrees, which is greater than the normal angle of draw associated with longwall subsidence. WEST RIDGE Resources has hired R,B&G Engineering to prepare a detailed evaluation report of the potential effects of longwall mining on the dam and reservoir. This evaluation report was reviewed by the Division of Dam Safety, DOGM, Bureau of Land Management, and the cities of East Carbon and Sunnyside. The report analyzed the potential impacts from both subsidence and seismicity associated with full extraction mining, with specific emphasis on panel #7, the longwall panel projected for mining nearest to the dam. The report concluded that the risk to the dam and reservoir is minimal, and that event the maximum probable seismic event or subsidence scenario would be well within the safety factor of the dam. In addition, there are no known faults that intercept the dam that could be encountered in the mining of Panel #7. The Division of Dam Safety, the BLM, and the cities of East Carbon and Sunnyside have all accepted the conclusions of the report. This report (Grassy Trail Dam and Reservoir Seismicity Report) is included in Appendix 5-11. This report also includes as an appendix an independent report prepared by Agapito Associates (Estimated Impacts to the Grassy Trail Reservoir due to Longwall Mining) which addresses the potential effects on the dam/reservoir due to longwall induced subsidence. A companion report (Grassy Trail Dam & Reservoir Phase II Dam Safety Study) is included as Appendix 5-12. WEST RIDGE has committed to an intensive program of monitoring of the dam and reservoir during the mining of Panel #7. This monitoring plan is outlined in section 301-114.100 of this Mining & Reclamation Plan and is included indetail in Appendix 5-13.

728.320 Presence of acid-forming or toxic-forming materials

Acid-forming materials in western coal mines generally consist of sulfide minerals, namely pyrite and marcasite, which, when exposed to air and water, are oxidized causing the production of H^+ ions (acid). Oxidation of pyrite will occur in the mine; however, acidic waters will not be observed in the mine. The acid is quickly consumed by dissolution of abundant, naturally occurring carbonate minerals. Iron is readily precipitated, as iron-hydroxide, and excess iron will be not observed in mine discharge water.

No other acid-forming materials or any toxic-forming materials have been identified or are suspected to exist in materials to be disturbed by mining.

728.331 Sediment yield from the disturbed area

Undisturbed drainage from C Canyon upstream from the mine yard facility area will, for the most part, be culverted underneath the mine site by means of a 4' diameter corrugated metal pipe in the right fork and a 3' diameter culvert in the left fork drainage. This culvert has been sized to meet or exceed the design storm for this drainage area. Runoff from the mine site disturbed area and whatever natural runoff which flows onto the disturbed area will be channeled to the mine site sediment pond. The drainage control system for the mine site is shown on Map 7-2.

The culvert and ditch system is designed to handle drainage from a 10 year, 24 hour event. Any storm event that exceeds this amount will flow through the mine yard drainage structures to the sediment pond. If a storm should exceed the design event and the magnitude of the runoff exceeds the pond capacity, the over flow will be channeled through the pond cells and out the emergency spillway to the natural drainage channel below the sediment pond. This overflow will have a lower suspended solid content than the inflow to the pond or any drainage which may be flowing down the natural drainage channel. The sediment pond will detain the inflowing water and allow suspended solids to settle out in the pond cells prior to discharge. Given the ephemeral nature of the drainages and the fact that the sediment pond is designed for the complete retention of the 10 year, 24 hour storm event, it is unlikely that discharge from the sediment pond will occur very often if ever. Since the sediment pond is designed to completely contain the 10 year, 24 hour event, only a limited amount of outflow, that in excess of the design event, would be discharged. Excess water contained in the sediment pond following runoff events would be allowed to settle and evaporate, or be decanted in a controlled manner through the primary discharge pipe to reduce the potential for erosion downstream.

Using the Universal Soil Loss Equation (USLE), an estimate of the annual sediment yield from the mine site disturbed area (in the pre-mining condition) is 0.3082 acre-feet per year. In the operational phase, this same area (the mine yard disturbed area) would then yield 0.3090 acre-feet per year. During the postmining phase, the estimated annual sediment yield is projected to be 0.2679 acre-feet per year. Even though the sediment yield from this area will be greater during the operational phase, the sediment pond has been designed to handle the sediment yield from the disturbed area and retain it in the pond. This will effectively reduce the sediment yield from the disturbed area to an insignificant amount during the operational phase of the mine.

The sediment pond will be constructed as soon as practical at the mine site during construction. When reclamation of the mine yard is initiated following the operational phase, the sediment pond will be removed during removal of the bypass

culvert and restoration of the natural channel through the site. Silt fences will be installed adjacent to the reclaimed channel to collect and contain sediment from the regraded site. The silt fences will be constructed approximately along contour with overlapping ends to prevent drainage from going around the ends. Refer to Map 5-9. Because the surface of the regraded area will be gouged with a backhoe bucket to create large depressions, the depressions of the regraded area will also act as a sediment trap. It is anticipated that sediment yield from the reclaimed area will be similar to other adjacent undisturbed areas.

During reclamation, if it is determined that topsoil resources are needed from the topsoil borrow site to achieve reclamation of the mine site, silt fencing would be placed around the outer limits of the borrow area to be disturbed. Topsoil would be stripped and stockpiled. The required amount of topsoil would then be removed from the borrow site. Care would be taken to contour the borrow pit such that runoff infiltration would be maximized to the fullest extent within the disturbed area. This would include gouging the regraded surface with pits approximately 24" wide, 36" long and 18" deep as well as sloping the regraded slopes inward to encourage precipitation infiltration on-site.

728.332 Impacts to important water quality parameters

WEST RIDGE Resources, Inc. anticipates that at some time it may be necessary to discharge water from its proposed mine into the C Canyon drainage. The distance from the proposed discharge point in the ephemeral C Canyon to the confluence with the first perennial stream, Grassy Trail Creek near Sunnyside Junction, is approximately 10 miles. Because of the general aridity of the region, and the permeable nature of the alluvial sediments over which the discharge water will flow, it is unlikely that the above-ground flow of discharge water will persist to the confluence with Grassy Trail Creek. When mine water is discharged into an ephemeral drainage from Andalex's Tower Mine (located in the Book Cliffs 15 miles north of West Ridge), water flows in the drainage for less than one mile before the flow is entirely lost to infiltration or evapotranspiration. Likewise, Icelander Creek, which flows over alluvial sediments at the base of the Book Cliffs Escarpment just south of East Carbon, flows for only about 4 miles before being totally lost to infiltration. Therefore, there will most likely be no impacts to important water quality parameters in Grassy Trail Creek from proposed mining operations because mine discharge water will likely not reach the creek. However, if mine discharge water were to persist in the stream channel to the confluence with Grassy Trail Creek, the volume of discharge water entering the creek will be only a fraction of that which discharged from the mine.

Discharge water from the Sunnyside Mines located southeast of West Ridge had TDS

concentrations of about 1,600 mg/l, with the dominant ions being sodium, sulfate, and bicarbonate (Sunnyside Coal Company, 1993). The chemical composition of this water is similar to that of waters that have been in contact with the Mancos Shale. The TDS concentration of discharge water from WEST RIDGE Resources, Inc.'s proposed new mine will likely be similar to discharge from the Sunnyside Mines.

The TDS concentration of water in Grassy Trail Creek at the mouth of Whitmore Canyon, (USGS station 0931430) near the upper contact with the Mancos Shale, averaged 988 mg/l between 1979 and 1984, with the dominant ions being sodium, sulfate, and bicarbonate (Waddell, 1981). The water quality of Grassy Trail Creek after flowing over 11 miles of Mancos Shale sediments to the confluence with the C Canyon drainage near Sunnyside Junction is significantly degraded.

Due to the low anticipated volume of mine discharge water which will flow into Grassy Trail Creek, and the similarity of the chemistry of the mine discharge water to the water in the creek, the water quality in Grassy Trail Creek will likely not be significantly impacted by mine discharge water.

Because of the poor quality of the water naturally flowing in Grassy Trail Creek near Sunnyside Junction and the relatively small quantities of mine discharge water (if any) which will flow into the creek, important water quality parameters in Grassy Trail Creek, such as sodium, sulfate, and bicarbonate will not be significantly increased.

Most of the water from any potential discharge from WEST RIDGE Resources, Inc.'s proposed new mine will infiltrate into the alluvial sediments in Clark Valley near the Book Cliffs escarpment. This will result in a rise in the local water table, or the creation of a perched water table above impermeable layers. Shale layers in the Mancos Shale will prohibit significant downward migration of these waters. The raising of the local water table may result in increased vegetation in the area. The increase in vegetation and the presence of surface water in the drainage would be a positive impact on wildlife and the local ecosystem. There are no known water rights or surface facilities adjacent to the stream drainage that could be impacted by the rising water table. Because the water quality of groundwaters in the Mancos Shale is naturally poor (with TDS significantly greater than 1,600 mg/l), the addition of mine discharge water to this system will not have any detrimental effects on water quality.

The Sunnyside mines discharged water from the mine workings for many years. This water was put to beneficial use for agricultural purposes such as growing alfalfa crops and also for irrigating the municipal golf course, from the time it was built in 1967 up to the closure of the mine in 1993. The city park also used the mine water for irrigation

since the mid-1940's. Sunnyside Coal Company had an approved UPDES permit with a TDS concentration limit of 1,650 mg/l for the mine water discharge. Excess water was discharged into Grassy Trail Creek where it was also utilized by cattle and wildlife.

The chemical quality of groundwater discharging from springs above the proposed coal mine will not be adversely affected by underground mining operations. The chemical quality of surface water flowing in upper Grassy Trail Creek will likewise not be adversely affected by underground mining operations. It has been demonstrated (Mayo and Associates, 1997; Appendix 7-1, 2001; Appendix 7-1A) that deep groundwaters adjacent to the coal seams throughout the Book Cliffs and Wasatch Plateau coal fields are hydraulically isolated from shallow overlying groundwater systems which support springs and provide baseflow to streams at the surface. There is no mechanism by which important water quality parameters in shallow groundwater systems above WEST RIDGE Resources, Inc.'s proposed coal mine may be adversely impacted by mining operations.

There are no known springs of significance in the lease and adjacent area which discharge from locations that are stratigraphically or topographically below the coal seam to be mined. The thick Mancos Shale will prevent the migration of any mine discharge water downward to formations underlying the Mancos Shale. No seeps or spring exist within or adjacent to the proposed topsoil borrow area to the west of C Canyon.

728.333 Flooding or streamflow alteration

WEST RIDGE Resources, Inc. anticipates that at some time it may be necessary to discharge water from its proposed mine into the C Canyon drainage. The discharge point will be about 1 mile above the confluence with B Canyon. Both C and B Canyons are ephemeral drainages that rarely have flow. The stream channel in this drainage is large enough to contain torrential thunderstorm events that commonly exceed several cfs in this region. The anticipated discharge rate from the mine is unknown at this time. However, historic discharges from nearby mines in the Book Cliffs coal field (Soldier Canyon and Sunnyside) average about 300 to 400 gpm. It is possible that over the life of the mine the discharge rate from WEST RIDGE Resources, Inc.'s proposed mine could be in this same range. However, it must be noted that as new mine workings are developed in "wet" areas, the discharge rate may temporarily exceed this amount. The discharge rates from these mines have been quite variable over time due to the nature of the groundwater systems encountered in the mines. Groundwater encountered in coal mines in the Book Cliffs and Wasatch Plateau coal fields is contained mostly in sandstone channels and in fractures and faults. It is not unusual for large portions of the

mines to be mostly dry. For these reasons, the mine discharge rate is more a function of the amount of new mine area recently opened than the total size of the mine. At the Soldier Canyon Mine, mining proceeded for several years before any significant water sources were encountered and thus, no discharge occurred. Similar experiences are reported at Andalex's Tower Mine. Thus, although short-term increases in mine discharge rates will likely occur, the long-term average will probably be in the range of 300 to 400 gpm if water is encountered.

A discharge of 300 to 400 gpm will not cause flooding or significant alteration of the streambed in the C Canyon drainage. The channel geometry in C Canyon is primarily the result of erosion which occurs during torrential thunderstorm events where the flow in the drainage is several times that anticipated from WEST RIDGE Resources, Inc.'s proposed mine. The mine discharge will easily be contained within the inner stream channel, which should be stable. Additionally, if a constant, relatively small discharge is achieved in C Canyon as a result of mine discharge, the net effect will be a positive one. Vegetation densities along the stream bank will increase causing increased bank stability and decreased erosion. Wildlife habitat will also be improved with the available water and the vegetation growing on the stream bank.

No streams exist in or adjacent to the proposed topsoil borrow area west of C Canyon in section 16, T. 14 S., R. 13 E.

728.334 Groundwater and surface water availability

Mining in the permit area will not significantly affect the availability of groundwater. Groundwaters in the Blackhawk Formation exist in highly compartmentalized partitions, both vertically and horizontally, and the formation does not act as a hydraulically continuous aquifer. Groundwater systems in the Blackhawk Formation are hydraulically isolated from overlying, modern groundwaters. The effects of locally dewatering the Blackhawk Formation adjacent to mine openings will not have any significant impact on groundwater availability in the region surrounding the mine.

There are no groundwater supply wells in the mine lease area or adjacent to it. The removal of water from horizons immediately above and below the mined horizon will not impact any water supplies. Rather, underground mining makes water available from the Blackhawk Formation that was previously inaccessible.

728.400

The hydrology and geology of the area around Grassy Trail reservoir is discussed in a seismic analysis report (see Appendix 5-11) and the Phase II dam safety report (see Appendix 512). These reports conclude that it is unlikely that mining induced

seismicity or subsidence will impact the performance of the Grassy Trail Dam and Reservoir. Based on the conclusion of this study the BLM has approved the R2P2 to allow full extraction longwall mining of Panel #7.

R645-301-729 CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

The Division will provide an assessment of the probable cumulative hydrologic impacts of the proposed coal mining and reclamation operation and all anticipated coal mining and reclamation operations upon surface and groundwater systems in the cumulative impact area.

R645-301-730 OPERATION PLAN

R645-301-731 GENERAL REQUIREMENTS

A plan has been included to minimize disturbance to the hydrologic balance, to prevent material damage, and to support postmining land use.

731.100 Hydrologic Balance Protection

Groundwater Protection

Although testing has shown that no significant impacts from acid or toxic producing materials should occur, groundwater quality will be protected by handling runoff in a manner which minimizes the infiltration into the groundwater system. Examples of techniques that may be utilized to accomplish this would include routing disturbed area drainage to the sediment pond through properly sized ditches and culverts and diverting undisturbed drainage through a bypass pipe past the disturbed area.

Within the disturbed area, drainage will be directed to ditches by sloping the yard areas. The ditches will be appropriately sized to handle flow from the 10 year/24 hour event. Culverts within the drainage system have also been sized to meet or exceed the 10 year, 24 hour design criteria.

Surface Water Protection

Coal mining and reclamation activities will be conducted according to the following plan.

The sediment pond will be installed as soon as possible during construction of the surface facility area. The pond will be appropriately sized to handle the design storm event (10 year, 24 hour) for the mine site.

Protection of surface water will incorporate measures cited under Groundwater Protection. All surface runoff from the mine site disturbed area will be diverted to the sediment pond for treatment. The sediment pond has been designed to provide total containment for the 10 year/24 hour storm plus three years of sediment accumulation. Based on sampling of the soils in the area and the fact that waste rock material will not be stored on the surface, it is unlikely that the sediment pond will impound acid- or toxic-drainage.

It is anticipated, based on the climate of the area, that the sediment pond will remain dry most of the time. (This has been demonstrated to be true for existing coal mining operations in central Utah.) Water in the pond should evaporate rapidly following precipitation events. Infiltration into ground water zones is not expected because of the interbedded nature of the strata below the pond. Thick sequences of shale in the bedrock below the pond will greatly limit the vertical movement of water. Also, the alkaline nature of other sediment flowing to the sediment pond would serve to neutralize any low pH materials when mingled together.

To minimize disturbance to the undisturbed drainage, large diameter bypass culverts will be installed beneath the mine yard facility to allow runoff upstream above the mine site to continue downstream without coming in contact with and becoming contaminated by the mine yard area.

The bypass culvert system will be the first structure to be installed during construction of the mine site facility. Undisturbed area drainage will be bypassed under the disturbed area to minimize the amount of drainage that must be treated by the sediment pond. The bypass culverts will allow natural drainage to continue down the drainage course unaffected by the mining operation. A 36" diameter culvert will be installed in the left fork and a 48" diameter culvert will be installed in the right fork. A 48" culvert will be installed in the main canyon below the confluence of the forks. The size of the culverts will adequately pass the 100 year, 6 hour flow event even though a smaller culvert would meet the requirements of the regulations.

At the topsoil pile locations, undisturbed drainage will be diverted around the stockpiles with ditches at the edge of the pile toward the undisturbed drainage channel. The ditches will divert water away from the stockpile to minimize erosion. The ditches have been sized to convey flow from the 10 year, 24 hour event. The ditches will slope 1% toward the natural drainage. A typical ditch design is presented in Appendix 7-4 "West Ridge Mine Sedimentation and Drainage Control Plan". The stockpiled topsoil

material will be loosely piled and have an irregular, pitted surface or contour furrows to help retain runoff from precipitation events and to reduce erosion until vegetation becomes reestablished. A diversion ditch will be constructed at the edge of the stockpile to divert undisturbed drainage away from the stockpile. Silt fencing will be placed around the perimeter of the stockpile to treat any runoff from the pile.

The topsoil stockpile and test plots will be designated as Alternate Sediment Control Areas (ASCAs).

Refer to Appendix 5-5 for a complete discussion on the construction of the topsoil stockpiles. Refer to Appendix 7-4 for details of the drainage control designs. Map 2-4 depicts the drainage controls of the topsoil stockpile areas.

731.200 Water Monitoring

This section describes the hydrologic monitoring plan. Locations of surface-water and groundwater monitoring sites are indicated on Map 7-6. Hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-1 through 7-6. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in Table 7-2, and for groundwater in Table 7-3. The hydrologic monitoring parameters have been selected in consultation with the DOGM's directive Tech-004, *Water Monitoring Programs for Coal Mines.*

Operational field and laboratory parameters will be measured for the first two years of mine operation; after this time, if sampling has adequately characterized the hydrology in the area, a request will be made to reduce monitoring to field parameters and one operational analytical sample collected during low flow (August or September). The physical parameters and chemical composition of springs and streams in and around the permit area should be adequately characterized following the collection of three years of baseline laboratory data (in progress) and two years of operational laboratory data. (The first year of field data was collected in 1985-1986. Two additional years of monitoring are being conducted in 1997 and 1998). Thereafter, continued monitoring for laboratory parameters would probably not enhance the scientific understanding of hydrologic systems in the mine permit area. However, in order to identify mining-related impacts to the discharge and chemical characteristics of streams and springs in the permit and adjacent area, monitoring of field parameters will continue during mine operation. If field parameters (pH, specific conductance, and temperature) at any sampling site deviate significantly from historical values, monitoring of operational laboratory water quality will resume at that site. Water monitoring reports will be submitted on a quarterly basis to UDOGM. Should any ground water or surface water samples indicate noncompliance with the permit

conditions, the operator will promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and will provide the results of the sampling to the Division.

WEST RIDGE Resources, Inc. believes that discontinuance of laboratory parameters after two years of operation will be approvable for two reasons. First, there are no mechanisms whereby the chemical composition of springs and streams that are above the mine workings can be adversely impacted by mining activities. Second, this type of groundwater monitoring program has been approved for the Alkali Creek and Dugout Canyon tracts at the Soldier Creek Mine, 10 miles north of the West Ridge area.

Each of the sampling locations and their hydrologic significance are described below. However, in order to comply with UDOGM directive Tech-004, baseline samples will be collected from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring site during low flow every five years beginning with the first mid-term review. The five year baseline samples will be repeated every five years until reclamation is complete.

Baseline monitoring will be performed on the specified monitoring sites until construction of the mine and mine facilities begins. Once construction is initiated, the operational monitoring schedule will be utilized. Monitoring will continue through reclamation until bond release unless otherwise modified.

Streams

Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. Four sites on Grassy Trail Creek will be monitored.

Stream site ST-3 is located below the confluence with Hanging Rock Canyon and is upstream of the permit area. Stream site ST-8 is located just above the confluence with Water Canyon, downstream of the permit area. Two additional monitoring sites will be established on upper Grassy Trail Creek. One site (ST-10) will be located immediately above the northern permit boundary. The other (ST-9) will be located on upper Grassy Trail Creek at the inlet to Grassy Trail Reservoir. These two monitoring sites are intended to monitor for potential impacts from the undermining of upper Grassy Trail Creek.

On the west side of West Ridge, five stations will be monitored on ephemeral drainages contributing to lower Grassy Trail Creek. They are ST-4 (lower Bear Creek), ST-5 (below confluence of B and C Canyons), ST-6A and ST-6 (above and below the mine site, respectively, in C Canyon) and ST-7 (below A Canyon). ST-4 will be visual observation of the channel for flowing water. ST-5 will have a crest gauge and automatic sampler while ST-6A, ST-6 and ST-7 will consist of a crest gauge and bottle samplers. The samplers will be checked after precipitation events.
Stream monitoring stations, used for baseline collection and proposed for operational monitoring beginning in 1999, are equipped as follows:

ST-4 No monitoring equipment is located at this site. The purpose of this station was to conduct baseline observations for two years to determine whether this portion of Bear Creek acted as an ephemeral or intermittent stream channel. Based on monthly monitoring during 1997 and 1998, it has been determined that intermittent flow does not occur in the lower section of Bear Creek and the channel responds only as an ephemeral drainage following substantial rainfall events.

ST-5 This location contains the ISCO automatic sampler and a crest gage. The crest gage is a steel pipe concreted into the channel bottom. The pipe has a hole near the bottom so that water can rise in the pipe and record the maximum flow height on a stick inside of the pipe. This station monitors drainage from both the B and C Canyon drainages. However, based on field observations, virtually all of the flow comes from the B Canyon drainage, primarily the lower side drainages and adjacent Mancos slopes. Both the B and C Canyon drainages respond as ephemeral drainages. No drainage has been recorded in C Canyon.

ST-6 and ST-6A

These two stations are located below and above the proposed mine site in C Canyon, respectively. A crest gage (as described above) and bottle samplers are cemented in the channel at each location. The bottles consist of one liter plastic bottles which are strapped to the pipe at specific heights. The bottle cap has two copper tubes which would allow a sample to fill the bottle when the flow height reaches the inlet level. The crest gages have not recorded any flow in the channel in 1997 or 1998 even though the rain gage in C Canyon has recorded 1-2" precipitation events.

ST-7 A crest gage and sampler bottles are located in the A Canyon drainage. It measures the maximum height of the flow down the A Canyon drainage as well as collecting a sample should the flow height reach the bottle inlet.

Sites ST-5, ST-6, ST-6A, and ST-7 all have crest gauges installed. Calculated flows, based on the crest gauge measurement and the channel configuration will be included in the surface water monitoring data.

If it becomes necessary to discharge water from the proposed mine, this water will discharge into the ephemeral C Canyon drainage. Discharge water will be subject to monthly monitoring stipulated by a UPDES permit. Because the monitoring required under the UPDES permit is more stringent and more frequent than that proposed in this permit application, discharge samples will be collected from the UPDES discharge monitoring point rather than at the drainage monitoring station.

Springs

Eight springs in the permit and adjacent areas will be monitored. Four of these springs (SP-12, SP-13, SP-15, and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs, WR-1 and WR-2, discharge from the upper slope of West Ridge in Whitmore Canyon. Refer to Map 7-6. One spring (SP-8) discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon.

Most of the monitoring stations in this monitoring program are located on the east slope of West Ridge. This is because, with the exception of SP-8, there are no springs that are suitable for monitoring on the west side of West Ridge. SP-8 will be monitored according to the operational schedule beginning in 1999.

Wells

Only one groundwater monitoring well (DH86-2) exists in the permit area. This well monitors the Sunnyside Sandstone Member of the Blackhawk Formation, which is below the coal seam that will be mined. In addition to field parameters and operational water quality parameters, water level will be measured in this well.

Table 7-1 Hydrologic monitoring protocols and locations

MONITORING PROTOCOLS

Discharge and water level measurements

Protocol	Applies to	Parameter	Frequency
A	Streams	discharge	quarterly
B	Springs	discharge	quarterly
C	Monitoring wells	water level	quarterly

Water quality

Protocol	Applies to	Parameters	Table	Frequency
1	Streams	operational field and laboratory for two years, then field only with DOGM concurrence	7-2	*quarterly
2	Springs	operational field and laboratory for two years, then field only with DOGM concurrence	7-3	quarterly
3	Monitoring wells	operational field and laboratory for two years, then field only with DOGM concurrence	7-3	quarterly

*samplers will be checked following precipitation events

MONITORING LOCATIONS

Site	Protocols	Comments
Streams		
ST-3	A,1	Grassy Trail Creek upstream of permit area
ST-4	A,1	Bear Creek downstream of permit area (Note 1)
ST-5*	A,1	B and C Canyon downstream of permit area
ST-6A*	A,1	C Canyon upstream of mine site area
ST-6*	A,1	C Canyon downstream of mine site area
ST-7*	A,1	A Canyon downstream of permit area
ST-8	A,1	Grassy Trail Creek downstream of permit area
ST-9	A,1	Grassy Trail Creek at Grassy Trail Reservoir inlet
ST-10	A,1	Grassy Trail Creek above permit area
ST-11	A,1	Bear Canyon Shallow Point (Note 2)
ST-12	A,1	Bear Canyon Falls (Note 3)
ST-13	A,1	Bear Canyon Below Forks
ST-15	A,1	Spring Canyon Stream (Note 4)
Springs		
SP-12	B,2	Colton Fm. upper Whitmore Canyon
SP-13	B,2	Colton Fm. upper Whitmore Canyon
SP-15	B,2	Colton Fm. near Grassy Trail Reservoir
WR-1	B,2	Colton Fm. on West Ridge

WR-2	B,2	Colton Fm. on West Ridge
SP-16	B,2	North Horn Fm. in Whitmore Canyon
SP-8	B,2	North Horn Fm. in C Canyon
SP-101	B,2	Little Spring Bottom (Note 5)
SP-102	B,2	Spring Canyon Hillside (Note 5)
S-80	B,2	Hanging Rock Spring
Wells		
DH86-2	C-3	Sunnyside Sandstone in C Canyon

Note 1: ST-4 was discontinued in the third quarter of 2005 and replaced with ST-13.

Note 2: ST-11 will be monitored monthly from May 15 through September 15 as long as flow is present during the flow season of 2005 and 2006 and quarterly throughout the remainder of the year. Thereafter, monitoring will be done on a quarterly basis.

Note 3: ST-12 will be monitored twice a year (late spring/early summer and late summer/early fall) during 2005 and 2006. Based on the results of this monitoring, the plan will be reassessed to determine if this site should be included in the permanent monitoring plan.

Note 4: ST-15 will be monitored for baseline data for the first two years (starting third quarter 2005) according to the surface water monitoring parameters outlined in Table 7-2.

Note 5: SP-101 and SP-102 will be monitored for baseline data for the first two years (starting third quarter 2005) according to the ground water monitoring parameters outlined in Table 7-3.

Table 7-2 Surface water operational water quality monitoring

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

* For those sites with crest gauges

Table 7-3 Groundwater operational water quality monitoring

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

Table 7-4 UPDES Discharge Point Monitoring

MONITORING POINTS	FREQUENCY
D001	Monthly
D002	Monthly

FIELD MEASUREMENTS	REPORTED AS
Flow	gpd
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Temperature	°C

LABORATORY MEASUREMENTS	MAXIMUM
Oil and grease (if sheen is visible)	10 mg/l
Total Suspended Solids	70 mg/l
Total Iron	1.0 mg/l
Total Dissolved Solids	one ton/day

WEST RIDGE MINE
WATER MONITORING SCHEDULE 2002 - 2003
TABLE 7-5 SURFACE WATER OPERATIONAL MONITORING LIST

STREAMS	MONITORING PARAMETER LIST	MONITORING SCHEDULE
ST-3	Operational List + Field Parameters including dissolved oxygen	Quarterly
ST-4	no sample collected	channel will be checked following precipitation events
ST-5	Operational List + pH	samplers will be checked following precipitation events
ST-6	Operational List + pH	samplers will be checked following precipitation events
ST-6A	Operational List + pH	samplers will be checked following precipitation events
ST-7	Operational List + pH	samplers will be checked following precipitation events
ST-8	Operational List + Field Parameters including dissolved oxygen	Quarterly
ST-9	Operational List + Field Parameters including dissolved oxygen	Quarterly
ST-10	Operational List + Field Parameters including dissolved oxygen	Quarterly

Operational List includes: Total Dissolved Solids, Total Suspended Solids, Total Hardness, Bicarbonate, Carbonate, Calcium, Chloride, Iron*, Magnesium, Manganese*, Potassium, Sodium, Total Alkalinity, Sulfate, Oil and Grease (if surface sheen is present), Cations, Anions, Cation/Anion Balance

(* analyzed for total and dissolved)

Field parameters include: flow rate, water temperature, pH and conductivity.

WEST RIDGE MINE
WATER MONITORING SCHEDULE 2002 - 2003
TABLE 7-6 GROUNDWATER OPERATIONAL MONITORING LIST

SPRINGS	MONITORING PARAMETER LIST	MONITORING SCHEDULE
SP-8	Operational List + Field Parameters	Quarterly
SP-12	Operational List + Field Parameters	Quarterly
SP-13	Operational List + Field Parameters	Quarterly
SP-15	Operational List + Field Parameters	Quarterly
SP-16	Operational List + Field Parameters	Quarterly
WR-1	Operational List + Field Parameters	Quarterly
WR-2	Operational List + Field Parameters	Quarterly
S-80	Operational List + Field Parameters	Quarterly
DH 86-2	Operational List + Field Parameters	Quarterly

Operational List includes: Total Dissolved Solids, Total Hardness, Bicarbonate, Carbonate, Calcium, Chloride, Iron*, Magnesium, Manganese*, Potassium, Sodium, Sulfate, Total Alkalinity, Cations, Anions, Cation/Anion Balance
(* analyzed for total and dissolved)

Field parameters include: flow rate, water temperature, pH and conductivity.

731.300 Based on testing of roof and floor materials, formation of acid- or toxic-materials does not appear to be a concern. Roof and floor materials will be permanently stored underground and will not brought to the surface for disposal.

Samples of the roof, floor and coal from an outcrop of the Lower Sunnyside coal seam in the left fork of C Canyon were collected for analyses. The samples were sent to Inter-Mountain Laboratories, Inc. in Sheridan, Wyoming and analyzed according to Table 6 in DOGM's "Guidelines for Management of Topsoil and Overburden For Underground and Surface Coal Mining". The Table 6 parameters were run on the samples to look for toxic or acid-forming materials. Refer to Appendix 6-1 for the laboratory analyses. The Table 6 sampling regime was intended for soil materials which are going to be used a plant growth medium during final reclamation. It is not likely that any significant amount of the roof, floor or coal material would be incorporated in the regraded fill material at the time of final reclamation because there will not be any coal processing or coal preparation at the minesite. Also, prior to reclamation of the minesite, all coal will be removed from the minesite and sold.

Chemicals and petroleum products to be used at the mine will be stored in a controlled manner. The following products may be used by mining operations: diesel fuel, gasoline, grease, motor oil, water based hydraulic fluid, antifreeze, brake fluid, gear lubricating oil, rock dust, magnesium chloride, spray paint and stopping sealant. Chemicals and petroleum products to be used at the mine will be stored in a controlled manner. Petroleum products such as diesel fuel, transmission oil and grease will be stored in the mine yard in a contained, concrete structure. Other miscellaneous products would be stored in the mine warehouse.

Emulsion fluid spills will be minimized through the following:

-Emulsion fluid will not be mixed on the surface. The emulsion concentrate is delivered to the minesite in factory sealed 500 gallon containers. These containers area specifically designed to be easily handled by standard equipment at the mine site and transferred to mobile equipment for transport underground near the longwall equipment.

-Most longwall installations now utilize a bio-degrade able emulsion fluid in accordance with the manufacturer's recommendations. The emulsion mixture is very dilute, typically 2 parts emulsion fluid to 98 parts water.

-Any accidental longwall fluid spills on the surface would be cleaned up like any other spill in accordance with the site specific Spill Prevention Control and Countermeasure Plan. The sediment pond cells would provide an effective line of defense against any offsite contamination.

-Any emulsion fluid spill underground would go to an underground sump where water is typically stored and reused underground. Any water discharged from the mine would be tested and analyzed in accordance with the approve UPDES permit.

-The C Canyon drainage is ephemeral and supports no aquatic life. The closest flowing stream is Grassy Trail Creek which is over 11 miles to the southwest.

731.400 All water wells utilized during the operating phase will be abandoned in accordance with the rules outlined in "Administrative Rules For Water Well Drillers, State of Utah, Division of Water Rights, 1987". Closure of the wells will be conducted by a licensed well driller.

Final abandonment of the proposed water monitoring well DH 86-2 (at the mine site) will be conducted prior to completion of final reclamation. The abandoned well will be filled to within two feet of the surface with Neat Cement conforming to ASTM standard C150, a cement grout consisting of equal parts of cement conforming to ASTM standard C150 and sand/aggregate with no more than 6 gallons of water per sack of cement or bentonite-based products specifically designed for permanent well abandonment.

The cement will be introduced at the bottom of the well and placed progressively upward to within two feet of the surface. The casing will be severed a minimum of two feet below the ground surface. A minimum of two feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the state engineer by the responsible licensed driller giving data related to the abandonment of the well. The report shall be made on forms furnished by the state engineer and shall contain the information required, including but not limited to:

1) Name of licensed driller or other person(s) performing abandonment procedures,

2) Name of well owner at time of abandonment,

3) Address or location of well by section, township and range,

4) Abandonment materials, equipment and procedures used,

5) Water right or file number covering the well,

6) Final disposition of the well,

7) Date of completion.

731.500 Discharges

731.510 The West Ridge Mine will be operating in the Lower Sunnyside seam which is the same seam mined by Kaiser Sunnyside mine immediately to the southeast of the West Ridge reserves. WEST RIDGE intends to mine around old Sunnyside mine workings. There is a possibility that the old Sunnyside works may contain water, especially in the northeasterly areas which are the furthest down dip. WEST RIDGE Resources has acquired all of the most current certified mine maps of the Sunnyside old works. The Kaiser mining operation was a large operation with a sophisticated engineering, surveying and drafting department. WEST RIDGE Resources is confident that these maps were accurately surveyed and updated and accurately portray the extent of the old works. Nonetheless, extreme caution will be exercised as mine development is being driven out toward the old works. WEST RIDGE Resources will employ professional licensed, certified land surveyors to monitor the progress of the underground mine development. All surveying in the West Ridge mine will be tied to the same surveying coordinates and control as was used for the Sunnyside mine. When the West Ridge works are within 500 feet of the projected Sunnyside works exploratory drilling will begin ahead of the development. Face drills will be used to drill at least 100 feet out in advance of the actual mine face development. The exploratory face drill will be a small diameter and if water is encountered from the old works the drill hole can easily be plugged and sealed. The West Ridge mine plan assumes that development will proceed to within 300 feet of the old works. West Ridge mine intends to stay away from the old works but will drill ahead as a precautionary measure in the event that the mine maps or surveying has a margin of error.

731.520 Gravity Discharges From Underground Mining Activities

Surface entries and accesses to underground workings will be located and managed to prevent or control gravity discharge from the mine. All workings will dip away (downdip) from the portals. It is anticipated that the mine will be relatively dry but in the event that discharge becomes necessary, the discharge will comply with the performance standards of the regulations and requirements of the UPDES permit before being discharged off the permit area.

Refer to Map 6-2, Coal Seam Structure Map for the Lower Sunnyside seam structure contours.

731.520 Gravity Discharges From Underground Mining Activities

Surface entries and accesses to underground workings will be located and managed to prevent or control gravity discharge from the mine. All workings will dip away (downdip) from the portals. It is anticipated that the mine will be relatively dry but in the event that discharge becomes necessary, the discharge will comply with the performance standards of the regulations and requirements of the UPDES permit before being discharged off the permit area.

Refer to Map 6-2, Coal Seam Structure Map for the Lower Sunnyside seam structure contours.

731.600 Stream Buffer Zones

The natural drainage channels in the main C Canyon and right fork of C Canyon drainage are classified as intermittent by the regulatory definition. (The watershed area is greater than one square mile). The channel operates like a ephemeral drainage channel although no drainage flow in the channel has been recorded during the last two years of monitoring.

A buried culvert will be placed through the proposed disturbed area to convey drainage from precipitation events past the mine site. The undisturbed bypass culvert system will be sized to handle runoff from the 100 year, 6 hour precipitation event. This is well in excess of the 10 year, 6 hour design event required by the regulations for a temporary diversion. The larger culvert is being proposed as an extra measure of safety and protection for the mineyard. Stream buffer zone markers will be placed at the north and south ends of the mine site facility area above the drainage channel to prevent channel disturbance by surface operations.

Mining activities will minimize impact to the undisturbed area by use of diversion ditches and the sediment pond to control and contain sediment and disturbed area runoff within the mineyard facility area.

It was determined by the Division of Water Rights that no stream alteration permit would be required for culverting of the C Canyon drainage. Refer to the August 19, 1998 letter included in Appendix 7-9.

The proposed undisturbed drainage channel diversion is discussed in greater detail under R645-301-742.300 and in Appendix 7-4.

Grassy Trail Creek is an intermittent stream located in the permit area in Whitmore Canyon located northeast of West Ridge. In this area the coal seam to be mined is

2000' below the streambed. Technically speaking, mining will be conducted within the 100' stream buffer zone, but only as measured horizontally. Therefore, no stream buffer zone protection measures on the surface are anticipated. In the "Investigation of Surface Water and Ground Water Systems in the Whitmore LBA Area, Carbon County, Utah" (Appendix 7-1A), Mayo and Associates concludes that "the stream channel in this area is underlain by approximately 2,000 feet of cover, which includes the entire thickness of relatively unfaulted and unfractured North Horn Formation, which is known to form an effective barrier to vertical groundwater migration (Mayo and Associates, 1998) and is known to contain hydrophyllic clays that swell when wetted to seal any fractures that may form. Therefore, the potential for the interception and diminution of surface water flows in Grassy Trail Creek as a result of mining induced subsidence is minimal." Mining related impacts to fish, wildlife and other hydrologic resources is expected to be correspondingly minimal.

731.700 Cross Sections and Maps

There is no flowing surface water within the permit area and no water supply intakes. Surface receiving waters are at least ten miles to the southwest where the ephemeral drainage system reaches Grassy Trail Creek near the Sunnyside Junction (junction of Highway 123 and State Road 6). Refer to Map 1-1 for the location of Grassy Trail Creek. All disturbed area runoff will flow into the sediment pond where it will be contained.

The location of the water monitoring well, the water supply pipeline from East Carbon and the water storage tanks to be used are shown on Map 5-5.

Water monitoring stations and water monitoring well DH 86-2 are shown on Map 7-6. Operational monitoring stations are depicted on Map 7-7 "Operational Monitoring Map". Refer to Table 7-1 for a listing of the operational monitoring locations.

Map 5-5 shows the location of the proposed sediment pond.

Cross sections for the proposed sedimentation pond are presented on Map 7-4A "Sediment Pond Cross-Sections".

731.800 Water Rights and Replacement

No surface coal mining and reclamation activities (strip mining) will occur in the affected permit area.

Mining should not have any impact on the existing water rights in and around the proposed mining area.

R645-301-732 SEDIMENT CONTROL MEASURES

732.100 Siltation structures will be constructed and maintained in accordance with the applicable regulations. Siltation structures will not be removed until authorized by the Division of Oil, Gas and Mining.

Alternative sediment control measures will be used in areas where the surface disturbance is minor and sediment control is expected to be restored fairly rapidly with revegetation. Alternate sediment controls will be used on the topsoil stockpile and test plot areas. At these locations diversion ditches will divert undisturbed area runoff away from the site. Silt fencing will be utilized to minimize siltation from the sites. The surface of the stockpile will be pocked and roughened to retain moisture and minimize runoff from the disturbed surface. The surface area will be revegetated to minimize surface erosion. The alternate sediment control area located in the right fork is 0.46 acres while the stockpile area for the left fork is 1.13 acres.

The other ASCA (alternate sediment control area) will be at the office and parking lot area below the mine yard facility area. This 1.37 acre area will be sloped to one end of the pad area where a sediment retention basin will be used for sediment control. In addition, the slopes and embankment of the office pad will be revegetated to control sedimentation and erosion.

732.200 The sedimentation pond has been designed in compliance with the appropriate regulations. Refer to Maps 7-4 and 7-4A for the sediment pond plan and cross-section details. The sediment pond will be reclaimed during reclamation of the mineyard facilities. Refer to Appendix 5-5 for the complete details of the reclamation plan.

732.300 Diversions will be constructed and maintained with respect to R645-301-742.100 and 742.300.

732.400 Road Drainage

Roads within the disturbed area will be designed and constructed to utilize standard designs for surface drainage control, culvert size and spacing and grade. Refer to Map 5-5, Surface Facility Map.

Drainage ditches and culverts have been designed to handle a 10 year, 24 hour storm event. The larger design capacity will also provide additional capacity above what is required by the regulations, for a greater margin of safety in the mineyard during operations.

Riprap will be placed around the inlet end of the culverts to a height of at least 6"

above the required headwall for each culvert. The outlet of the main canyon bypass culvert will be equipped with adequately sized riprap to slow the outlet velocity and prevent erosion to the natural downstream channel.

Trash racks will be placed on all undisturbed bypass culvert inlets to prevent floating debris and rocks from plugging the culvert. The trash racks will be slanted 3/4 inch steel bars welded on six inch centers across the flared inlet structures of each culvert. The bars will be sloped from the front of the inlet up to the top of the culvert. Use of trash racks on the smaller culverts within the mine yard drainage system will be at the discretion of the operator and based on site specific conditions.

R645-301-733 IMPOUNDMENTS

733.100 General Plans

A sediment impoundment structure (sediment pond) is proposed for treatment of disturbed area runoff from the mineyard facility area. The pond will be located near the southern end of the mine yard (refer to Map 5-5) and has been designed to contain and treat drainage from the 10 year, 24 hour event. The associated conveyance structures, such as culverts and ditches, have been sized to convey drainage from the 10 year, 24 hour event into the sediment pond. Appendix 7-4 provides the detailed designs and calculations used to derive the pond capacity, ditch and culvert sizes.

733.110 The designs and calculations have been certified by a registered, professional engineer experience in the design and construction of sediment ponds.

733.120 Maps 7-4 and 7-4A depict the pond design in plan view and in cross-section. Calculations made in Appendix 7-4 are based on the design dimensions presented in the above-mention maps.

733.130 The sediment pond has been designed to contain runoff from the mineyard disturbed area as well as several contributing undisturbed drainage areas. The runoff and sediment yield have been calculated using a 10 year, 24 hour precipitation event. Because of the narrowness and steep gradient of the canyon at the downstream end of the mine yard facility area, the sediment pond has been designed to have two cells that will contain the total volume of the 10 year, 24 hour design event plus three years of sediment storage (using 0.1 acre-feet of sediment per disturbed acre). Sediment will be captured by both cells (A and B). The total sediment storage capacity of the sediment pond for a three year interval is 1.845 acre feet, however, the sediment will be cleaned out when the storage capacity reaches 60%. Sediment indicator stakes will be placed at various locations in both the upper and lower cells (A and B) so that a visual determination of the 60% level can be made.

The required volume for the sediment pond is calculated at 7.052 acre feet, including 3 years of sediment storage. The actual pond volume at the principal spillway is 7.669 acre-feet. Refer to Appendix 7-4 for the pond design calculations. Refer to Map 7-4 for the individual cell dimensions and features. The upper cell will be approximately 18.5' feet deep from the cell bottom to the crest of the embankment while cell B will be approximately 14' feet deep. Neither of the cells meet the size specifications that require them to be regulated by MSHA under 30 CFR 77.216(a).

The pond will provide a theoretical detention time of 24 hours. The upper cell (cell A) of the sediment pond will be constructed with an open channel spillway at a minimum depth of 1.5' below the top of the dam. The open-channel spillway will be constructed of grouted rip-rap or concrete, and will have a minimum 5' bottom width with 2h :1v side slopes. The lower cell (cell B) will be constructed with a combination of 2 spillways. The principal spillway will be a 36" C.M.P. culvert riser and oil skimmer. This spillway will overflow at an elevation at least 3' below the top of the dam. This spillway will discharge directly into the bypass culvert (UC-OO) which is located beneath the pond. In the unlikely event of failure of the principal spillway, the lower pond cell will also be equipped with a second (emergency) culvert spillway, consisting of a 36" C.M.P. culvert riser and oil skimmer, with a minimum depth of 2.0' below the top of the dam. This spillway will also flow directly into the undisturbed bypass culvert (UC-OO).

Discharge from the pond will be in accordance with the UPDES permit issued for the facility. Decanting the pond will be accomplished by using a portable submersible pump with an inverted inlet to decant the pond if necessary. A sample will be collected prior to decanting to determine if the water quality will meet the requirements of the UPDES permit.

UPDES sample point # 1 is located at the principal spillway of the sediment pond. (see Map 7-4). This sample point will be used if and when the pond fills to capacity and must be decanted. Access to this sampling point will be provided by a walkway which will be constructed from the crest of the pond embankment out to the primary spillway. This walkway will be substantially constructed of steel, with an expanded metal walk surface and adequate handrails. It will be attached to the steel structure of the primary spillway/oil skimmer structure. During discharge activities personnel in charge of the sampling will walk to the end of the walkway to collect samples

Decanting of this pond will be done manually using a small mobile gasoline powered pump. When used, the pump will be positioned on the spillway walkway, (see Map 7-4). The end of the suction hose will be equipped with a float so that the decanted water is sucked from the top layer of pond water which should contain less sediment. The discharge line of the pump will feed directly into the primary spillway. Mine personal will take samples at the discharge end of the pump line as it enters the

principal spillway. Samples will be secured and analyzed in accordance with the approved UPDES permit.

UPDES sample point #2 is located at the culvert riser near the mine portals. This riser leads directly into the main bypass culvert. The riser will be 42" in diameter, large enough to allow access by mine personnel. The purpose of UPDES sample point #2 is to sample any water that may be discharged from the mine in the future. It is not known at this time if or when such discharge may be necessary. However, if mine discharge becomes necessary, a discharge line (most likely 6" to 8" diameter) would be installed in the return entries (to keep from freezing) and would exit the mine through the fan portal. From the fan it is a short distance over to the culvert where the line would discharge directly into the main bypass culvert riser the discharge line will be equipped with a small petcock value that will conveniently allow the operator to take a UPDES sample whenever water is being discharged from the mine. Samples will be secured and analyzed in accordance with the approved UPDES permit. Refer to Appendix 7-10 for the UPDES general permit.

Inlet ditches to the pond will be protected from erosion by using concrete, culverts or rip rap to convey drainage down to the water level.

The principal spillway in cell B will be a 36" cmp culvert fitted with an oil skimmer. This spillway will carry the peak flow from the 25 year, 6 hour event at a depth of 0.89' over the pipe.

The emergency spillway, located on cell B, will also be a 36" cmp culvert fitted with an oil skimmer. This spillway will be utilized, if necessary, to convey any flow in excess of the 25 year, 6 hour precipitation event out of the pond.

The sediment pond is a temporary feature. It will be removed during final reclamation of the mine site.

733.140 No previous mining has occurred under the sediment pond location, nor is mining proposed under that site. Therefore, there should be no effect on the sediment pond due to past or future mining activities.

The pond will be constructed according to design criteria listed in Appendix 7-4 under "Design and Construction Specifications For Sedimentation Pond". The sediment pond will be removed upon cessation of mining.

733.150 A structural stability analysis was performed on the pond embankment slopes by Agapito Associates, Inc. The results of their analysis are presented in Appendix 5-4.

The pond embankment (the east slope of the pond) will be keyed into bedrock or

natural ground. The bedrock appears to be competent at this location with no visible faults or fractures that would impair the operation and stability of the pond.

733.160 A certified sediment and drainage control plan containing design details (Appendix 7-4) is presented in this permit application package.

733.200 Permanent and Temporary Impoundments

Maps and cross-sections for the sediment pond have been prepared and certified. Refer to Maps 7-4 and 7-4A. Details of the pond design are presented in Appendix 7-4.

The sediment pond will collect runoff from the disturbed area during mining operations. Because the pond is a temporary structure, it has been sized according to requirements for the 10 year, 24 hour storm event. The calculated required volume for this storm event is 7.052 acre-feet, which includes a volume for three years of sediment storage. The actual design volume for the pond is 7.669 acre-feet. The pond will have a principal and emergency spillway in cell B. The maximum pond volume will be 7.669 acre-feet at the principal spillway and the maximum height water could be impounded in either of the cells is 16.5 feet (to the principal spillway in cell A). The pond therefore does not meet the criteria for MSHA regulation.

In addition to the principal spillway, the pond's emergency spillway has also been designed to safely pass the peak flow from the 25 year, 6 hour precipitation event. Any discharge from this pond will meet the requirements of the UPDES permit for the facility.

No mining will occur underneath the sediment pond nor has any mining been done beneath this location in the past. The potential effect on the structure from subsidence of subsurface strata would be nonexistent.

This temporary impoundment will be constructed and maintained to comply with the appropriate requirements. No permanent impoundments are being proposed. Reclamation of the structure will be as presented in the reclamation portion of Chapters 5 and 7 and in Appendix 5-5, Construction and Reclamation Plan.

R645-301-734 DISCHARGE STRUCTURES

Discharge structures will be constructed and maintained to comply with R645-301-744. Refer to the discussion under R645-301-744.

R645-301-735 DISPOSAL OF EXCESS SPOIL

No areas are presently designated for disposal of excess spoil. No excess spoil is anticipated during the life of the mine.

R645-301-736 COAL MINE WASTE

No coal mine waste disposal areas are being planned in the mine yard. Any waste generated will be disposed of in an approved, permitted disposal site.

R645-301-737 NONCOAL MINE WASTE

Noncoal mine waste will be stored in dumpsters, or in a contained manner, in a designated portion of the disturbed area near the shop/warehouse. Final disposal of noncoal mine waste will be in an approved, waste disposal site and will comply with R645-301-747.

R645-301-738 TEMPORARY CASING AND SEALING OF WELLS

Sealing of the groundwater monitoring well and any future wells will comply with R645-301-748. Refer to R645-301-765 for the well abandonment plan. The groundwater monitoring well will be used for monitoring only and is locked in a closed position between sampling events.

R645-301-740 DESIGN CRITERIA AND PLANS

Site specific plans that incorporate design criteria for control of drainage from disturbed and undisturbed areas are presented below.

R645-301-742 SEDIMENT CONTROL MEASURES

Sediment control measures have been designed to prevent, to the extent possible, additional contributions of sediment to stream flow or runoff outside the permit area, to meet effluent limitations and to minimize erosion.

The most significant sediment control measure will be to collect all disturbed area runoff and divert it into a sediment pond designed for total containment of the 10

year, 24 hour precipitation event. Runoff from undisturbed areas above the mining site will be diverted, as much as possible, to reduce the amount of runoff to be treated by the sediment pond. Refer to Appendix 7-4 for the "West Ridge Mine Sedimentation and Drainage Control Plan" and Map 7-1 "Drainage Area Map" and Map 7-2 "Mine Site Drainage Map" for the mine site drainage calculations and diversion culvert specifications.

Additional measures to be taken may include: interim reclamation of disturbance, where practical, to reduce runoff and erosion; rip rapping or lining diversion ditches, where necessary, to reduce erosion; and using straw bales and check dams to control flow, sediment and erosion. A discussion of alternate sediment controls measures is presented in Appendix 7-4 for the ASCA areas (topsoil stockpile, test plots and office pad). Designs for the sediment controls will be according to information presented in Appendix 7-4 and Maps 5-5, 5-8, 7-1, and 7-4.

Snow removal activities at the mine site will attempt to stockpile any large amounts of snow in those snow storage site locations indicated on Map 7-2. The snow stockpile locations are primarily designed for storing snow clear from some of the larger pad areas. Snow will still be plowed to the side of roadways and small pad areas.

742.220 Minimizing contributions of suspended solids and sediment to streamflow or runoff outside the permit area will be accomplished by constructing a multiple cell sediment pond for sediment treatment and storage of runoff from the disturbed area. The sediment pond has been designed to provide adequate sediment storage and detention time for the 10 year, 24 hour precipitation event. The pond has a principal and emergency spillway in cell B which is designed to pass the peak flow from the design event as required by the regulations. The design of both the principal and emergency spillways will accommodate the peak flow of 23.71 cfs from a 25 year, 6 hour event.

Water will be decanted in accordance with the UPDES permit for the facility. A submersible pump will be used to decant the pond if needed.

The sediment in the pond cells will be removed when it reaches 60% of the maximum design sediment level in cells A and B of the pond. Two sediment markers will be installed at various locations in the bottom of the cells for evaluation of the sediment level. Refer to Map 7-4 for information regarding the sediment pond configuration. Refer to Appendix 7-4 for the "West Ridge Mine Sedimentation and Drainage Control Plan" for design calculations.

The sediment pond cell will be cleaned out upon reaching the 60% of the maximum sediment capacity. Clean out will be done during late fall or early winter, October-December, when the chance of thunderstorms is the lowest and the pond is dry.

Decanting of the pond prior to cleanout will probably be unnecessary due to the arid nature of the climate. However, if decanting is necessary, the water will be allowed to settle for a minimum of 24 hours. The water will be drawn down as much as possible by pumping it into the adjacent cell.

Prior to sediment removal, samples will be taken from the sediment on the bottom to determine the depth of sediment as well as the nature of the material to be removed. Samples will be composited and analyzed according to Table 6 of DOGM's "Guidelines For Management Of Topsoil And Overburden For Underground And Surface Coal Mining".

The sediment pond does not meet the size criteria of MSHA 30 CFR 77.216(a).

The sediment pond has been designed with a primary and emergency spillway each capable of safely discharging the peak flow from the 25 year, 6 hour precipitation event. This should provide an additional measure of safety to prevent damage to the pond's integrity.

The construction site for the sediment pond will be cleared of all vegetation and debris prior to the removal of topsoil. Topsoil, if present, will be removed from the pond site and stockpiled in the topsoil storage area. In areas where fill is to be placed for the pond impoundment, natural ground will be removed for at least 12" below the base of the structure. Native material will be used when possible. The fill will be placed in lifts not to exceed 15" and compacted. Compaction of the fill material will be 95% or greater. Silt fencing and straw bales will be used to treat drainage from the site until the sediment pond embankment is constructed.

742.300 Diversions

General Requirements

Flow from undisturbed areas will be diverted away, where possible, from disturbed areas by means of temporary diversions (i.e. undisturbed drainage culverts). The diversions have been designed to minimize impacts to the hydrologic balance of the permit and adjacent areas.

All of the undisturbed drainage diversions (bypass culverts) have been sized, as a minimum, to meet the 100 year, 6 hour event for maximum protection of the mine yard area, sediment pond and undisturbed drainage below. The design incorporates structural stability and protection against flooding and damage to life and property. Designs for all diversions are presented in Appendix 7-4 and the structure locations depicted on Map 7-1. The map and plan have been certified by a registered, professional engineer.

The sediment pond has been designed and located such that if any of the temporary drainage structures (disturbed area culverts and ditches) within the disturbed area were to exceed their capacity, all drainage would still flow to and be treated by the sediment pond. Four culverts will convey drainage into the sediment pond. These inlets, have been designed to pass the flow from a 10 year, 24 hour precipitation event in order to provide more capacity and an extra measure of protection.

Following completion of mining activities, the undisturbed drainage diversion culverts, which will bypass the undisturbed drainage past the disturbed area, will be removed and the natural channel restored. Restoration of the channel will seek to reestablish a natural appearance to the drainage channel while providing a suitable channel configuration. Refer to Appendix 5-5 for a detailed discussion of the reclamation plan for the C Canyon drainage channel.

Based on measurements taken during field investigations and baseline mapping in the mine yard area, it will be possible to restore the channel to a configuration similar to what exists at the present time (pre-disturbance). Refer to Map 5-1 which is the existing topography of the site. Refer to Map 5-9, Mine Site Reclamation, for the proposed channel alignment and configuration.

Vegetation surveys conducted during June and August of 1997 confirm that there is no riparian zone in the existing drainage channels. Refer to Appendix 3-1 in Chapter 3 for information regarding vegetation of the mine site area.

742.400 Road Drainage

Roads within the disturbed area will be designed and constructed to provide environmental protection and safety and will adequately provide for surface drainage control, sufficient culvert design and spacing.

The placement of the road will seek to minimize downstream sedimentation and disturbance to the road due to runoff. The road will be located on the most stable available surface.

Primary Roads

Drainage structures on the road within the mineyard will be designed and constructed to pass the peak runoff from a minimum of a 10 year, 24 hour precipitation event.

Culverts will be designed so as to avoid plugging, collapse or erosion at the inlets and outlets. Trash racks will be installed where deemed appropriate by the operator.

The culvert calculations for the C Canyon county road culvert located within the disturbed area are provided in Appendix 7-8 C Canyon Road Station 406+70 - Culvert Sizing. The culvert was sized for a 25 year storm using the UDOT Small Area Method, the same method used to size the other culverts on the C Canyon road as well.

Following mining activities, the channel will be completely restored by removing the mine yard pad fill and regrading slopes to approximate original contour. In topsoiled areas, the channel will be reestablished by removing the geotextile fabric once the pad fill has been removed. Below the geotextile will be the original channel materials in their original arrangement. The restored channel will merge with the undisturbed downstream drainage southwest of the mine office area. The gradient of the channel and the side slopes will be similar to the premining channel.

No riparian area exists along the present drainage channel. The proposed seed mix to be used for final reclamation will incorporate species that presently exist in and adjacent to the channel area. The seed will be applied to the regraded channel side slopes by hydroseeding or hand broadcasting and raking. Containerized plants would also be planted along specified portions of the reclaimed channel.

R645-301-743 IMPOUNDMENTS

The proposed sediment pond is less than the size criteria listed in MSHA, 30 CFR 77.216(a). It has been designed and certified according to R645-301-512. Since the impoundment (sediment pond) is a temporary structure, regulations require the principal and emergency spillway to be designed to safely pass the 25 year, 6 hour precipitation event.

The impoundment will be inspected as described under R645-301-514.300.

R645-301-744 DISCHARGE STRUCTURES

Discharge from the sediment pond and bypass culvert will be controlled by riprap energy dissipators below the outlet ends downstream from the culvert outlet. The calculations and design specifications for the spillway are presented in Appendix 7-4.

R645-301-745 DISPOSAL OF EXCESS SPOIL

No areas are presently designated for disposal of excess spoil. No excess spoil is anticipated during the life of the mine. Refer to the discussion in Chapter 5, section

R645-301-553 under Spoil and Waste (553.200).

No valley fills or head-of-hollow fills are being proposed.

No durable rock fills are included in the operation plan.

R645-301-746 COAL MINE WASTE

No coal mine waste piles are being proposed.

R645-301-747 DISPOSAL OF NONCOAL MINE WASTE

Noncoal mine waste, including but not limited to grease, lubricants, paints, flammable liquids, garbage, machinery, lumber and other combustible materials generated during coal mining and reclamation operations will be placed and stored in a controlled manner at the designated location near the shop/warehouse, (see Map 5-5) within the disturbed area or in a state-approved solid waste disposal area. No noncoal waste will be permanently disposed of within the permit area. Dumpsters will be used for collection and disposal of trash.

Lubricants, solvents, and grease will be stored in a covered area with limited access to prevent accidental contact from machinery. The storage area will be in the vicinity of the shop/warehouse. Any leakage at the fuel storage site will be contained within concrete lined or steel containment structures. Surface runoff will be diverted away from the storage site. Should any uncontrolled discharge of oil or petroleum products occur within the general mine yard area, the sediment pond would act as a last line of defense for the containment of any such spills and prevent flow into the natural drainage system. A Spill Prevention Control and Countermeasure (SPCC) Plan will be posted at the shop/warehouse.

A dumpster will be placed in a convenient location for disposal of nonhazardous trash. Used/broken equipment will be stored within the storage area of the mine yard. As the entire storage area reports to the sediment pond, the exact location of storage will be left to the discretion of the operator as long as the storage of materials does not block ditches or roadways.

R645-301-748 CASING AND SEALING OF WELLS

The water monitoring well (DH86-2) will be cased, sealed or plugged to prevent acid or toxic drainage from entering ground or surface water, to minimize disturbance to

the hydrologic balance and to ensure safety when no longer utilized.

Upon completion of monitoring activities, the groundwater monitoring well will be permanently sealed by filling the hole with cement to within two feet of the top of the hole. Two feet of compacted native material will be placed above the sealed hole and the area reseeded.

Any future water or monitoring wells will be abandoned in a similar manner.

R645-301-750 PERFORMANCE STANDARDS

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

R645-301-751 WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS

WEST RIDGE Resources, Inc. has obtained a UPDES discharge permit to cover any possible discharge from the sediment pond. Refer to Appendix 7-10.

R645-301-752 SEDIMENT CONTROL MEASURES

Sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs given under R645-301-732, R645-301-742 and R645-301-760.

752.100 Siltation Structures and Diversions

Siltation structures and diversions will be located, maintained, constructed and reclaimed according to plans and designs given under R645-301-732, R645-301-742 and R645-301-763.

752.200 Road Drainage

Any roads within the disturbed area will be located, designed, reconstructed and maintained to control erosion, minimize contributions to stream flow, minimize diminution of the surface and ground water systems and refrain from significantly altering the normal flow of water in the drainage channel in accordance with R645-

301-732.400, R645-301-742.400 and R645-301-762.

Drainage for the roads within the mine yard disturbed area has been addressed in Appendix 7-4 under culvert and ditch designs. The road configuration is presented on Map 5-5.

R645-301-753 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, R645-301-745 and R645-301-760.

R645-301-754 DISPOSAL OF EXCESS SPOIL, COAL MINE WASTE AND NONCOAL MINE WASTE

Disposal for coal mine waste and noncoal mine waste will be located, maintained, constructed and reclaimed as described in R645-301-735, R645-301-736, R645-301-745, R645-301-746, R645-301-747 and R645-301-760.

R645-301-755 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

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R645-301-760 RECLAMATION

R645-301-761 GENERAL REQUIREMENTS

All temporary structures will be removed and reclaimed before bond release is sought. The restored channel will follow the grade, alignment and sinuosity of the original natural channel. Suitable riprap already existing in the stream channel will provide adequate protection against erosion, as demonstrated by the stability of the existing natural channel.

R645-301-762 ROADS

The access road is a Carbon County public road and will be left in place and

maintained by Carbon County. A turnaround will be left at the end of the road.

R645-301-763 SILTATION STRUCTURES

Siltation structures will be maintained until removal is authorized by the Division and the disturbed area has been stabilized and revegetated.

When the sediment controls are removed, the land on which the siltation structures are located will be regraded and revegetated. Refer to Chapter 5 for the regrading plans of siltation structures and Chapter 3 regarding the revegetation plan for reclamation.

R645-301-764 STRUCTURE REMOVAL

Appendix 5-1 presents a detailed timetable and outline for the removal of all structures on the minesite area. Removal of the siltation structures will be contingent upon DOGM approval. The sediment pond will be removed in conjunction with the reclamation of the mine yard.

R645-301-765 PERMANENT CASING AND SEALING OF WELLS

Permanent closure of the monitoring well 86-2 will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", July 15, 1987, State of Utah, Division of Water Rights.

The abandoned well will be filled to within two feet of the surface with Neat Cement conforming to ASTM standard C150, a cement grout consisting of equal parts of cement conforming to ASTM standard C150 and sand/aggregate with no more than 6 gallons of water per sack of cement or bentonite-based products specifically designed for permanent well abandonment.

The cement will be introduced at the bottom of the well and placed progressively upward to within two feet of the surface. The casing will be severed a minimum of 2 feet below the ground surface. A minimum of 2 feet of compacted native material will be placed above the abandoned well upon completion.

Within 30 days of the completion of well abandonment procedures, a report will be submitted to the state engineer by the responsible licensed driller giving data related to the abandonment of the well. The report shall be made on forms furnished by the state engineer and shall contain the information required, including but not limited

to:

1) Name of licensed driller or other person(s) performing abandonment procedures,

2) Name of well owner at time of abandonment,

3) Address or location of well by section, township and range,

4) Abandonment materials, equipment and procedures used,

5) Water right or file number covering the well,

6) Final disposition of the well,

7) Date of completion.

REFERENCES

Doelling, H.H., Central Utah Coal Fields: Sevier-Sanpete, Wasatch Plateau, Book Cliffs and Emery, Monograph Series No. 3, 1972.

Guttman, N.B., 1991, A sensitivity analysis of the Palmer Hydrologic Drought Index: Water Resources Bulletin, v. 27, n. 5, p. 797-807.

Kaiser Coal Corporation, 1986, Sunnyside Number 5 Mine, Mining and Reclamation Plan.

Karl, T.R., 1986, The sensitivity of the Palmer Drought Severity Index and Palmer's Z-Index to their calibration coefficients including potential evapotranspiration: Journal of Climate and Applied Meteorology, v. 25, p. 77-86.

Mayo and Associates, 1997, Investigation of surface-water and groundwater systems in the West Ridge Area, Carbon County, Utah: unpublished consulting report, 80 p.

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Sidel, R.C., Kamil, I., Sharma, A., and Yarnashita, S., 2000, Stream response to subsidence from underground coal mining in central Utah; Environmental Geology, v. 39, p. 279-291.

Sunnyside Coal Company, 1993, Sunnyside Mines, Mining and Reclamation Plan.

United States Forest Service, 2001, Draft environmental impact statement, Flat Canyon Tract.

Utah Department of Environmental Quality, 1991. State of Utah Public Drinking Water Rules: Part I - Administrative Rules. Eighth Edition.

Waddell, K.M., Contratto, C.T., Sumsion, C.T., and Butler, J.R., 1981, Hydrologic Reconnissance of the Wasatch Plateau-Book Cliffs Coal-Fields area, Utah: USGS Water Supply Paper 2068.

FIGURES

Figure 7-1	Average Monthly Precipitation at Sunnyside, Utah
Figure 7-2	Palmer Hydrologic Drought Index for Utah Division 6
Figure 7-3	Palmer Hydrologic Drought Index for Utah Division 7

APPENDIX 7-11

BEAR CANYON GVH HYDROLOGY REPORT
PETERSEN HYDROLOGIC, LLC

PETERSEN HYDROLOGIC, LLC

15 October 2008

Mr. Dave Shaver
West Ridge Resources, Inc.
P.O. Box 902
Price, Utah 84501

Dave,

At your request, we have evaluated the probable hydrologic consequences relating to the proposed installation and operation of the West Ridge Panel 8 gob gas vent holes (GVH) in Bear Canyon. We are providing this letter report to present the findings of a hydrogeologic investigation we have performed in this regard and to describe the probable hydrologic consequences of the GVH drilling and operational activities.

This report includes the following sections:

- Methods of Study
- Physical setting
- Geologic Setting
- Hydrologic Conditions
- Probable Hydrologic Consequences
- References Cited

2695 N. 600 E. LEHI, UTAH 84043 (801) 766-4006

Methods of Study

On 7 October 2008 we made a site visit to the GVH drilling site in the right fork of Bear Canyon. During this visit we examined the Bear Canyon surface-water systems adjacent to the GVH drilling site. The stream channel characteristics and the shallow alluvial and colluvial sediments in the canyon were observed. The geologic and hydrogeologic conditions at the drilling site and adjacent areas were observed and photographed.

Information regarding proposed GVH drilling plans and pertinent hydrogeologic reports and maps were obtained and reviewed as part of this investigation.

Physical Setting

The GVH area is situated in the right fork of Bear Canyon in the southwest quarter of the southeast quarter of Section 3, Township 14 South, Range 13 East, in Carbon County, Utah. The Bear Canyon GVH area overlies the previously mined Panel 8 longwall panel at the West Ridge Mine and is designed to vent gasses from the longwall gob area in the underground coal mine workings for mine safety purposes. The venting of the gas will occur through drill holes advanced from the land surface in Bear Canyon to the underlying mine gob area. The underground mine workings are separated from the overlying land surface in Bear Canyon by approximately 380 feet of overburden (Personal communication, Dave Shaver, 2008). Current plans call for the installation of three drillholes at the GVH site. Based on current plans the holes will be drilled at 45 degree angles into the mine, and will have individual depths (lengths) of 504, 376, and 502 feet.

Geologic Setting

The land surface in Bear Canyon at the GVH site is underlain by sandstone bedrock of the Cretaceous Castlegate Sandstone formation. In some areas, the bedrock is directly exposed at the land surface, while in other areas relatively thin deposits of alluvium, colluvium, and soil are present.

The stream channel substrate in the right fork of Bear Canyon Creek near the GVH exists either directly on Castlegate Sandstone bedrock or on thin deposits of alluvium overlying the sandstone bedrock.

The rock strata comprising the overburden between the Panel 8 mine workings and the land surface in Bear Canyon near the GVH consists of rocks of the Castlegate Sandstone and the Cretaceous Blackhawk Formation. The Castlegate Sandstone consists predominantly of lenticular fluvial sandstones interbedded with minor siltstone or claystone layers. The Blackhawk Formation in the region consists of interbedded sandstones, siltstones, claystones and coal deposits. The bedrock strata locally dip at approximately three to eight degrees to the northeast. Major faulting has not been observed in the GVH area (Mayo and Associates, 1997).

Hydrologic Conditions

Groundwater and surface-water systems in the West Ridge Mine permit and adjacent area have previously been characterized by Mayo and Associates (1997). During the 7 October 2008 site visit to the GVH area, no springs or seeps were observed. Wetness in the near-surface unconsolidated sediments in the vicinity of the GVH was likewise not observed, which suggests a lack of appreciable groundwater baseflow discharge locally. Because the GVH location is near the up-dip ends of the Castlegate and Blackhawk geologic formations (which have been truncated by the erosional Book Cliffs escarpment), regional, long-flowpath type groundwater systems are likely not present in the area.

In previous spring and seep surveys in the area, no springs or seeps were identified in either the Castlegate Sandstone or the Blackhawk Formation in the vicinity of the GVH drill sites (Mayo and Associates, 1997). It should be noted that two seeps discharging at less than 1 gallon per minute each were previously identified in the two upper forks of the right fork of Bear Canyon Creek above the GVH area (S-27 and S-28; Mayo and Associates, 1997). However, these seeps discharge from the Price River Formation

topographically and stratigraphically above the drilling area and thus are not of concern in this investigation.

The right fork of Bear Canyon Creek appears to be an ephemeral drainage (Mayo and Associates, 1997). No discharge was present in the drainage during the 7 October 2008 site visit. The complete absence of flow in the creek in areas where the stream channel sits directly on clean bedrock surfaces demonstrates that there is at present no appreciable alluvial groundwater system associated with Bear Canyon Creek in the vicinity of the GVH area.

Probable Hydrologic Consequences

Adverse impacts to the hydrologic balance resulting from the installation and operation of the Bear Canyon GVH system are not anticipated. The basis for this conclusion is summarized below.

The gob vent holes will be constructed in a manner that minimizes the potential for adverse impacts to groundwater and surface-water resources and the hydrologic balance in the area. The proposed construction designs for the GVH holes include a nominal 20 foot length of 16-inch non-perforated steel surface casing that will be cemented in place. The surface casings will isolate the wells from surface-water, soil moisture, and any shallow groundwater potentially present in the upper 20 feet and will prevent shallow water from entering the GVH wells. From approximately 20 to 200 feet below the surface, the proposed well construction plans call for the placement of 9.625-inch non-perforated steel casing that will be cemented into place. The cemented steel well casing will isolate groundwaters that may be present in bedrock groundwater systems in the upper 200 feet from the GVH wells and prevent the inflow of groundwater into the wells.

Proposed construction plans call for the lower approximately 150 feet of the GVH wells to be cased with 8.75-inch slotted steel casing that will be left open to the rock strata and will not be cemented. The purpose of the slotted steel casing is to allow the drainage of

gob gasses into the well bore in the fractured rock strata overlying the Panel 8 gob. While there is the potential for drainage of some Blackhawk Formation groundwater into the GVH holes in the 150 feet interval overlying the longwall gob, the potential for appreciable or sustained groundwater drainage through these wells is minimal. This is because 1) groundwater systems in the Blackhawk Formation occur in hydraulically isolated groundwater partitions that are not in hydraulic communication with adjacent groundwater partitions, which limits the amount of groundwater that could potentially be drained, 2) the GVH holes are situated near the up-dip ends (outcrop locations) of the Castlegate Sandstone and Blackhawk Formation which limits groundwater recharge potential and the potential for the interception of regional groundwater systems, and 3) the 150-foot interval of the Blackhawk Formation overlying the gob area was likely intensely fractured as a result of the longwall mining prior to the construction of the wells which would likely have drained the groundwater partitions immediately overlying the gob area at the time of mining. For these reasons, the potential for drainage of appreciable groundwater or surface-water resources through the GVH drill holes is considered low.

The potential for detrimental impacts to the ephemeral Bear Canyon Creek drainage or any associated alluvial groundwater systems is considered remote. As discussed above, appreciable baseflow alluvial groundwater systems were not identified near the GVH location during the 7 October 2008 visit. Additionally, because the GVH well bores will be hydraulically isolated from the upper approximately 200 feet, the potential for impacts to water quality in the drainage are unlikely The implementation of appropriate sediment control management practices will minimize the potential for increased sediment yield from the GVH site during the construction and operational phases of the GVH system.

Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations. The casings will be plugged at the bottom to hold the concrete. A lean concrete mixture will be poured into the casing until the concrete is

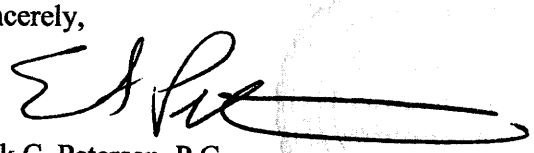
within five feet of the surface. At that time the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed. In this manner, the potential for any long-term impacts to the hydrologic balance resulting from the GVH system will be minimized.

References Cited

Mayo and Associates, 1997, Investigation of surface-water and groundwater systems in the West Ridge Area, Carbon County, Utah: unpublished consulting report, 80 p.

Please feel free to contact me should you have any questions in this regard.

Sincerely,



Erik C. Petersen, P.G.
Principal Hydrogeologist
Utah PG #5373615-2250

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APPENDIX 7-12

BEAR CANYON GVH
DRAINAGE CONTROL PLAN

DRAINAGE CONTROL PLAN
FOR
GOB GAS VENT HOLE SITE

BEAR CANYON
WEST RIDGE MINE

PREPARED BY: DAN W. GUY, P.E.
BLACKHAWK ENGINEERING, INC.
OCTOBER 2008

DRAINAGE CONTROL PLAN
GOB GAS VENT HOLE SITE

I. Introduction

This report will provide the drainage control plan and calculations for the proposed gob gas vent hole site in Bear Canyon, above the East Ridge Mine. The parameters used in the calculations (i.e. rainfall, runoff curve number, etc.) were taken directly from Appendix 7-4, "West Ridge Mine Sedimentation and Drainage Control Plan (As Constructed)". Drainage area and slopes were measured directly from the maps provided with the proposal.

General Plan

The proposed drill pad and blower location is a very small area located just south of the existing public road in Bear Canyon. The new disturbance is proposed to be approximately 0.246 acres. Due to the extremely small surface area and limited space for a sediment pond, this site will be treated as an Alternate Sediment Control Area (ASCA). The majority of the natural runoff above the site is diverted around and north of the turnaround and road through an existing ditch. This report will discuss only the drainage that will actually be affected by the new construction.

It is proposed to first remove the topsoil from the proposed disturbed area and store it in a protected location elsewhere in the canyon. The proposed drill pad and blower location site will then be constructed. Due to the narrow canyon, the pad areas will be created by cutting into the existing hillside, creating a small cut slope along the south side of the pad. Runoff from above and on the pad areas will be collected in an adequately sized cut ditch at the toe of the cut slope. The pad and existing road will also be sloped toward this ditch. All runoff from the pad and road area will then flow into the ditch, through a series of excelsior logs place at 50' intervals as energy dissipaters, through a final set of 4 closely-spaced excelsior logs for sediment control and then into the natural channel below the site. The entire drainage ditch will be rip-rapped for added protection. The average slope of the drainage ditch is approximately 8.11%; however, the slope does steepen at the lower end of the pad to approximately 11.17%. Rip-rap sizing is based on the expected flow velocities in this steepest, worst-case section of the ditch. Rip-rap sizing is based on the Rip-Rap Chart, Figure 2 in Appendix 7-4 of the West Ridge MRP. The cut slopes will be pocked and reseeded and covered with woodstraw, and the pad and road areas will be graveled. This will further enhance the erosion protection on the site.

Calculations

Runoff calculations and ditch sizing were calculated using the computer program "Office of Surface Mining Watershed Model", Storm Version 6.20 by Gary E. McIntosh. Runoff curve numbers and rip-rap sizing were taken from Appendix 7-4. Drainage areas and slopes were measured directly from the enclosed maps. All calculations are based on the 10 year-24 hour precipitation event for this area.

The following are the specific parameters used for the runoff calculations at this site:

10 year-24 hour precipitation	**=**	**2.00"**
Runoff Curve Number (Undisturbed)	**=**	**64**
Runoff Curve Number (Disturbed)	**=**	**90**
Undisturbed Runoff Area	**=**	**2.790 ac.**
Undisturbed Runoff Slope	**=**	**60.45%**
Existing Road Area	**=**	**0.305 ac.**
New Disturbed Area	**=**	**0.246 ac.**
Disturbed Runoff Slope	**=**	**8.11%**
Manning's n for Ditch	**=**	**0.035**
Average Ditch Slope	**=**	**8.11%**
Maximum Ditch Slope	**=**	**11.17%**

Peak flows were calculated for the undisturbed slope drainage to the pad area and for the pad and road area. These flows were added together for a total peak flow to be routed through the ditch. Calculations are included in Attachment A of this report.

The following are the results of the calculations:

Peak Flow - Undisturbed	**=**	**0.06 cfs**
Peak Flow - Disturbed	**=**	**0.53 cfs**
Peak Flow - Total	**=**	**0.59 cfs**
Average Ditch Flow Depth	**=**	**0.42 ft.**
Average Ditch Flow Velocity	**=**	**3.39 fps**
Maximum Ditch Flow Depth	**=**	**0.39 ft.**
Maximum Ditch Flow Velocity	**=**	**3.82 fps**

Proposed Construction

Based on the calculated peak flow runoff for this site, the following proposed hydrologic controls will provide adequate protection:

1. **Ditch Size - Triangular/Minimum 12" depth**
2. **Rip-Rap Size – 3" D_{50}/Minimum 6" Depth**
3. **Velocity Control – Excelsior Logs – 50' spacing along Ditch**
4. **Sediment Control - Excelsior Logs - 4 Rows Minimum 5' apart**

It is proposed to construct a triangular shaped ditch with maximum average of 1:1 slopes and minimum depth of 12" along the base of the cut slope along the entire length of the disturbed area. The entire ditch will be armored with 3" Minimum D50 rip-rap. Excelsior logs will also be placed at 50' intervals along the ditch as energy dissipaters. The lower end of the ditch will pass through a series of at least 4 rows of excelsior logs for velocity and sediment control, and then to the natural channel below the site. Excelsior logs will be installed per manufactures recommendations.

Conclusion:

Due to the small size of the site and installation of the proposed sediment and erosion controls, there should be no adverse effects to the surface hydrology of this area.

ATTACHMENT A

HYDROLOGY CALCULATIONS

Project Title = WEST RIDGE GVH UNDIST 10/24
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1

Curve number	=	64.0
Area	=	2.8 acres
Hydraulic length	=	670.00 Feet
Elevation change	=	405.0 feet.
Concentration time	=	0.09 hours
Concentration time type	=	SCS Upland Curves
Unit hydrograph type	=	Forested

-- Total Area = 2.8 acres

-- Storm data

Total precipitation	=	2.0 inches
Storm type	=	SCS Type 2 storm, 24 hour storm
Peak Discharge	=	0.06 cfs
Discharge volume	=	0.03 acre ft

Project Title = WEST RIDGE GVH DIST 10/24
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1

Curve number	=	90.0
Area	=	0.6 acres
Hydraulic length	=	370.00 Feet
Elevation change	=	30.0 feet.
Concentration time	=	0.04 hours
Concentration time type	=	SCS Upland Curves
Unit hydrograph type	=	Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation	=	2.0 inches
Storm type	=	SCS Type 2 storm, 24 hour storm
Peak Discharge	=	0.53 cfs
Discharge volume	=	0.05 acre ft

Title of run: WEST RIDGE GVH AVG.

Solving for	Depth Normal

Triangle

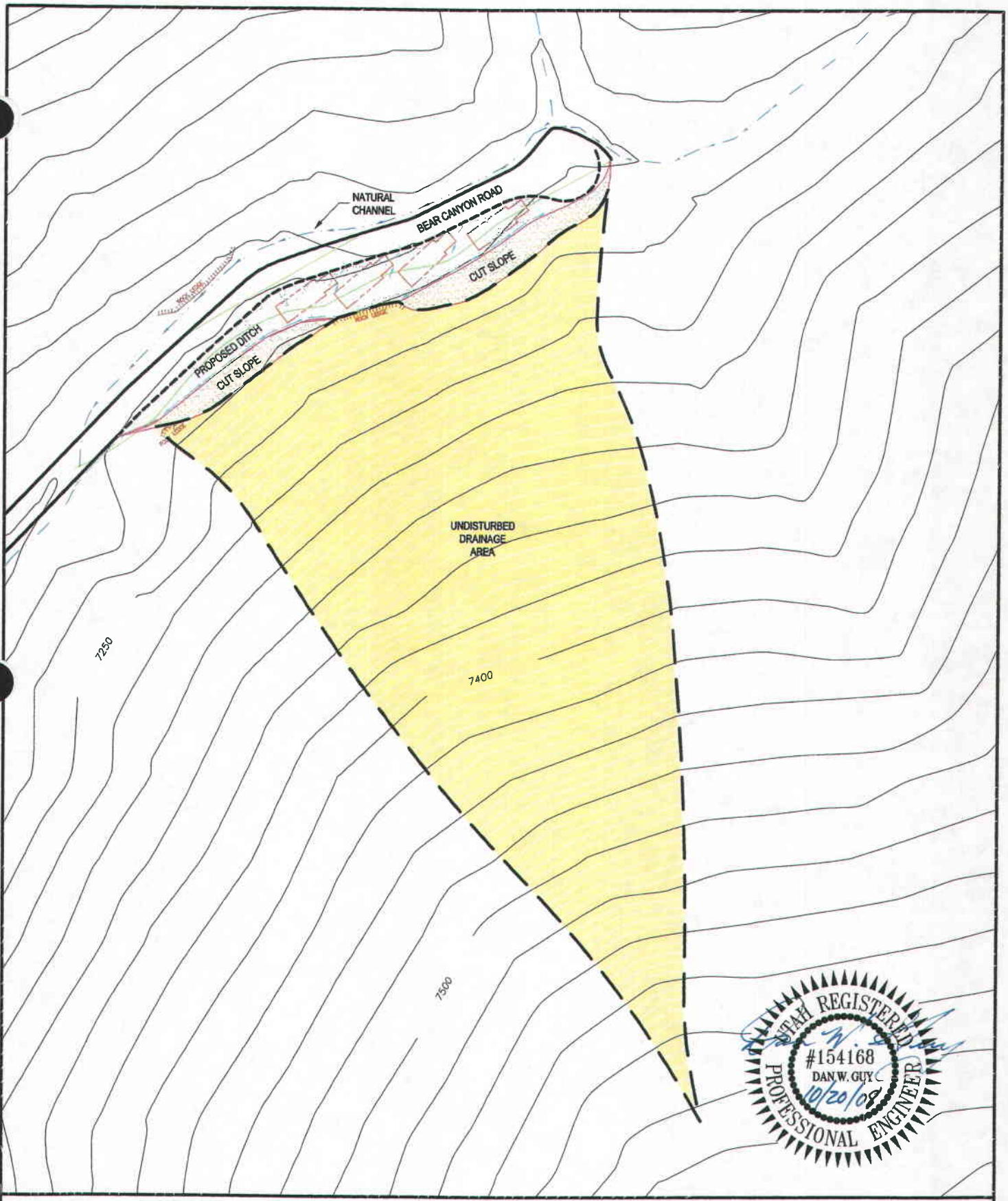
Flow depth (ft)	0.42
First Side slope	1.0
Second Side slope	1.0
Slope of diversion	0.0811
Manning"s n	0.035
CFS	0.59
Cross section area (sqft)	0.17
Hydrualic radius	0.15
fps	3.39
Froude number	1.55

Title of run: WEST RIDGE GVH MAX.

Solving for	Depth Normal

Triangle

Flow depth (ft)	0.39
First Side slope	1.0
Second Side slope	1.0
Slope of diversion	0.1117
Manning"s n	0.035
CFS	0.59
Cross section area (sqft)	0.15
Hydrualic radius	0.14
fps	3.82
Froude number	1.80

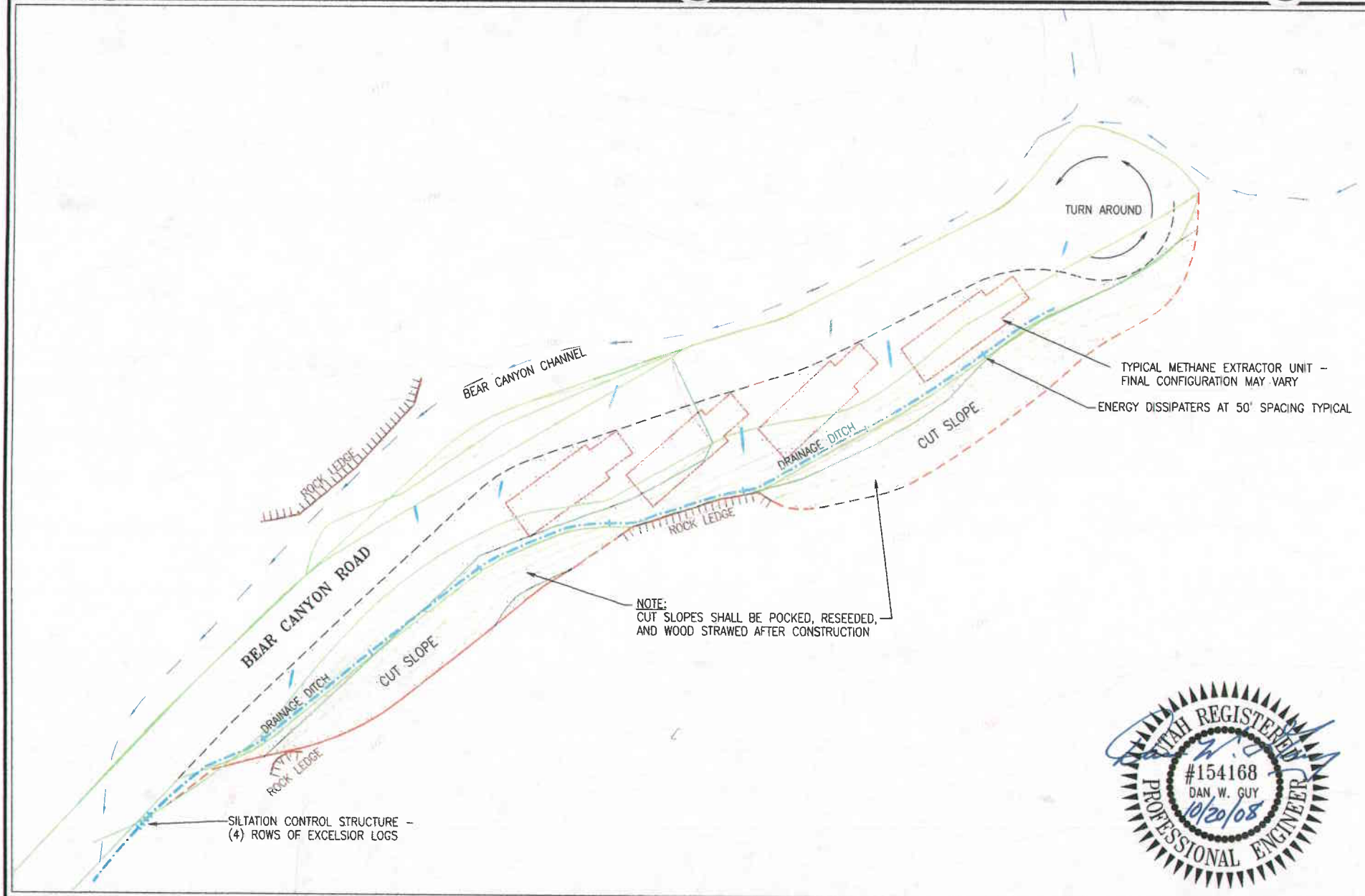


N

SCALE: 1" = 100'

BEAR CANYON HYDROLOGY
WEST RIDGE MINE
UNDISTURBED DRAINAGE AREA
FIGURE 1

BLACKHAWK ENGINEERING, INC.

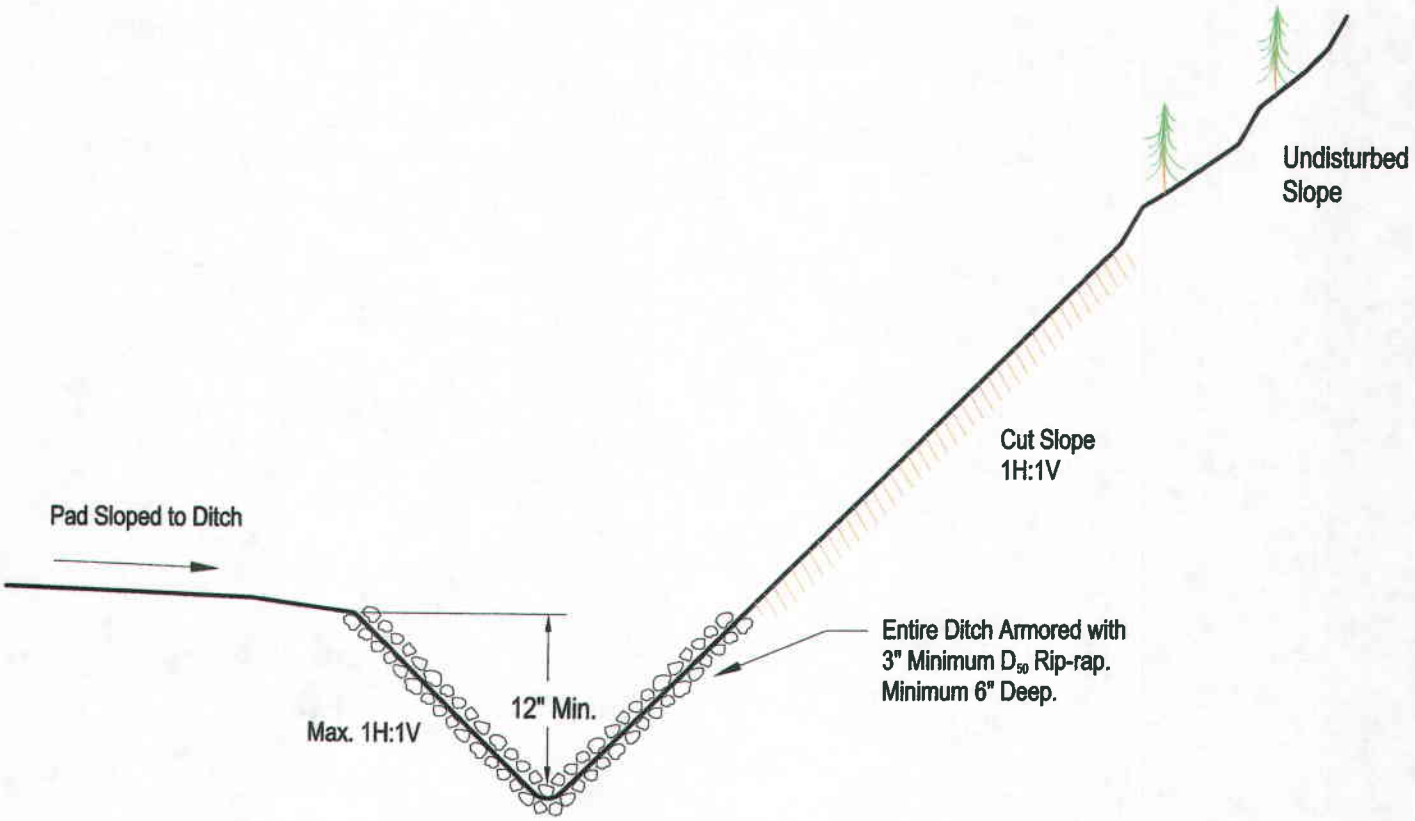


UTAH REGISTERED #154168 DAN W. GUY 10/20/08 PROFESSIONAL ENGINEER

NOTE:
ALL PAD AND ROAD AREA ABOVE CHANNEL CROSSING TO BE GRAVELED

BEAR CANYON HYDROLOGY
WEST RIDGE MINE
DRAINAGE PLAN
FIGURE 2

BLACKHAWK ENGINEERING, INC.



TYPICAL SECTION

UTAH REGISTERED
#154168
DAN W. GUY
10/20/08
PROFESSIONAL ENGINEER

NOTE:

Ditch Side Slopes may vary - Average Side Slopes will not exceed 1H:1V.

BEAR CANYON GVH
WEST RIDGE MINE
DRAINAGE DITCH
FIGURE 3

BLACKHAWK ENGINEERING, INC.

APPENDIX 5-14

BEAR CANYON GOB GAS VENT HOLE (GVH)

APPENDIX 5-14

BEAR CANYON GOB GAS VENT HOLE (GVH)

ATTACHMENTS

1) Attachment 1 — Bear Canyon GVH,
   a) Location
   b) Site Plan
   c) Cross-Sections
   d) Earthwork Volumes
   e) Reclamation Contours

2) Attachment 2 — Soils Survey, Bob Long, CPSS

3) Attachment 3 — Topsoil Storage Area

4) Attachment 4 — Vegetation Report, Mt. Nebo Scientific

5) Attachment 5 — 2008 Raptor Survey, DWR

6) Attachment 6 — Archeology Surveys, Senco-Phenix

7) Attachment 7 — GVH Operational Drawings (Dave Canning)

8) Attachment 8 — Slope Stability Analysis, Blackhawk Engineering

9) Attachment 9 — SITLA Correspondence regarding Bear Canyon Road and GVH Facilities

10) Attachment 10 — Hydrology Report, Petersen Hydrologic LLC

11) Attachment 11 — Drainage Control Plan, Blackhawk Engineering

12) Attachment 12 — Tower (Centennial) GVH Bonding Calculations

13) Attachment 13 — Reclamation Seed Mixes

14) Attachment 14 — Spill Prevention, Control, and Countermeasure Plan (SPCC)

15) Attachment 15 — MSDS Sheets for Drilling Products

16) Attachment 16 — Updated T & E Species List (2008), Mt. Nebo Scientific

17) Attachment 17 — Updated GVH Bonding Information provided by the Division.

WEST RIDGE RESOURCES, INC.
BEAR CANYON GOB GAS VENT HOLE (GVH)

Due to the increasing levels of methane liberation within the West Ridge Mine workings the Company must immediately pursue gob gas ventilation. On September 26, 2008, MSHA wrote a letter stating, "degasification of the longwall gob area for Panel 13 will be required prior to commencement of longwall mining". Therefore, MSHA has determined that this action is necessary for the safety of the underground workforce. Under our current production projections, initial longwall mining in Panel 13 is scheduled for mid-November, 2008. Therefore, without rapid and immediate development of a gob gas vent hole, under the requirements of the MSHA dictate, planned longwall production from Panel 13 is in risk of being stopped. This would have very serious consequences for the company in terms of meeting existing power-supply contracts, and maintaining the workforce against potential layoffs.

Upon subsequent meeting, MSHA agreed that a gob gas vent hole (GVH) drilled from the surface in the Right Fork of Bear Canyon into gob from extracted Panel 8 will satisfy their requirement for gob degasification. Refer to Attachment 1 for the location of the GVH site within the permit area. The site of the GVH pad lies at the end of the Bear Canyon Road. This is an old existing road that was recently upgraded to provide better access to the GVH site. The GVH site will be located adjacent to the road in a narrow strip measuring approximately 35' wide x 300' long in the bottom of the canyon. Total disturbance associated with the site, including cutslopes, is about 0.24 acres. Another 0.1 acres will be involved at an off-site topsoil storage area located approximately 3300' down-canyon from the GVH site, which will also be located adjacent the Bear Canyon Road (see Attachment 1 for location). Thus, the GVH installation will involve a total increase of disturbed area of 0.34 acres.

The GVH site will contain three separate holes drilled at 45 degree angles to intercept the longwall cave area (gob) located below. The depth of cover at this site above the mine is approximately 380'. From the well heads the methane gas will be piped to four methane extractor units, each measuring approximately 14' wide x 50' long. Details of a typical extractor unit can be found in Attachment 7. The extractor units will be positioned in a linear arrangement along the narrow strip-pad located between the road and the canyon hillside. The GVH facility is expected to be operational for the remaining life of the West Ridge Mine, and will be reclaimed at the same time as the minesite in C Canyon. During the life of the operation the facility will require daily inspection and maintenance by mine personnel. Refer to Attachment 1 for a site plan of the Bear Canyon GVH facility, and Attachment 3 for the topsoil storage area. Because both the GVH site and the topsoil storage are to be located on SITLA land adjacent to the Bear Canyon road, SITLA has concurred with these facilities being located within 100' of the public use road (refer to Attachment 9).

It should be noted that the GVH installation proposed for West Ridge Mine is quite similar to the GVH installations presently permitted and operational nearby at the Company's sister Tower Mine (Andalex Resources, Inc., Centennial Project, C/007/019, Appendix X). The differences are that the West Ridge GVH is smaller (0.24 acres vs 1.0 acre, typical), it will involve more methane extractor units (four vs one or two), and topsoil will be stored off-site rather than on-site. The holes are also shallower (three each, totaling 1380' vs 2700'). Refer to Attachment 7 for photos of typical Tower GVH installations.

The following narrative is intended to give an overall description of the proposed GVH installation in terms related to the individual MRP chapters. Specific relevant information is included in each chapter, but this appendix supplies the total information in a common overview source. It should be noted that, unless specifically noted in this appendix, all elements of the plan amendment for the Bear Canyon GVH site are identical to those already approved for the C Canyon minesite regarding facility construction, final reclamation, and environmental protection issues. Detailed and general descriptions of the soils, biology, land use, geology and hydrology for the overall permit area, which includes the Bear Canyon GVH site, can be found in the appropriate chapters of the approved MRP. Pertinent consultant reports and surveys for the GVH site have been included in both the individual chapters and in this Appendix as well in order to facilitate review. All affected Maps have been updated to show the GVH site and, where appropriate, the topsoil storage area.

CHAPTER 1, LEGAL:

The GVH site, and associated topsoil storage area, is located on SITLA coal lease ML49287 in the extreme western part of the existing DOGM permit area. The GVH site is located in Section 3, T14S,R13E, NW1/4NE1/4SW1/4SE1/4, and involves 0.24 acres of disturbance. The topsoil storage area is located in Section 10, T14S, R13E, NW1/4SE1/4NW1/4NW1/4 and involves 0.1 acre of disturbance. All affected surface is owned by SITLA. Other than increasing the total disturbed area by 0.34 acres from 29.06 acres to 29.4 acres there are no changes in Chapter 1.

Right-of-entry for the GVH facilities is granted under the terms of SITLA coal lease ML49287. Concurrence for the specific surface use for the GVH installation and the topsoil storage area has been provided by SITLA (see Attachment 9). The correspondence states *"Section 8.1 of the lease agreement provides that the Lessee may use the surface estate to the extent reasonably necessary for the economic operation of the leasehold. Your request to construct a GVH and stockpile area .....appear to meet that criteria and are hereby granted approval to proceed by the Lessor."*

Refer to the Location Map in Attachment 1 for the location of the GVH site and the associated topsoil storage area.

Appendix 1-2 (Violation Information) has been updated.

There is no change in the Company Ownership and Control

CHAPTER 2, SOILS:

Before any excavation begins at the GVH site, all available topsoil will be salvaged. Bob Long, CPSS, of Long Resource Consultants, Inc., has conducted an Order 1 soils survey of the site. His report is included in Attachment 2. Soil profile field descriptions are included in Attachment 2 as well. Three test pits were dug in the hillside and the soil resources were measured and catalogued. There is a significant layer of soil material present, which will be salvaged and stored nearby for final reclamation. Due to its location in the bottom of the canyon, and the varying steepness of the sideslope, the thickness of the soil varies considerably over the site. Also, as is typical for the Book Cliff canyons, there are a number of large boulders lying on the surface, surrounded by pockets of topsoil. Based on the results of the survey, the average depth of topsoil at the site is about 16". The area of the GVH site, including both the pad and the adjacent cutslope, is approximately 0.24 acres. Therefore, according to the soils survey, at least 515 cu. yds., or 13,878 cu. ft. of topsoil should be salvaged from the site.

Soils samples were taken by Mr. Long and have been sent to the laboratory for analysis. Once the analysis results are obtained they will be submitted to the Division and inserted as part of Appendix 2-10. If laboratory analysis of the soils indicates a need for additives, fertilizers, or enhancement of other kinds, the Company commits to providing such at the time of final reclamation as determined by the Division . However, it is felt that this soil in its existing condition should be adequate for final reclamation because it appears to be well developed and of sufficient quantity. In fact, it is the identical same soil removed from the site which will be replaced at the time of reclamation. The Order 1 Soils Reports concludes that *"the potential for successfully reclaiming the Bear Canyon GVH location is good based on the estimated quality and quantity of topsoil that may be salvaged."*

The topsoil will be carefully removed using a trackhoe which can reach up the slope from the road surface below. Large boulders will be separated from the material, and the topsoil will then be loaded into rock-trucks and hauled off-site for storage. The storage site is located approximately 3300' down-canyon from the GVH site, in a flat area adjacent to the road. This storage area is located on SITLA surface and SITLA coal lease ML49287 (see Attachment 1 for location). The pile will be constructed with overall dimensions of approximately 100' long, 40' wide, and 8' high, with 2:1 sideslopes (see Attachment 3 for details of the pile configuration). The pile will be kept low to prevent unnecessary compaction, and to help maintain viable micro-organisms. Attachment 3 shows that a pile configuration with a capacity in excess of 700 cu. yds. can easily be stored at this site.

Upon completion of topsoil salvage, the storage pile will be pocked (roughened) and reseeded with a previously approved seed mix as shown in Table 3-3 included in Attachment 13 for ready reference. As an alternate, Attachment 13 also includes a seed mix which was used on the Crandall Canyon East Mountain drillhole reclamation project and is readily available, subject to Division concurrence of its use. A layer of wood straw will then be scattered over the surface. 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. 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, the Company commits to having an monitor on site at all times. The purpose of this person will be to make sure that all topsoil resources are properly salvaged, to maintain accurate truck count of 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.

CHAPTER 3, BIOLOGY:

The GVH site is located in the bottom of Bear Canyon at an elevation of 7200'. The site is located less than 6000 feet (straight-line) from the main surface facilities which are located one canyon over to the southeast in C Canyon, which also sits at an elevation of 7200'. Both canyons face in the same direction, i.e., to the northeast. The canyons are nearly identical in terms of elevation, lithology, orientation, exposure, rainfall, etc. Therefore, the vegetation at the Bear Canyon GVH site is basically identical to that found at the C Canyon minesite. The vegetation at the Bear Canyon site is classified as Douglas Fir/Maple Community. Much of the minesite in C Canyon is also identified as Douglas Fir/Maple Community. Dr. Patrick Collins of Mt. Nebo Scientific, conducted a vegetation survey of the GVH site and concluded that, given the similarities in the locales, the existing vegetation reference source for the mine in C Canyon is appropriate to represent the GVH site as well as a basis for determining final reclamation performance. According to the report, Dr Collinss is of the opinion that *"...the Douglas Fir/Maple Reference Area (1998) would be an appropriate area for revegetation success standards at the time of final reclamation...."*. A copy of Dr. Collins' report is included in Attachment 4. Also refer to Appendix 3-1 for a description of the Dougas Fir/Maple Community nearby in C Canyon, and to Appendix 3-1A for a discussion of the existing Douglas Fir/Maple vegetation reference are in C Canyon.

The sensitive plant species Canyon Sweetvetch (Hydysarum occidentale var. canone) exists in Bear Canyon, as well as all other outward-facing Book Cliff canyons within the permit area, including C Canyon where the minesuite is located.. The Canyon Sweetvetch generally occurs in the canyon bottom in and adjacent to the stream channel. As a pro-active mitigation measure, however, West Ridge employees, working on species identification from Dr. Patrick Collins of Mt. Nebo Scientific, have collected a significant amount of Sweetvech seed from the surrounding area in September, 2008. This seed will be included in the seed mix for interim cutslope revegetation, and/or topsoil pile revegetation, if requested by the Division. A similar commitment was included previously in the MRP prior to the construction of the West Ridge Mine surface facilities in C Canyon, which occurs in R645-341.100, and is reprinted herein for ready reference:

> *Canyon sweetvetch seed was collected by Dr. Patrick Collins (Mount Nebo Scientific) in C Canyon in 1999 prior to construction of the minesite. This seed was later used to re-seed the topsoil pile. This constitutes the on-going field test to determine the viability of using canyon sweetvetch in the seed mix for final reclamation. Dr. Collins is presently monitoring the success of the sweetvetch population on the topsoil pile. If it appears that the sweetvetch is successful and can be added to the reclamation seed mix, seed will be collected from the topsoil population, as well as other populations in C Canyon and/or nearby canyons, at the time of final reclamation.*

At the location of the GVH site, Bear Canyon is an ephemeral stream, and there is no riparian habitat located at or near the GVH site. The GVH site is located close to the area where the

depth of cover over the longwall panels is the shallowest within the permit area. As a result, this area has been an area of interest in previous MRP amendments, and a more detailed discussion of the biology and hydrology can be found in R645-301-322.100 of the approved MRP. It should be noted that the area has been now been completely undermined since November, 2006, and subsidence has stabilized at about 3'. No adverse affects to biologic or hydrologic resources has been observed. The area is subject to on-going hydrologic and subsidence monitoring under the presently approved MRP.

After the topsoil has been removed and the GVH pad area constructed, the new cutslopes will be prepared for interim reclamation. This will be done by pocking the newly exposed surface (roughening) and re-seeding with the previously approved interim seed mix as shown in Table 3-3 (reprinted in Attachment 13 for ready reference), or with an alternate seed mix approved by the Division subject to availability. (Attachment 13 includes a seed mix which was used on the Crandall Canyon East Mountain drillhole reclamation project and is readily available, subject to Division concurrence.) A layer of wood straw will then be scattered over the surface. 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.

On final reclamation, the pad area and cutslopes will be backfilled to approximate original contour, and topsoil will be re-applied to the reclaimed slope (see Attachment 1) The slope will be re-vegetated according to the same existing approved plan for the minesite in nearby Canyon, as specified in R645-301-341. For completeness, the reclamation plan elements are included herein as taken directly from the currently approved plan:

a) *Fill will be placed in the cut in 18" lifts until approximate original contour is achieved. The fill will be obtained from the adjacent pad fill.*

b) *A certified noxious weed-free alfalfa hay mulch will be blown over the topsoiled surface at a rate of 2000 pounds per acre. Fertilizer, if determined necessary by soil testing, would also be applied at this time.*

c) *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.*

d) *The appropriate seed mix (Table 3-2B, for Douglas Fir/Maple Community) will be either broadcast by hand or hydroseeded on the area at the rate specified on the table. (Table 3-2B is reprinted in Attachment 13 for ready reference.)*

e) *A certified noxious weed-free straw mulch will be applied to the surface at a rate of 2000 pounds per acre and held to the surface with a wood fiber mulch and tackifier applied to the surface at a rate of 500 pounds per acre.*

The revegetation monitoring schedule for the Bear Canyon GVH site will be the same as for the

minesite reclamation, and is reprinted in Table 3-4 in Attachment 13 for ready reference.

Revegetation success standards for the GVH site will be the same as for the C Canyon minesite, as presented in R645-341.250. The revegetation timetable for the GVH site will also be the same as the minesite, as presented in Table 3-1, reprinted in Attachment 13 for ready reference.

Due to the proximity of the GVH site to the minesite within the permit area, all threatened and endangered (T&E) species information applicable to the existing permit area in the MRP (mid-term review approved on July 7, 2008) is current and therefore applicable to the GVH site as well. Refer to Appendix 3-4 and 3-4A for current T&E information. There are no threatened or endangered species in the Bear Canyon GVH area (refer to Attachment 16 for current (2008) T&E information, provided by Mt. Nebo Scientific) Various species of concern during previous amendments, such as the Mexican Spotted Owl and the Yellow-Billed Cuckoo have been adequately addressed in the presently approved MRP and are not a factor. Dr. Collins has addressed the current status of T & E species in his report (see Attachment 4).

An annual raptor survey was conducted for the permit area, including Bear Canyon, by Division of Wildlife Resources (DWR) in the spring of 2008, and is included in Attachment 5. The survey shows no raptor nests in the Bear Canyon area, neither at the GVH site nor the topsoil storage area.

As shown on Maps 3-4A,3-4B and 3-4C, wildlife range for deer, elk, and antelope is basically the same at the GVH site as for the minesite, which is to be expected given their proximity and many similarities.

There will be no additional water consumption, nor disruption of flow, from the West Ridge Mine as a result of the GVH installation. Therefore, construction and operation of the GVH facility will have no affect on the Colorado River Endangered Fish Recovery Program.

CHAPTER 4, LAND USE:

There will be no changes in the current land use of the Bear Canyon area as a result of the construction and operation of the GVH units.

The site is located in the Bear Canyon grazing allotment, and no change in grazing activity will result from the GVH installation. (Refer to Map 4.1)

The GVH site is located at the site of previous coal exploration drilling done in the early 1950's.

The site is located at the end of the Bear Canyon Road. This is a pre-existing road constructed in the early 1950's, and is a public use road located on public land. The road has been upgraded to provide better year-around access to the GVH site. The improved road access will facilitate existing public uses of the area such as grazing management, big-game hunting, and other recreational pursuits, and on-going environmental monitoring associated with the West Ridge Mine operation. The road will be used on a daily basis by mine maintenance personnel.

It is SITLA's position that the Bear Canyon road will be left in place (i.e., not reclaimed) to facilitate grazing management, hunting and other recreational use, mineral development, and other public multiple use (refer to correspondence in Appendix 4-8 and Attachment 9 of Appendix 5-14)

Class 3 (intensive) cultural resources surveys have been completed for both the GVH site and the topsoil storage site by Senco-Phenix Archeological Consultants. These surveys conclude that, for both sites, *"no cultural resources were located and the potential for undetected remains is remote. A finding of no effect is appropriate and archeological clearance without stipulation is recommended."* Copies of these reports are included in Attachment 6, and will be transferred to the Confidential Binder after Division review.

Operational areas that are used by mobile equipment will be water sprayed to control fugitive dust. The application of water will be of sufficient frequency and quality to maintain the surface material in a damp/moist condition unless it is below freezing.

CHAPTER 5, ENGINEERING:

The GVH facility will consist of three drillholes, four methane extractor units, and interconnecting piping as shown on Attachment 1. Please note that the final arrangement of the holes and extractor units may change depending on the final site configuration, the size of the available drilling rig, and other variables. A detailed description of the drillhole installation, and the assembly and operation of the methane extractor units can be found in Attachment 7. The site pad will consist of a narrow strip (approximately 35' wide x 300' long) located adjacent to and parallel with the road. The drillholes will be located at the southern (down-canyon) end of the site pad. The extractor units will be located in a serial arrangement along the northern (up-canyon) end of the site pad. The total facility area will be about 0.24 acres, including the adjacent cutslopes.

Three angled holes will be drilled at angles ranging from 20 degrees to 45 degrees from vertical. Drilling will be conducted using tri-cone rotary and/or hammer. Drilling fluid will be primarily compressed air (600-800 psi) with water and Baroid Quick Foam and EZ Mud (see Attachment 15 for MSDS sheets for these products). Cuttings will pass up the annulus and be diverted to the reserve pit on the surface. Each hole will be spudded with a 19" diameter hole into which a 16" diameter conductor casing will be set and grouted to an approximate depth of 20'. Thereafter, a 12.25" hole will be drilled to within 200' of the Lower Sunnyside coal seam (an inclined depth of 200'-300'). A 9.625" T&C casing will be set and grouted to total depth of the 12.25" bore. An 8.75" bit will be tripped in to drill out the shoe and will continue about 175' to within 25' of the coal seam horizon. Sections of 7" slotted casing will be tripped in from bottom of hole to about 40' above the bottom of the upper casing, but will not be grouted so that it can move with any additional subsidence.

Before construction starts identification signs will be posted at the site. These signs will list the company name as permit holder, the permit number, address and phone number. During the initial phase of construction, topsoil will be salvaged. Based on a recent Order 1 soils survey the current estimate of topsoil to be salvaged is approximately 515 cubic yds. (See Attachment 2). After the topsoil has been removed, the slope will be excavated back for a distance of about 20', leaving a 1:1 cutslope against the hillside. Based on current surveys it is estimated that about 1,357 total yds of material will be excavated from the bank. This includes the estimated 515 yds of topsoil, so the remaining amount of excavated material will be about 842 yds (see Cut Slope Excavation Volumes, Attachment 1 for details). Material excavated from the cutslope will be used to level off the area for the drillhole (for the drilling operation) and for the individual methane extractor units. Excess material may be used to raise the grade of the adjacent roadway. All fill areas will then be compacted for stability.

During the drilling phase of the GVH installation, the pad area will be used as an equipment lay-down area for drill steel, drill casing, drilling mud, concrete, etc. The pad will also be used to accommodate the mud pits needed during the drilling operation. The mud pit will measure approximately 30' long x 10' wide x 10' deep, and will be located immediately down-canyon, i.e.,

southwest of, the drillholes, as shown in Attachment 1. The pit will be lined with a 12 mil plastic liner, with a 20 mil felt underlayment. Based on the diameter and total combined length of the drillholes, and assuming a swell factor of 40% for the cuttings, the estimated volume of cuttings is 1283 cubic feet, or 47 yds. This would result in a total depth of cuttings remaining in the bottom of the pit of 4.28 ft. After the drillholes have been completed the remaining cuttings will be mixed with native material until it can be handled with heavy machinery. It will then be removed from the pit and hauled off-site to an approved disposal facility.. After the cuttings have been removed, the pit will be backfilled and eliminated. The site will then be cleaned up and fine-graded prior to installing the methane extractor units (see Attachments 1 and 7 for details).

After the cutslopes have been excavated, the slopes with be reclaimed (interim reclamation) by pocking, re-seeding and applying a layer of wood straw as described above. A disturbed area drainage ditch will be constructed along the toe of the cut. This ditch will be designed to handle the flow from the up-slope undisturbed area, the reclaimed cutslope, the drillpad, and the adjacent section of road. Runoff from the ditch will be routed through a series of sediment-control structures (silt fences, excelsior logs, etc.) to effectively remove sediment. (A more detailed description of the sediment control measures associated with the site can be found in the Chapter 7, Hydrology discussion below.)

A security fence may be installed around the perimeter of the pad between the facilities and the road.. The facilities will not encroach upon nor affect the road nor the road turn-around, and neither will public use of the road be affected. The Company will provide the Division with an as-built drawing of the facility upon completion of construction.

Operation of the GVH facility is expected to continue for the life of the West Ridge operation. Therefore, reclamation of the site will be done at the same time and under the same conditions as for the minesite surface facilities in C Canyon. However, if temporary cessation of mining operations occurs, the GVH well will continue to function.

Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations. The casings will be plugged at the bottom to hold the concrete. A lean concrete mixture will be poured into the casing until the concrete is within five (5) feet of the surface. At that time the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed. There will be three drillholes installed and therefore plugged at reclamation. (This commitment is identical to the currenty approved plan for the Tower (Centennial, C/007/014) GVH reclamation plan.) Based on current projections the holes will be drilled at 45 degree angles into the mine, and will have individual depths (lengths) of 504', 376', and 502', for a combined total depth of 1382'. Using 9-5/8" casing for all holes, the volume of concrete needed to plug all three holes would be 26 cu. yds.

On final reclamation, the pad area and cutslopes will be backfilled to approximate original contour (see Reclamation Contours, Attachment 1). Fill material will be obtained from the adjacent roadway and leveling pads. This is the exact same material that was excavated from the

cutslope during initial construction. The cutslope will be backfilled in 18"-24" lifts and compacted with rubber-tired vehiclesand/or vibratory mechanical equipment. The reclaimed slopes, at approximate original contour, will average about 1.5: 1, so slope stability will not be an issue. Because of the compaction in lifts, and the rocky nature of the backfill material (one and the same as the original native material), stability of the reclaimed slopes is sufficient to achieve approximate original contour and eliminate the potential for remnant cutslope exposures. A slope stability analysis prepared by Blackhaek Engineering concludes that *"calculations show safety factors well in excess of the required 1.3 for the reclaimed cut slopes of 1.5H:1V and up to 30' in height. This is not inconsistent with the natural conditions of the area, and will allow for complete reclamation of all cut slopes created by the emergency drilling pads."* (See Attachment 8 for the complete slope stability analysis report.) The slope will then be re-topsoiled and re-vegetated according to the same existing approved plan for the minesite in nearby Canyon, as specified in R645-301-341, and as described in the Chapter 3, Biology discussion above.

The amount of backfill material is estimated to be up to 842 cubic yards, and the amount of replaced topsoil is estimated at about 515 cubic yards. Total reclaimed area, including both pad and cutslopes will be approximately 0.24 acres. Because the cutslopes are only about 20' maximum high, all work, both backfilling and topsoil replacement, can easily be done from the existing adjacent road-pad surface, using trackhoes with sufficient boom reach. After the reclaimed slopes have been topsoiled and reseeded, a row of excelsior logs will be installed along the full length of the toe of the slope between the slope and the remaining road. The purpose of this row of excelsior logs is to control sediment of the site until the revegetation has become established.

For bonding information refer to Chapter 8 discussion below

CHAPTER 6, GEOLOGY:

The geology of the GVH site is essentially the same as at the West Ridge Mine surface facilities located nearby in C Canyon, as shown on Map 6-1. The primary difference is that the mine site is located in the upper part of the Blackhawk Formation where the Sunnyside coal seam outcrops, whereas the Bear Canyon GVH site is located stratigraphically about 384' above the coal seam within the part of the canyon where the Castle Gate Sandstone begins to outcrop. This results in the GVH site being situated in a narrow, ledgebound part of the canyon. The drillholes will reach down to near the top of the mined out coal seam horizon (see Attachment 7 for details). Because the coal seam in this area has been completely extracted by longwall mining, the GVH drillholes will penetrate through subsided and fractured strata. Based on previous subsidence monitoring the GVH site has subsided about 3 feet, but subsidence has now stabilized.

CHAPTER 7, HYDROLOGY:

The GVH site will be located on the opposite side of the road (southeast side) from the primary canyon drainage channel. Therefore, construction and operation of the GVH facility will have no affect on the natural canyon drainage. Because of the limited size of the site (0.24 acres) and the narrow configuration within the confines of the narrow ledges of the canyon, there is insufficient room to construct a sediment control pond. Therefore the company intends to employ a combination of alternate sediment control methods at the site. During the construction phase of the pad site, adequate rows of excelsior logs will be placed downgrade from the site to prevent construction sediment from entering the channel. Once the pad site is finished, which should take less than two weeks, a disturbed area drainage ditch will be constructed along the toe of the cut. This ditch will be designed to handle the flow from the up-slope undisturbed area, the reclaimed cutslope, the drillpad, and the adjacent section of road. This ditch will discharge into the natural drainage channel a short distance below the drillhole location. This ditch will be armored with adequately-sized rip-rap for its entire length. This rip-rap will decrease the potential for erosion in the ditch, and will also act initially as a siltation trap as a certain amount of sediment is allowed to settle into the rip-rap voids.

The total length of the drainage ditch will be approximately 350'. At 50' intervals along its length energy dissipaters will be installed in the ditch. These energy dissipaters will consist of excelsior logs laid in the ditch perpendicular to the flow direction, and anchored securely with stakes. These dissipaters will reduce the flow velocity to help reduce erosion, and will also serve as siltation filters to help remove sediment prior to reaching the natural channel. In addition, a terminal set of excelsior logs will be installed in the ditch immediately above the point where it discharges into the natural channel. The installation, consisting of four (4 ea.) closely-spaced rows of excelsior logs will serve primarily as sediment traps, rather than energy dissipaters. This set will be located conveniently close to the road to facilitate regular cleaning and maintenance. The sediment traps will be inspected routinely to make sure they are functioning properly. There will be mine personnel attending to the GVH units on a daily basis, and will be instructed to check the sediment traps on a regular basis, and especially after storm events. If they are in need of repair and/or cleaning such maintenance will be done immediately. Sediment cleaned from the traps will be hauled off-site and disposed of at an approved facility, such as the permitted Wildcat Loadout Coal Mine Refuse Disposal Site (DOGM permit C/007/033). All excelsior logs will be installed according to the manufacture's instructions.

Immediately after the cutslopes have been excavated to create the pad-site, the slopes will be pocked, and reseeded. A layer of woodstraw will then be spread over the reseeded slopes. This straw serves to not only provide microclimate conditions to encourage seed germination, it also absorbs some of the energy from falling raindrops, and therefore helps control erosion on the slopes until revegetation can become established. The pocking, which consists of irregular depressions measuring about 24" x 36" x 18" deep, helps revegetation by holding the seed and water in place, and thereby helps minimize erosion as well.

During the drilling phase of the GVH installation, the pad area will be used as an equipment lay-down area for drill steel, drill casing, drilling mud, concrete, etc. The pad will also be used to

accommodate the mud pits needed during the drilling operation. The mud pit will measure approximately 30' long x 10' wide x 10' deep, and will be located immediately down-canyon, i.e., southwest of, the drillholes, as shown in Attachment 1. The pit will be lined with a 12 mil plastic liner, with a 20 mil felt underlayment. Based on the diameter and total combined length of the drillholes, and assuming a swell factor of 40% for the cuttings, the estimated volume of cuttings is 1283 cubic feet, or 47 yds. This would result in a total depth of cuttings remaining in the bottom of the pit of about 4.28 ft. After the drillholes have been completed the remaining cuttings will be mixed with native material until it can be handled with heavy machinery. It will then be removed from the pit and hauled off-site to an approved disposal facility. After the cuttings have been removed, the pit will be backfilled and eliminated. The site will then be cleaned up and fine-graded prior to installing the methane extractor units (see Attachments 1 and 7 for details). A period of approximately two weeks will be required to construct the drillpad and to drill the holes. During this time interim sediment control will be provided by several rows of excelsior logs installed at the lower end of the construction site. Sediment is not expected to be a problem because of the short construction time involved (approx. 2 weeks), the low probability of rainfall events in late November at this elevation, and the temporary installation of the excelsior logs.

After the site has been constructed the entire operational pad area, as well as the adjacent road area and turnaround, will be graveled from the channel crossing up to the end of the road . This gravel will consist of a crushed rock 1.5" x 0" road base material, laid down and then compacted to a tight surface. This graveled surface will also serve to reduce erosion on the pad (and adjacent road segment) and thereby decrease sedimentation to the natural drainage.

In summary, the site will be an alternate sediment control area. Sediment will be controlled by the following combination of treatment methods:

1) Armoring the entire length of the drainage ditch with rip-rap.

2) Installation of energy dissipaters within the ditch to slow the flow velocity.

3) Installation of set of sediment control excelsior logs in the ditch ahead of the discharge point.

4) Pocking and revegetating the cutslope, including a layer of protective wood straw.

5) Graveling the pad-site and adjacent roadway

Refer to the site plan in Attachment 1 for the location of the drainage diversion ditch, energy dissipaters, excelsior log siltation controls, and graveled area. See Attachment 11 for the drainage control calculations determined by Blackhawk Engineering. This report concludes that with *"....installation of the proposed sediment and erosion controls, there should be no adverse effects to the surface hydrology of this area."*

The GVH installation and operation should have no adverse affect on ground-water hydrology.

The GVH site is located close to the area where the depth of cover over the longwall panels is the shallowest within the permit area. As a result, this area has been an area of interest in previous MRP amendments, resulting in enhanced water monitoring and subsidence monitoring requirements both above and below the GVH site. A more detailed discussion of the area hydrology can be found in R645-301-322.100 of the approved MRP. It should be noted that this area has been now been completely undermined since November, 2006, subsidence has stabilized, and no adverse affects to underground or surface hydrologic resources have been observed. See Attachment 10, prepared by Petersen Hydrologic, for a discussion of the potential hydrologic affects from the GVH installation and operation. This report concludes that *"adverse impacts to the hydrologic balance resulting from the installation and operation of the Bear Canyon GVH system are not anticipated."* The probable hydrologic consequences (PHC) section of the MRP (645-301-738) has been updated to include a discussion of the Bear Canyon GVH installation.

During drilling operations, as well as during the remainder of the operational life of the GVH installation, noncoal mine waste will be stored in suitable containers, and then disposed of off-site at an approved waste disposal facility. Hydrocarbons, including Diesel fuel, gasoline, oil and grease, will be stored in the factory supplied containment mounted within the machinery. If any stand-alone storage tanks are used they will be equipped with built-in containment capable of holding the entire contents of the tank. Absorbent pads and bags of absorbent granules will be kept on hand during the drilling operation, and later during the GVH operation, to be used in case of a spill of oil, fuel or grease. Used absorbent material will be disposed of at an approved disposal facility. All operations will be subject to the current Spill Prevention Control and Countermeasure Plan (SPCC) for the West Ridge Mine currently on file with the Division, and included in Attachment 14 for ready reference.

Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations, as discussed in the Chapter 5 section above. Upon final reclamation, any portion of the gravel surface that is stained or contaminated in any way with hydrocarbons will be dug up and hauled off the site to an approved waste disposal facility. After removing any contaminated gravel, the pad area and cutslopes will then be backfilled to approximate original contour, using fill material obtained from the adjacent roadway and leveling pads, and covering up the diversion ditch and the remaining gravel in the process. The slopes will then be re-topsoiled. The surface will then be pocked and re-seeded with an approved seed mix as described in the Chapter 2 discussion. A layer of wood straw will also be spread over the reclaimed slopes to help minimize erosion, and promote vegetation growth. After the reclaimed slopes have been topsoiled and reseeded, a row of excelsior logs will be installed along the full length of the toe of the slope between the slope and the remaining road, as shown on the Reclamation Plan, Attachment 1. The purpose of this row of excelsior logs is to control sediment off the site until the revegetation has become established. These sediment control logs will remain in place until vegetation has been established adequate for Phase 2 bond release.

CHAPTER 8, BONDING:

Note: In the West Ridge Mine MRP C/007/041, the bonding discussion appears in Chapter 5, Engineering. Bonding is included in this Appendix 5-14 as a Chapter 8 item to make the discussion more clear.

To aid in the determination of the bonding requirements for the Bear Canyon GVH, the following information is provided:

1) Volume of topsoil to salvage, and later to respread (as per the Order 1 soils survey, Attachment 2) .....515 yds

2) Volume of cut material to be backfilled upon reclamation (based on on-site surveys, and 1.5:1 reclaimed slopes, per Attachment 1).....842 yds

3) Number of methane extractor units to remove.....4 each

4) Drillhole to be plugged.....3 each, totaling 1380' deep, requiring 26yds of concrete

5) Total area of disturbance to be reclaimed and re-vegetated.....0.24 acres

As a basis of comparison, the existing Tower GVH reclamation costs, as taken from the currently approved MRP C/007/019, are broken down on a per-hole basis as follows:

Demolition	Structure removal (one unit/ site)	$8,220
	Plugging (average 2700' hole)	$5,000
	Total Demolition	$8,220
Earthwork	Backfill/Grading (5000 yds/site)	$3265
	Topsoil replacement (1600 yds/site)	$1258
	Support	$330
	Total Earthwork	$4861
Reveg	(Assumes one acre site)	$3575
Total Direct Costs		$16,656
Indirect Costs (26.8%)		$4,464
Total Cost		$21,120
Escalation (0.012 x 4 years)		$1,032
Reclamation Cost		$22,120
Bond amount (rounded to nearest $1000)		$23,000

It should be noted that the reclamation bonds for the most recent GVH installations at Tower Mine (Centennial Project, C/007/017, April, 2007) is $28,000. The allows an additional amount to reclaim the dedicated access roads leading to various pads. Complete details of the Tower GVH bonding calculations can be found in Appendix B of the Centennial Project Mining and Reclamation Plan on file with the Division. Relative pages from those calculations pertinent to the most recent Tower GVHs are included herein in Attachment 12 for ready reference.

In comparison to the West Ridge Bear Canyon GVH, the typical Tower GVH sites involve:

a) deeper holes to be plugged..... (2700' vs 1380')
b) greater volume of topsoil to be replaced..... (1600 yds. vs 515 yds)
c) larger pad areas to be topsoiled..... (1.0 acre vs 0.24 acres)
d) greater backfill volume..... (5000 yds. vs 842 yds.)

One the other hand, the West Ridge GVH has four units to dissemble vs one or two at Tower, and at the West Ridge GVH the topsoil must be hauled about 3300' back to the site whereas at Tower the topsoil is stockpiled on the site itself. On balance, it would appear that the reclamation bonding cost of the West Ridge GVH should reasonably be no greater than the Tower cost, especially since the actual Tower bonding amount is $28,000 per site rather than the calculated $23,000.

However, the most important consideration is the fact that the West Ridge Mine reclamation bond is presently posted at $2,117,000, while the reclamation cost escalated to 2011 is $1,735,000. Therefore West Ridge Resources presently has $382,000 excess bonding in place (22.2% difference) which should be more than adequate to cover the conservatively estimated reclamation cost of $28,000 for the Bear Canyon GVH site.

In the interest of time, West Ridge Resources is agreeable to using the $28,000 bonding amount currently accepted by the Division for the Tower GVH installations as sufficient for the West Ridge Bear Canyon GVH as well, subject to Division concurrence. This would increase the total (2011) West Ridge Mine bond obligation to $1,763,000 ($1,735,000 + $28,000), but would still leave a bonding surplus of $354,000 ($2,117,000 - $1,763,000).

Note : Updated bonding information reflecting the Bear Canyon GVH, as provided by the Division, is now included in Attachment 17.

ATTACHMENT 1

BEAR CANYON GVH SITE

a) LOCATION
b) PRE-EXISTING SITE
c) FACILITY SITE PLAN
d) TYPICAL CROSS-SECTIONS
e) CUTSLOPE EXCAVATION VOLUMES
f) RECLAMATION CONTOURS

WEST RIDGE MINE
Bear Canyon GVH Location Map

STATE LEASE ML 49287

STATE LEASE ML 47711

FEDERAL LEASE UTU-78562

FEDERAL LEASE SL-068754

FEE

BEAR CANYON GVH SITE

GVH TOPSOIL STORAGE AREA

TOPSOIL BORROW PERMIT AREA (SITLA)

PUMP STATION PERMIT AREA

46 KV POWERLINE

CARBON COUNTY ROAD

T. 13 S.

T. 14 S.

R. 13 E.

R. 14 E.

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

UTAH REGISTERED #6449561 David W. Hibbs 10/15/08 PROFESSIONAL ENGINEER

Existing Permit Area (6114.89 acres)

LEGEND:
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop

N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

DATE: 10-15-08 REV: 1 ACAD REF: GVH Location Map

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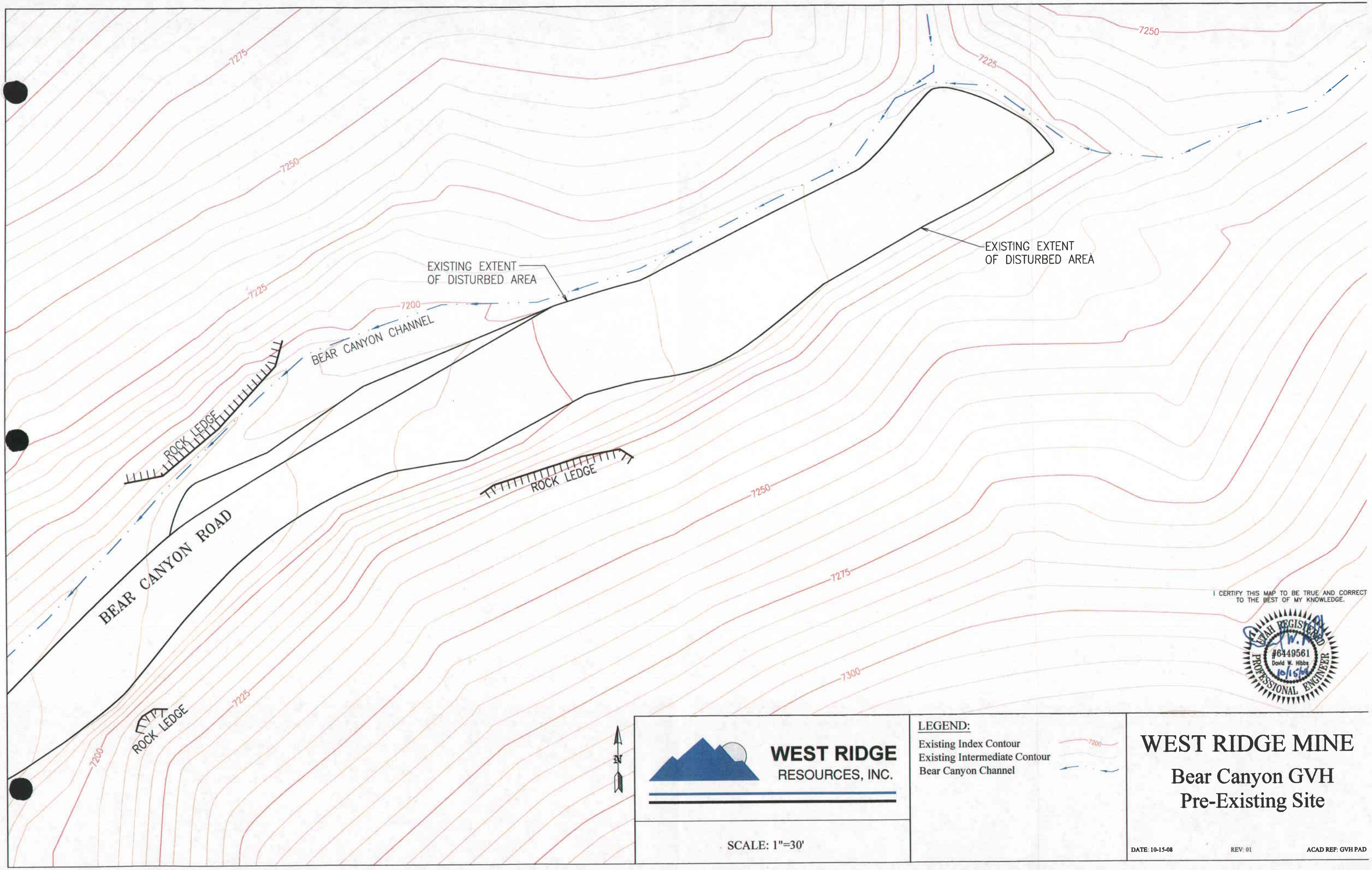


I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

UTAH REGISTERED
David W. Hibbs
#6449561
PROFESSIONAL ENGINEER
10/15/08

WEST RIDGE
RESOURCES, INC.

SCALE: 1"=30'

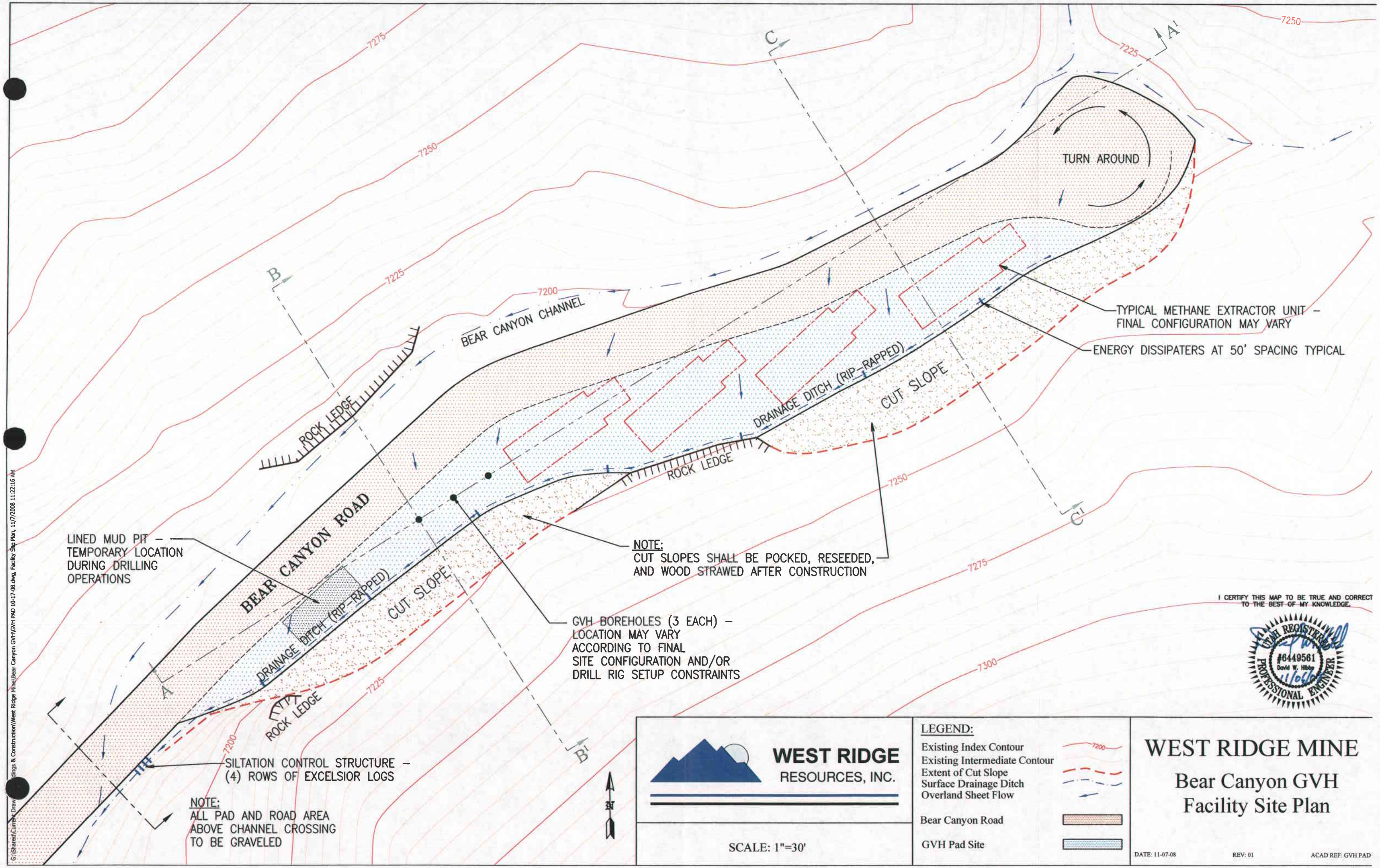
LEGEND:

Existing Index Contour
Existing Intermediate Contour
Bear Canyon Channel

WEST RIDGE MINE

Bear Canyon GVH
Pre-Existing Site

DATE: 10-15-08 REV: 01 ACAD REF: GVH PAD



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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

WEST RIDGE RESOURCES, INC.

SCALE: 1"=30'

LEGEND:

- Existing Index Contour (7200)
- Existing Intermediate Contour
- Extent of Cut Slope
- Surface Drainage Ditch
- Overland Sheet Flow
- Bear Canyon Road
- GVH Pad Site

WEST RIDGE MINE

Bear Canyon GVH Facility Site Plan

DATE: 11-07-08 REV: 01 ACAD REF: GVH PAD

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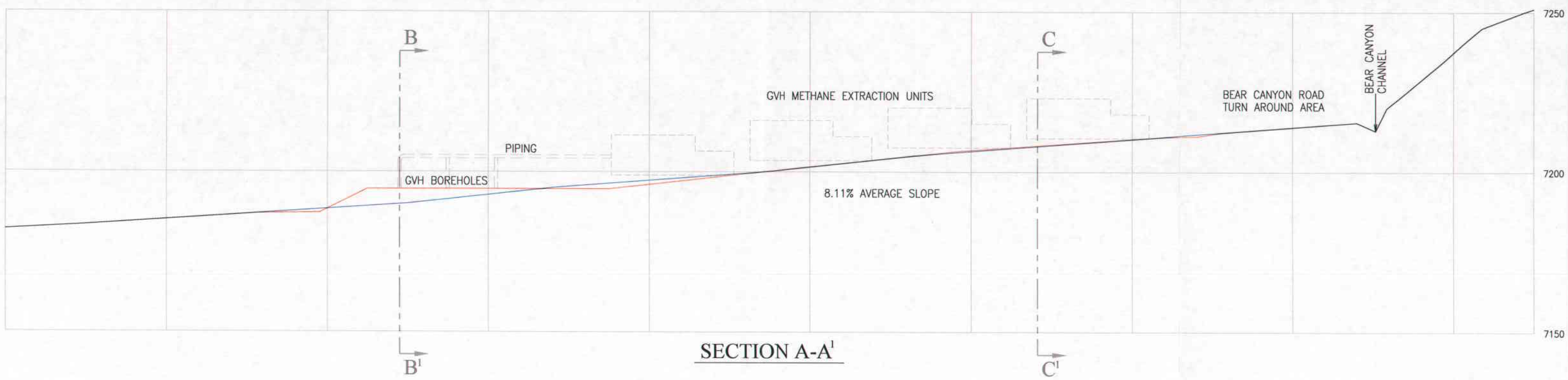

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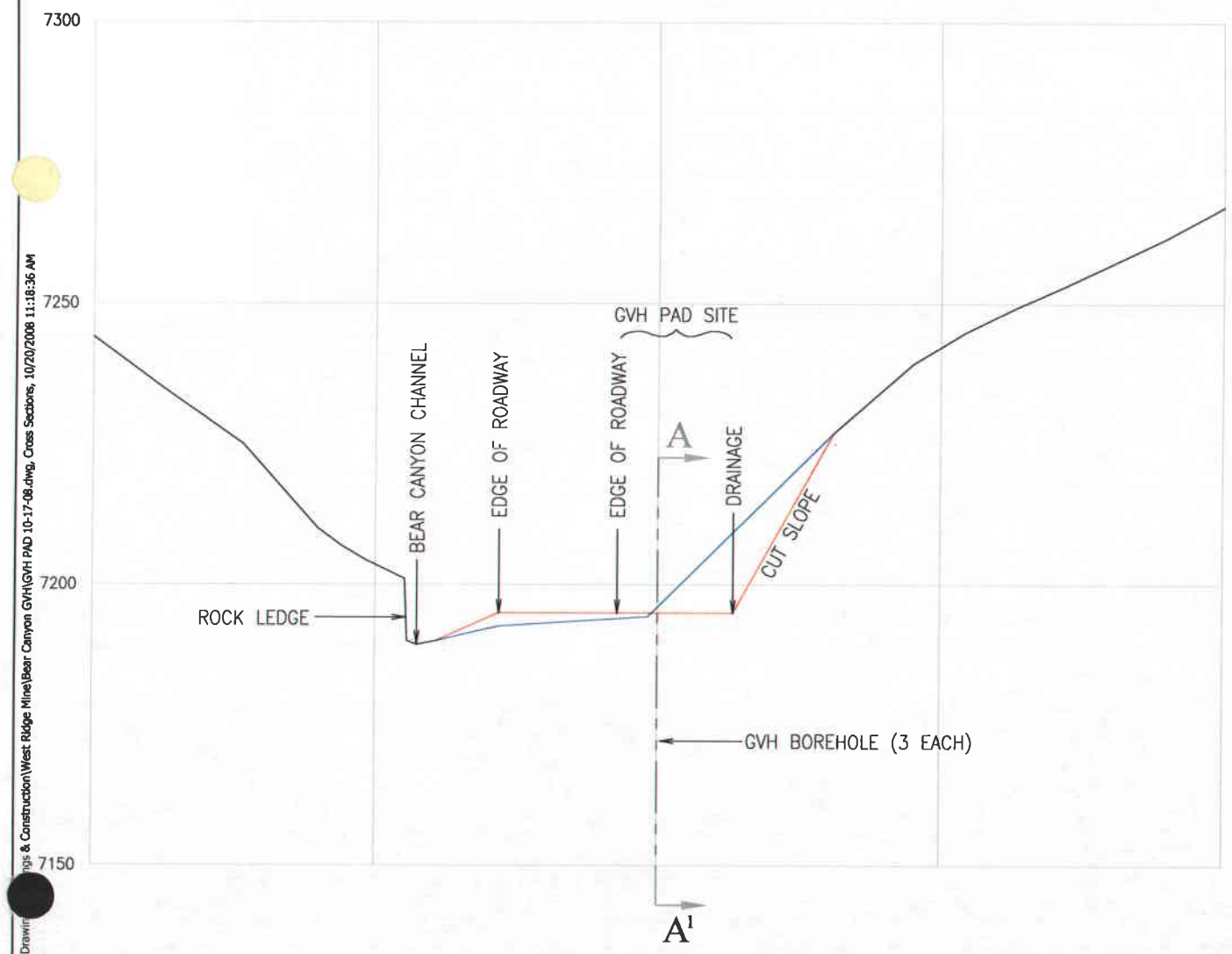

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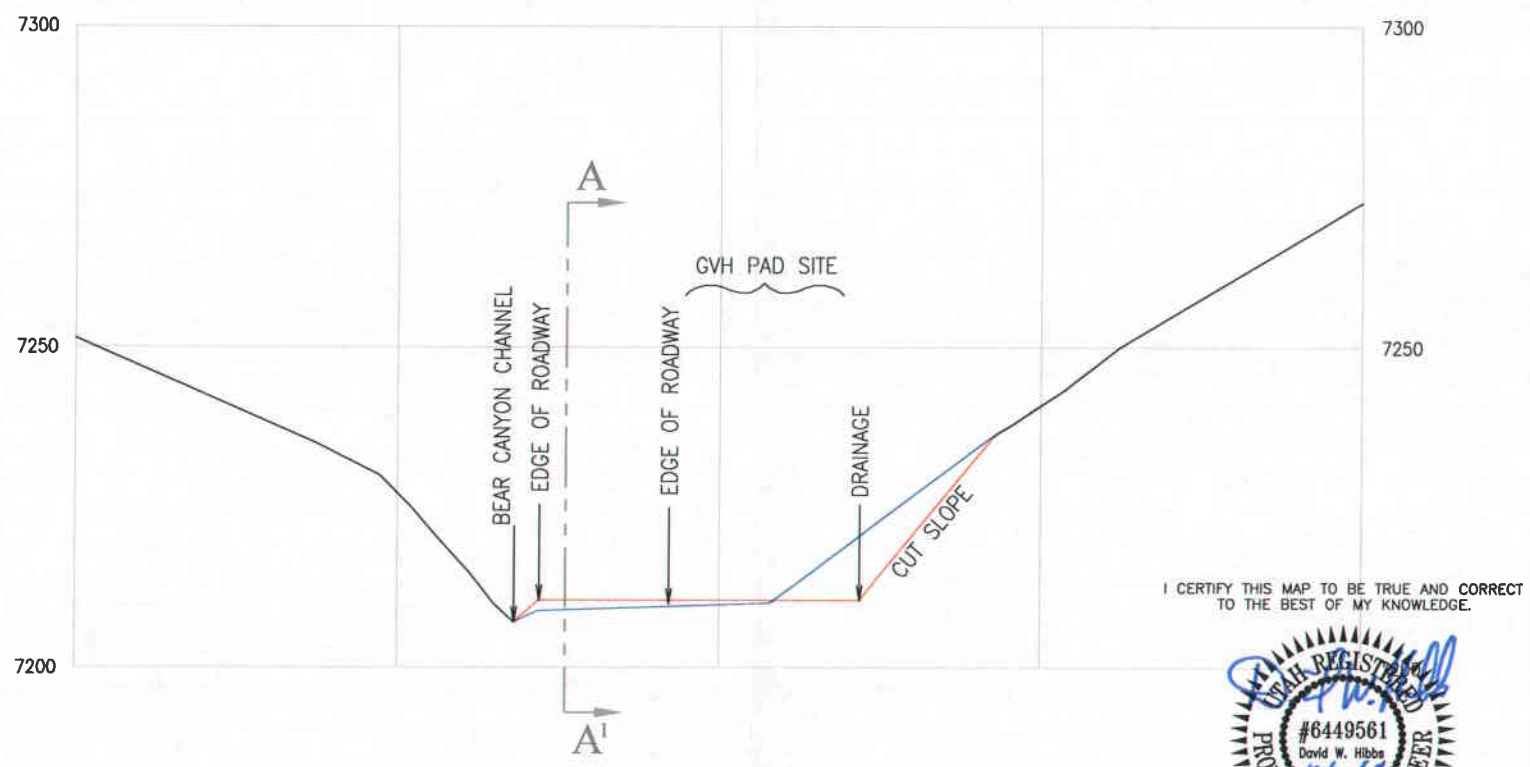

SECTION C-C1

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER 10/20/08

WEST RIDGE RESOURCES, INC.

SCALE: 1"=30'

LEGEND:

Pre-construction Profile

Operational Profile

WEST RIDGE MINE

Bear Canyon GVH Typical Cross-Sections

DATE: 10-20-08 REV: 01 ACAD REF: GVH PAD

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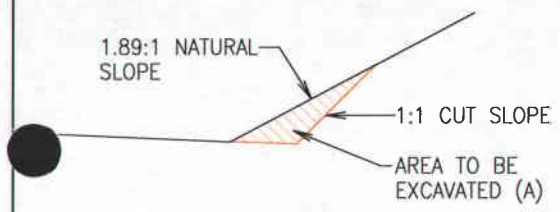

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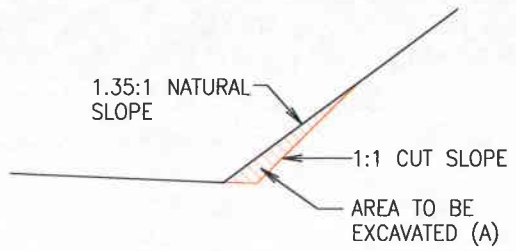

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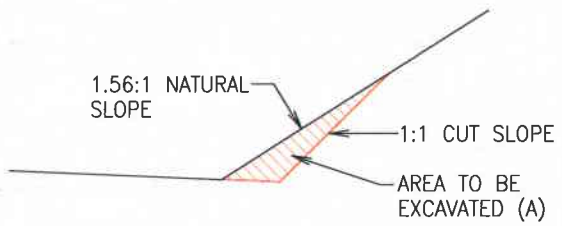

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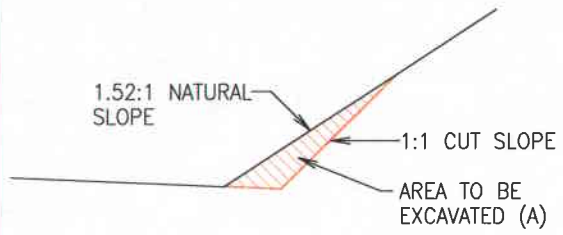

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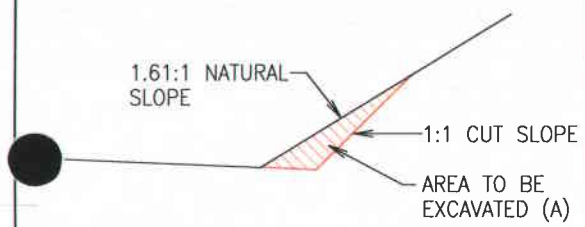

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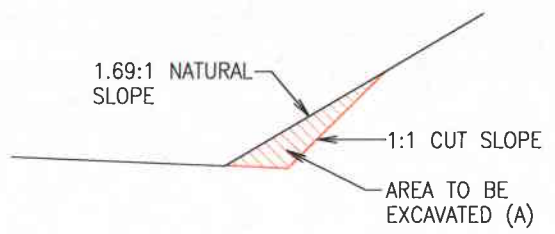

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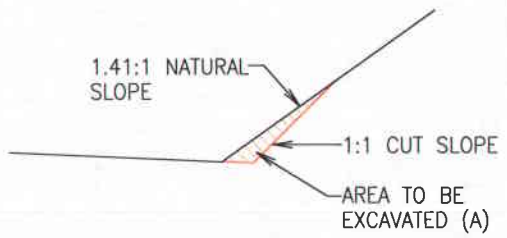

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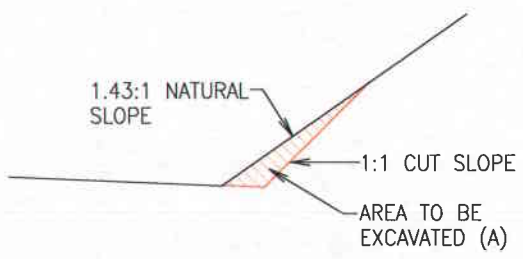

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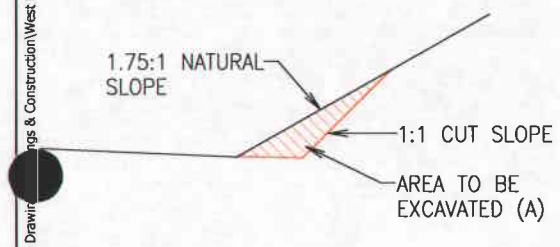

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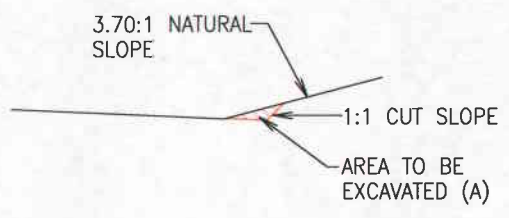


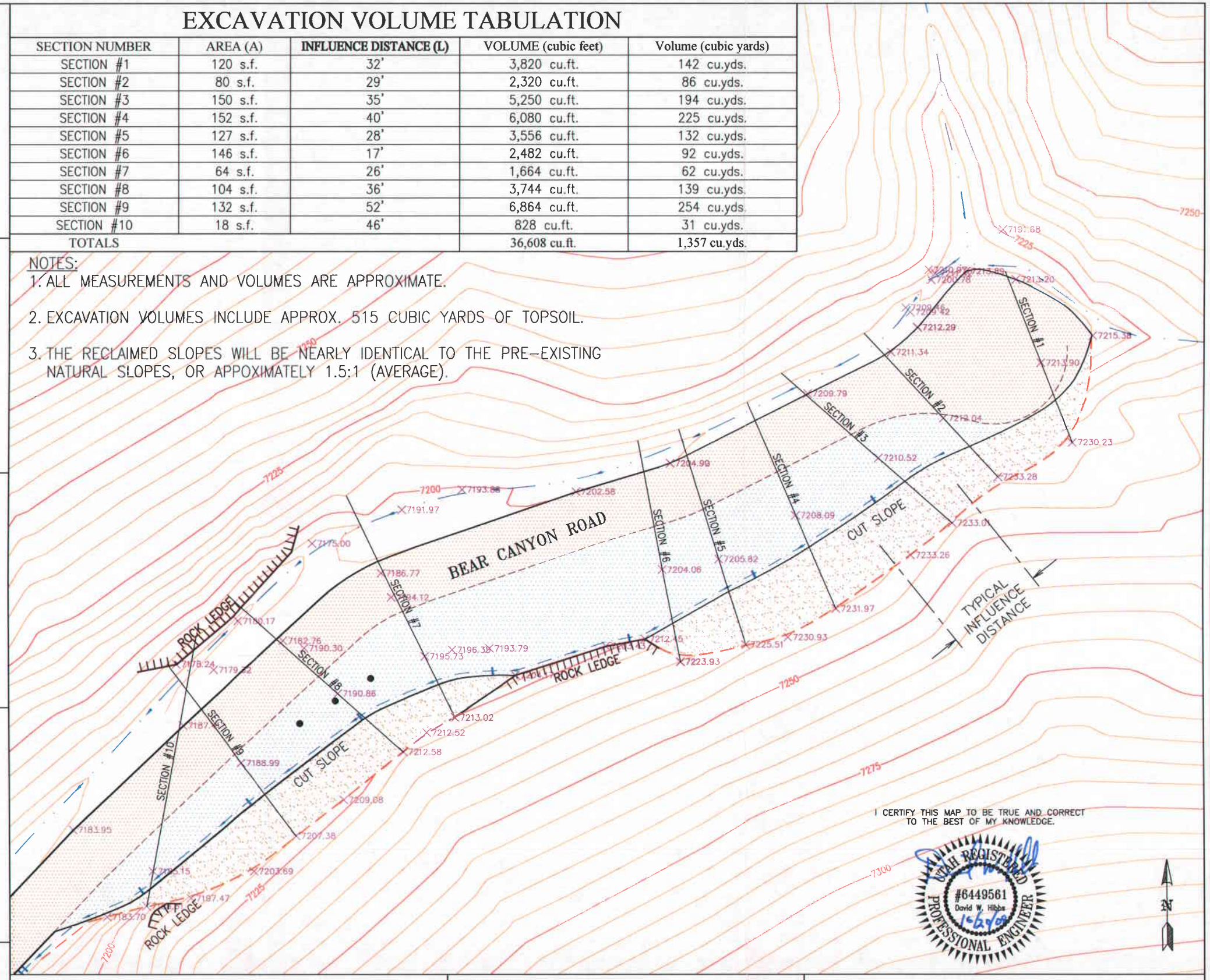
SECTION #10

EXCAVATION VOLUME TABULATION

SECTION NUMBER	AREA (A)	INFLUENCE DISTANCE (L)	VOLUME (cubic feet)	Volume (cubic yards)
SECTION #1	120 s.f.	32'	3,820 cu.ft.	142 cu.yds.
SECTION #2	80 s.f.	29'	2,320 cu.ft.	86 cu.yds.
SECTION #3	150 s.f.	35'	5,250 cu.ft.	194 cu.yds.
SECTION #4	152 s.f.	40'	6,080 cu.ft.	225 cu.yds.
SECTION #5	127 s.f.	28'	3,556 cu.ft.	132 cu.yds.
SECTION #6	146 s.f.	17'	2,482 cu.ft.	92 cu.yds.
SECTION #7	64 s.f.	26'	1,664 cu.ft.	62 cu.yds.
SECTION #8	104 s.f.	36'	3,744 cu.ft.	139 cu.yds.
SECTION #9	132 s.f.	52'	6,864 cu.ft.	254 cu.yds.
SECTION #10	18 s.f.	46'	828 cu.ft.	31 cu.yds.
TOTALS			36,608 cu.ft.	1,357 cu.yds.

NOTES:

1. ALL MEASUREMENTS AND VOLUMES ARE APPROXIMATE.
2. EXCAVATION VOLUMES INCLUDE APPROX. 515 CUBIC YARDS OF TOPSOIL.
3. THE RECLAIMED SLOPES WILL BE NEARLY IDENTICAL TO THE PRE-EXISTING NATURAL SLOPES, OR APPOXIMATELY 1.5:1 (AVERAGE).



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

UTAH REGISTERED PROFESSIONAL ENGINEER #6449561 David W. Hibbs

WEST RIDGE RESOURCES, INC.

SCALE: 1"=40'

LEGEND:

- Existing Index Contour
- Existing Intermediate Contour
- Extent of Cut Slope
- Existing Bear Canyon Channel
- New Surface Drainage
- Bear Canyon Road
- GVH Pad Site

WEST RIDGE MINE

Cut Slope Excavation Volumes

DATE: 10-20-08 REV: 01 ACAD REF: GVH PAD

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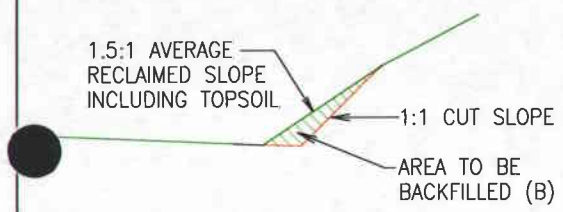
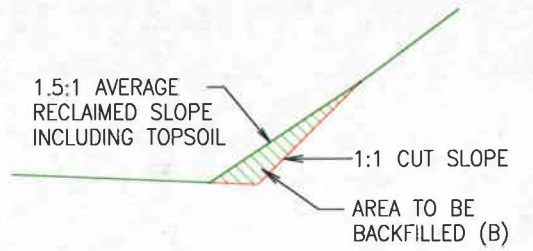


SECTION #1



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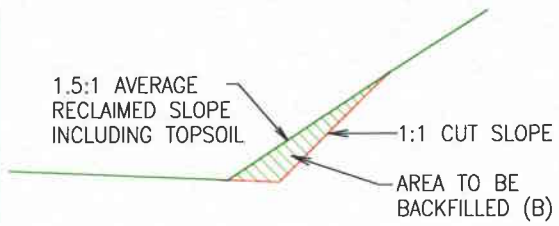

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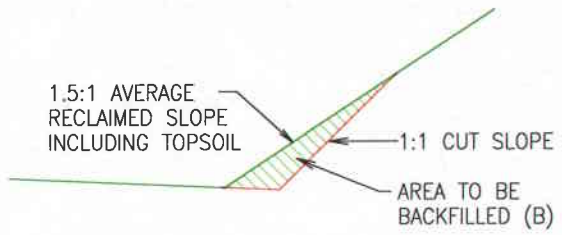

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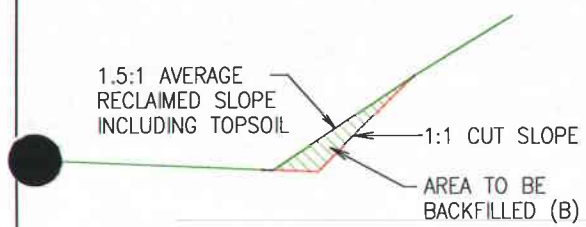

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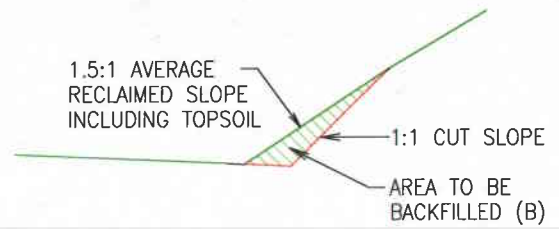

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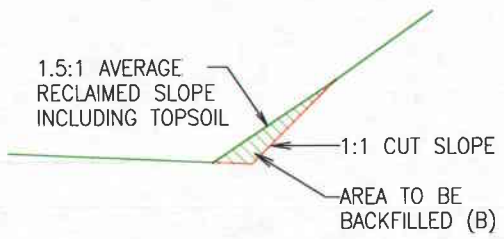

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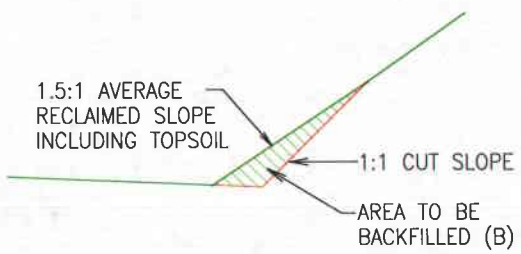

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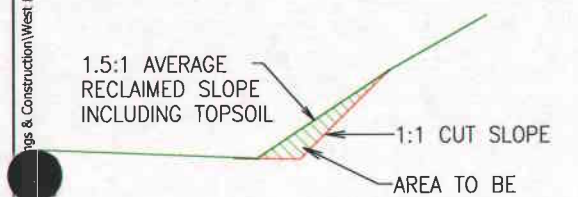

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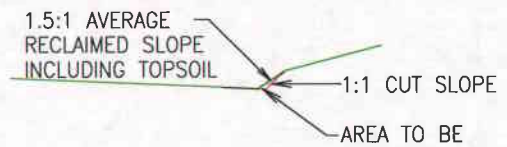
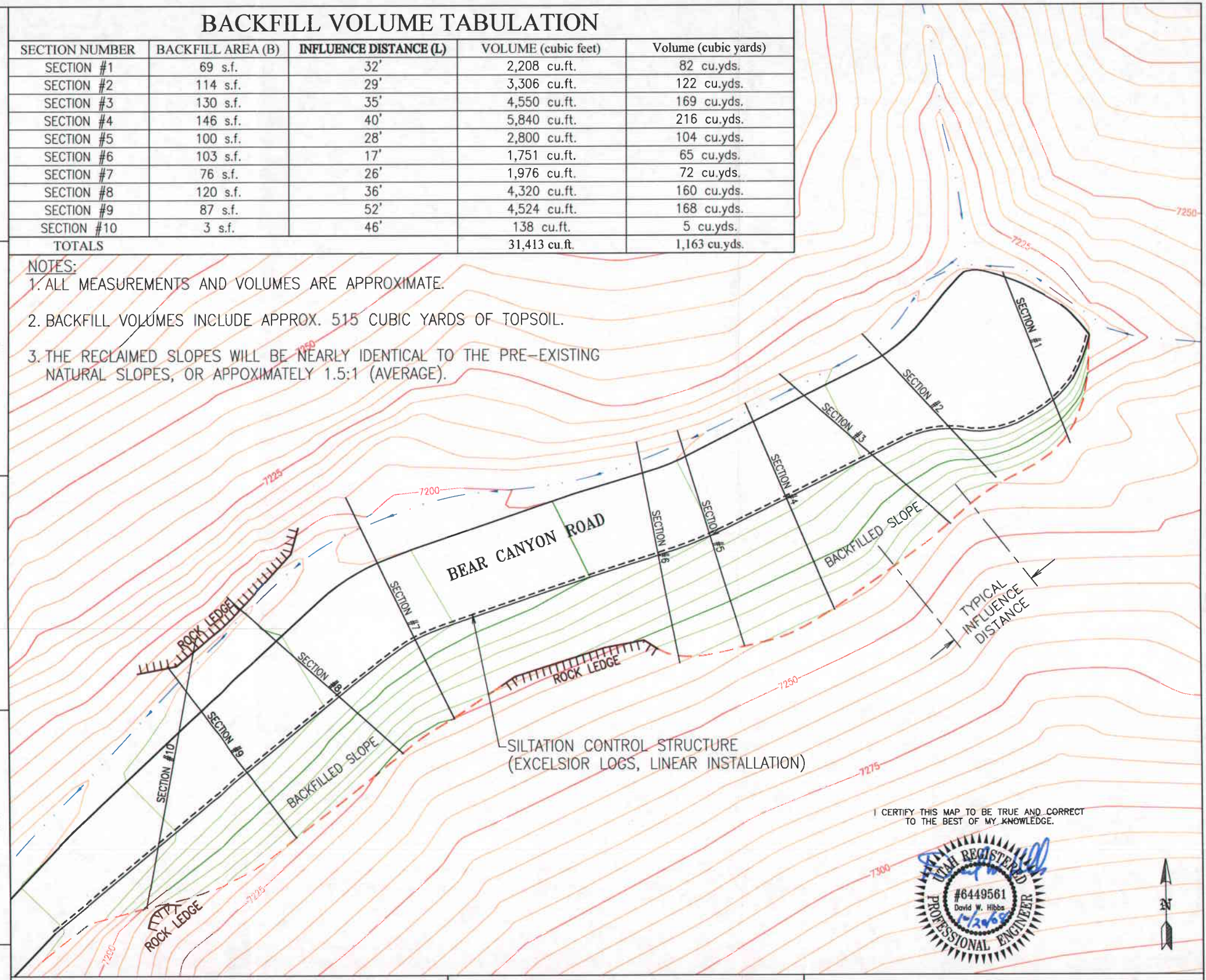


SECTION #10

BACKFILL VOLUME TABULATION

SECTION NUMBER	BACKFILL AREA (B)	INFLUENCE DISTANCE (L)	VOLUME (cubic feet)	Volume (cubic yards)
SECTION #1	69 s.f.	32'	2,208 cu.ft.	82 cu.yds.
SECTION #2	114 s.f.	29'	3,306 cu.ft.	122 cu.yds.
SECTION #3	130 s.f.	35'	4,550 cu.ft.	169 cu.yds.
SECTION #4	146 s.f.	40'	5,840 cu.ft.	216 cu.yds.
SECTION #5	100 s.f.	28'	2,800 cu.ft.	104 cu.yds.
SECTION #6	103 s.f.	17'	1,751 cu.ft.	65 cu.yds.
SECTION #7	76 s.f.	26'	1,976 cu.ft.	72 cu.yds.
SECTION #8	120 s.f.	36'	4,320 cu.ft.	160 cu.yds.
SECTION #9	87 s.f.	52'	4,524 cu.ft.	168 cu.yds.
SECTION #10	3 s.f.	46'	138 cu.ft.	5 cu.yds.
TOTALS			31,413 cu.ft.	1,163 cu.yds.

NOTES:
1. ALL MEASUREMENTS AND VOLUMES ARE APPROXIMATE.
2. BACKFILL VOLUMES INCLUDE APPROX. 515 CUBIC YARDS OF TOPSOIL.
3. THE RECLAIMED SLOPES WILL BE NEARLY IDENTICAL TO THE PRE-EXISTING NATURAL SLOPES, OR APPOXIMATELY 1.5:1 (AVERAGE).



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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER 12/2/08

WEST RIDGE RESOURCES, INC.

SCALE: 1"=40'

LEGEND:
- Existing Index Contour
- Existing Intermediate Contour
- Extent of Cut Slope
- Existing Bear Canyon Channel
- Siltation Control Structure
- Reclaimed Index Contour
- Reclaimed Intermediate Contour

WEST RIDGE MINE

Reclamation Plan with Backfill Volumes

DATE: 10-20-08 REV: 01 ACAD REF: GVH PAD

G:\Shared\Current Drawings & Construction\West Ridge Mine\Bear Canyon GVH\GVH PAD 10-17-08.dwg, ReBarn, 10/20/2008 11:23:46 AM

ATTACHMENT 2

ORDER 1 SOILS SURVEY
LONG RESOURCE CONSULTANTS

Long Resource Consultants, Inc.

1960 W Deep Creek Road, Morgan, UT 84050-966, Office 801-829-6416, Cell 801-791-3447, Email lrcsoils@msn.com

Mr. Dave Shaver
Utah American Energy
West Ridge Mine
P.O. Box 1077
Price, Utah 84501

October 15, 2008

Dave,

Attached is the soils evaluation report for the Bear Canyon Gas Vent Hole location. It includes an assessment of existing soil conditions correlated to established soil series that are presently in use by the NRCS in either Carbon or Emery counties. An estimate of the potential topsoil salvage quantity is also included. All salvage operations should be closely monitored.

Thank you for the opportunity to conduct this soil resource evaluation for the Westridge Mine. Please contact me if you have any questions (801-791-3447).

Sincerely,

Robert E. Long, CPSS
President

Bear Canyon – Left Fork
Soils Evaluation

Gas Vent Hole

Location:	Easting	547580
	Northing	4387075
	Zone	12
	NAD	1983
	Township	14 South
	Range	13 East
	Section	3
	Meridian	Salt Lake
	USGS Quad: Mount Bartles, Utah	
Elevation:	7185 to 7240 feet	

Purpose of Soil Resource Assessment

The purpose of this soil resource assessment was to determine how closely the soils at the Bear Canyon Gas Vent Hole (GVH) site correlated with the Carbon County Soil Survey produced by the Natural Resource Conservation Service (NRCS, USDA 2007). Topsoil and subsoil salvage depths were estimated based on soil profile descriptions. Soil types vary across the site and monitoring should be part of the topsoil salvage operations.

The identification of hazardous or toxic materials was not part of this soil resource assessment.

Assessment Methods

This assessment was made by comparing the soil map unit delineated by the NRCS in the Carbon County Soil Survey with the soils actually identified at the site. Three soil profile descriptions were completed for the Bear Canyon GVH location using the Field *Book for Describing and Sampling Soils* (Schoeneberger, P.J., et. al., 2002).

The soil resource assessment was conducted by Robert E. Long, Certified Professional Soil Scientist (CPSS, No. 02346 ARCPACS) on October 7, 2008.

Taxonomic classification of the soil pedons was based on *Keys to Soil Taxonomy*, Tenth Edition (USDA 2006). The pedons were correlated to established soil series (USDA 2008) currently in use in Carbon and Emery Counties, Utah.

Soil colors were compared with color chips in the *Munsell Soil Color Charts* (Munsell 2000).

Soil pH was measured with field indicator dyes (phenol red and thymol blue).

Percent calcium carbonate was determined with a field calcimeter.

Digital photographs were taken at each soil profile location to document current conditions.

The *Soil Pit Location Map* was drawn to scale by Westridge mine staff. Elevations for each soil profile location were based on the soil map topographic lines. Soil area delineations were estimated in the field by visual observation of the cutbank.

Dominant vegetation was identified. A separate quantitative vegetation assessment is being prepared by Mt. Nebo Scientific.

Site locations were recorded with a Garmin GPSmap 60CSX in UTM, NAD 1983. The UTM location listed at the beginning of this report is for soil pit BC-GVH-02 which is located near the center of the Bear Canyon GVH evaluation area.

General Site Description

A soil resource evaluation was conducted at the Gas Vent Hole location in the right fork of Bear Canyon on October 7, 2008. The access road leading to the site had been upgraded just prior to the soils evaluation. The road upgrade exposed an 8 to 12 foot cutbank along the north side of the proposed GVH site. The Bear Canyon GVH location is 0.24 acres (*Soil Pit Location Map*).

The proposed GVH site is at the footslope of a very steep north-northwest facing mountain sideslope. Slopes on the GVH site range from 6 to 10 percent on the footslope and 25 to 40 percent above the footslope. Soils developed from alluvial and colluvial deposition.

Elevation at the site ranges from 7,185 to approximately 7,240 feet.

Estimated annual precipitation ranges from 20 to 35 inches based on the official soil series descriptions (USDA 2008).

Sandstone rock outcrops occur on the upslope perimeter and are shown on the *Soil Pit Location Map* as rock ledges.

NRCS Soil Map Unit

The south side of the right fork of Bear Canyon was delineated (NRCS 2007) as map unit 21 by the NRCS (Croydon loam, 8 to 30 percent slopes). Croydon soils are very deep with a thick mollic (dark) surface and an argillic horizon (Pachic Argicryoll, fine-loamy, mixed, superactive). Soils identified at the Bear Canyon GVH site were similar to Croydon, but they have calcic horizons and contain large amounts of subangular sandstone fragments. Descriptions of the soils identified at the Bear Canyon GVH site are in the *Topsoil Resource* section of this report.

The north side of the right fork of Bear Canyon was delineated (NRCS 2007) as map unit 84 (Podo – Rock outcrop complex, 50 to 70 percent slopes) by the NRCS. Disturbance is not anticipated on the north side of the right fork of Bear Canyon.

Soil Resource

Three soil pedons were evaluated along the access road cutbank. Soil pedon BC-GVH-01 was trimmed back with shovels, while pedons BC-GVH-02 and BC-GVH-03 were dug approximately 6 to 8 feet into the cutbank with a backhoe. Table 1 lists the taxonomic classification and correlated soil series for the described soil pedons. The location of each soil pedon is shown on the *Soil Pit Location map*.

Table 1. Taxonomic classification of Bear Canyon GVH soil profiles.

Pedon	Soil Series	Taxonomic Classification
1	Aagard skeletal taxadjunct	Calcic Pachic Argicryoll, loamy-skeletal, mixed, superactive
2	Northorn	Calcic Argicryoll, fine-loamy, mixed, superactive
3	Aagard	Calcic Pachic Argicryoll, fine-loamy, mixed, superactive

Coarse fragments ranging in size from gravels to stones and some boulders were observed in all three soil pedons. Percent, size, and location of sandstone fragments varied between and within the pits.

Each of the three soil pedons exhibited evidence of multiple episodes of alluvial and colluvial deposition. This determination was based on irregular changes in soil color, texture, carbonates, and rock fragments (size and percent).

Pedon BC-GVH-01 was located near the east end of the Bear Canyon GVH evaluation area, photos 1 through 3. This pedon is pachic with mollic soil colors extending to a depth of 17 inches. Rock fragments were approximately 40 percent in the surface 12 inches and none in the buried A horizon (2A, 12-17 inches). Rock fragment content below 17 inches ranged from 5 to 45 percent. Calcium carbonate percent increased significantly below 17 inches. The amount of calcium carbonate present in the soil met the requirements for a calcic horizon from 17 to 44 inches. This soil was correlated to a skeletal taxadjunct of the Aagard soil series.

Pedon BC-GVH-02 was located near the center of the Bear Canyon GVH evaluation area, photos 4 through 6. Mollic soil colors only extended to 12 inches in this pedon. Rock fragments ranged from 18 to 30 percent in the surface 12 inches; and from 10 to 70 percent below 12 inches. Calcium carbonate percent began to increase significantly at 12 inches. Two calcic horizons were present at 20 to 38 inches and from 51 to 84 inches. This soil was correlated to the Northorn soil series.

Pedon BC-GVH-03 was located near the west end of the Bear Canyon GVH evaluation area, photos 7 through 9. This pedon is pachic with mollic soil colors extending to a depth of 17 inches. Rock fragments were approximately 15 percent in the surface 17 inches; and ranged from 40 to 70 percent below 17 inches. Calcium carbonate percent ranged from 18 to 25 percent below 17 inches and met the requirements of a calcic horizon. This soil was correlated to the Aagard soil series.

Topsoil Salvage

The depth of topsoil salvage varies across the Bear Canyon GVH location. The GVH location was divided into three soil areas to describe the potential topsoil salvage depths. Table 2 illustrates the range of soil characteristics within each pedon that have an effect on topsoil suitability. The depth of suitable topsoil corresponds directly with the depth of mollic soil colors.

Large stones and boulders should be removed from the salvaged topsoil, as much as may be feasibly possible, during the salvage operations.

Table 2. Soil characteristics influencing topsoil suitability (Utah DOGM 2005).

Depth	Horizon	Mollic Soil Colors	pH[1]	$CaCO_3$ [2]	Rock Fragments[3]	Topsoil Salvage Depth	Topsoil Salvage Depth Determining Feature(s)
inches				%	%	inches	
BC-GVH-01							
2-0	Oi		Leaves, needles & twigs				
0-3	A1	Yes	7.6	6	40		
3-12	A2	Yes	7.6	11	40		
12-17	2A	Yes	7.9	8	0	17	
17-34	2Btk	No	8.4	16	45		Alkaline soil pH (>8.2), CaCO3% (>15), rock fragments (>35%).
34-44	3A	No	8.2	15	30		
44-56	3Bw	No	8.2	10	5		
56-84	4Bk	No	8.4	8	40		
BC-GVH-02							
2-0	Oi		Leaves, needles & twigs				
0-3	A	Yes	7.8	2	18		
3-12	Bt	Yes	7.9	8	30	12	
12-20	BC	No	8	12	40		Alkaline soil pH (>8.2), CaCO3% (>15), rock fragments (>35%).
20-38	2CA	No	8.1	19	10		
38-45	3Bk	No	8.2	15	70		
45-51	4A	Yes	7.9	5	10		
51-72	5Bk	No	8.4	15	70		
72-84	6C	No	8.1	9	15		
BC-GVH-03							
2-0	Oi		Leaves, needles & twigs				
0-4	A	Yes	7.6	3	15		
4-17	Bt	Yes	7.9	7	15	17	
17-30	BC	No	8.2	18	40		Alkaline soil pH (>8.2), CaCO3% (>15), rock fragments (>35%).
30-57	2CA	No	8.4	18	40		
57-90	3Bk	No	8.4	25			

1. Soil pH was measured with indicator dyes; good (6.2-8.2), fair (8.2-8.5), and poor (8.6-9.0).
2. Percent CaCO3 was measured with field calcimeter; good (<15%), fair (15-30%), and poor (>30%).
3. Percent rock fragments was estimated visually in the field; good (<35%), fair (35-65%), poor (>65%).

Topsoil suitability: Good Fair Poor

Table 3 lists the potential topsoil salvage depths and estimated quantities for the Bear Canyon GVH location. Topsoil depths may decrease as the slope increases. Topsoil salvage operations should be monitored by a Certified Professional Soil Scientist. The estimated total topsoil salvage quantity of 514.2 cubic yards will allow approximately 15 to 16 inches of topsoil to be spread evenly over the final graded surface of 0.24 acres.

Table 3. Potential topsoil salvage depths and estimated quantities by soil area and total GVH project location.

Soil Area	Soil Pedon	Potential Topsoil Depth[1]	Area[2]	Estimated Topsoil Quantity[3]
		inches	acres	cubic yards
A	1	17	0.08	182.8
B	2	12	0.05	80.7
C	3	17	0.11	251.4
Total			0.24	514.2

1. Potential topsoil salvage depth is based on depths observed in representative soil pedons evaluated in each soil area.
2. Area is based on acres measured by Westridge Mine staff and delineated on the *Soil Pit Location Map*.
3. Estimated topsoil salvage quantity is based on potential topsoil salvage depth and measured area.

Vegetation

The dominant vegetation community consists of an overstory of Douglas fir, bigtooth maple, and quaking aspen. The understory shrub community is dominated by mountain snowberry. The vegetation report written by Mt. Nebo Scientific contains a more detailed quantitative description of the site vegetation.

Reclamation Potential

The potential for successfully reclaiming the Bear Canyon GVH location is good based on the estimated quality and quantity of topsoil that may be salvaged.

Site Photos

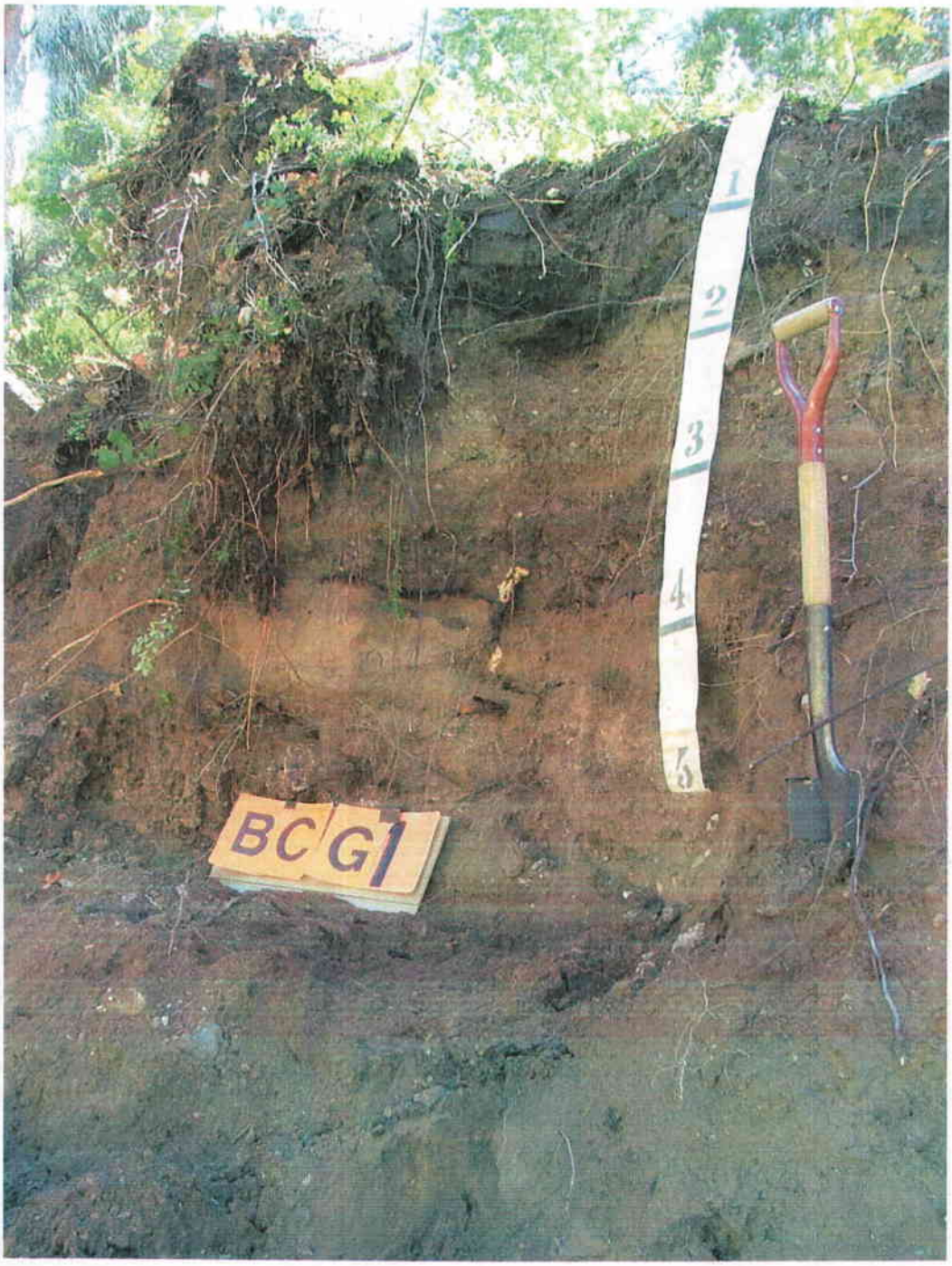


Photo 1. Soil profile BC-GVH-01 located at the east end of the Bear Canyon GVH evaluation area. This soil was correlated to be a skeletal taxadjunct of the Aagard soil series (Calcic Pachic Argicryoll, loamy-skeletal, mixed, superactive).

Photo 2. Location of soil profile BC-GVH-01 at east end of Bear Canyon soils evaluation area. Description was done in cutbank on convex knoll of mountain footslope.

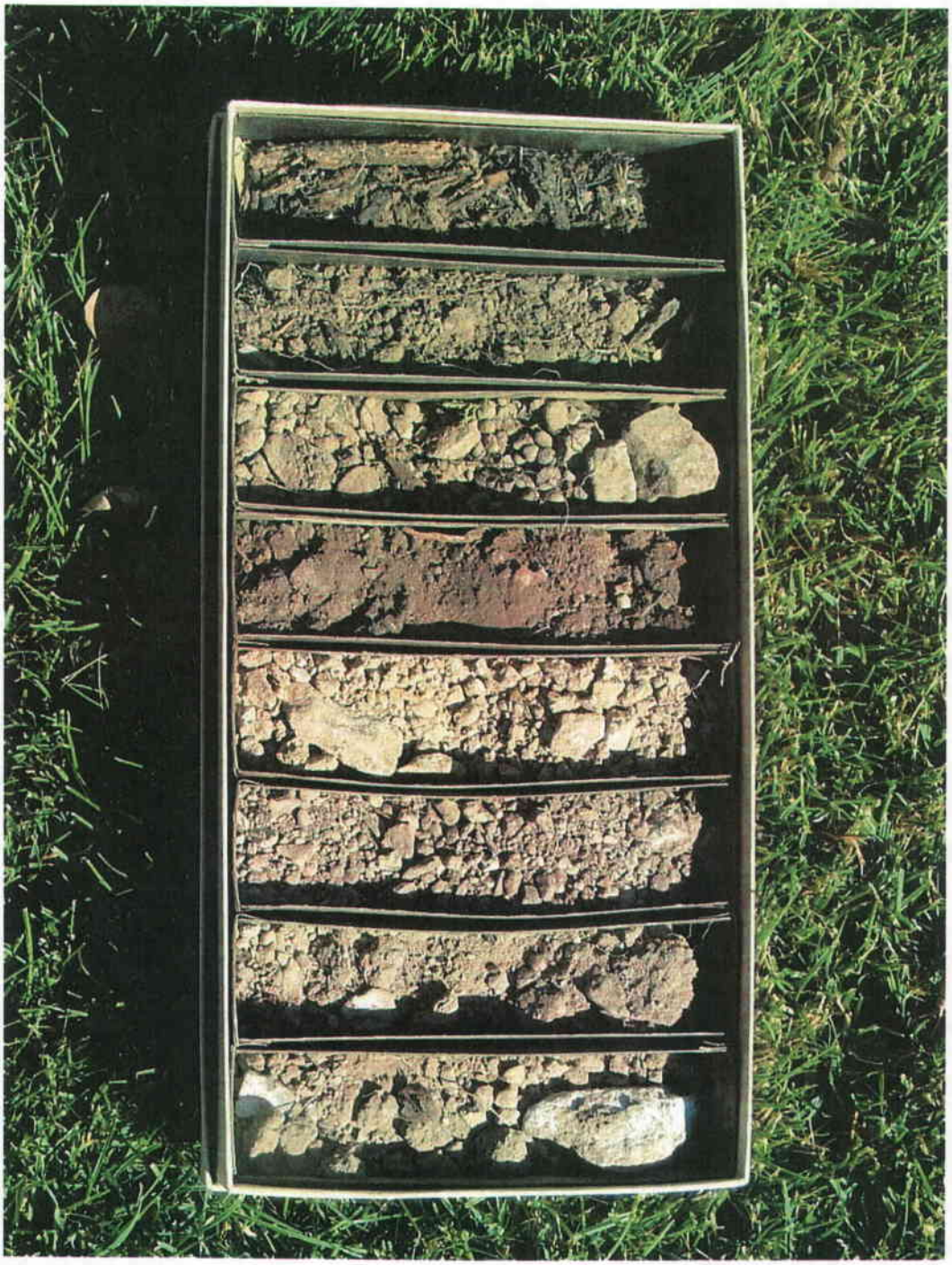


Photo 3. BC-GVH-01 pedon sample box. Top tray contains the Oi horizon (needles, leaves, and twigs). Potential topsoil salvage depth (0-17 inches) is limited to trays 2 (A1, 0-3 inches), 3 (A2, 3-12 inches), and 4 (2A, 12-17 inches) from top. The calcic horizon is contained in trays 5 (2Btk, 17-34 inches) and 6 (3A, 34-44 inches) from the top. Tray 8 (4Bk, 56-84 inches) has poor soil pH and poor percent rock fragments.

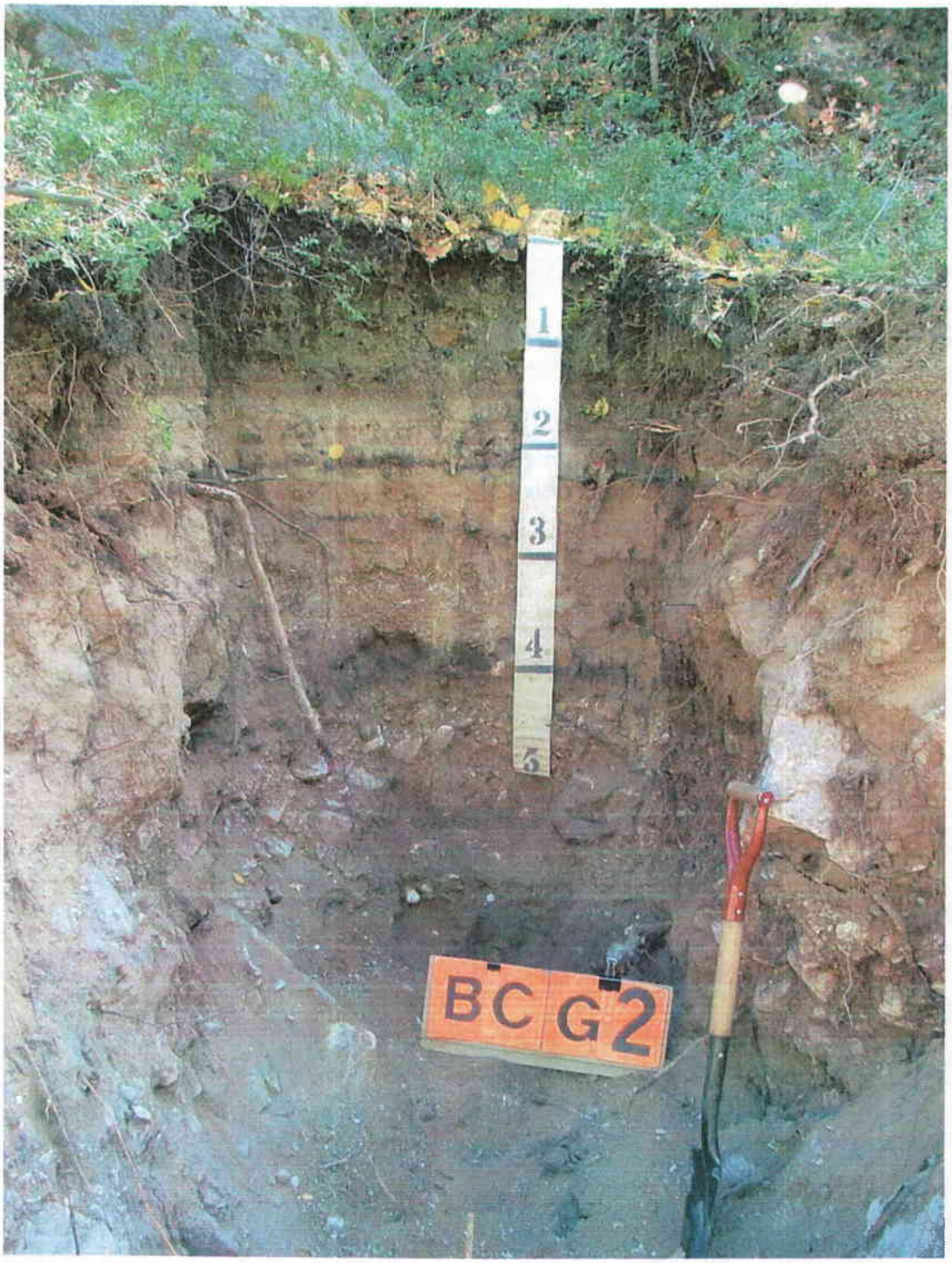


Photo 4. Soil profile BC-GVH-02 near center of Bear Canyon GVH evaluation area. Soil was correlated to Northorn series (Calcic Argicryolls, fine-loamy, mixed, superactive).

Photo 5. Location of soil profile BC-GVH-02 near center of Bear Canyon GVH soils evaluation area. Pit was on cutbank on concave mountain footslope near sandstone rock outcrop (at right in photo).

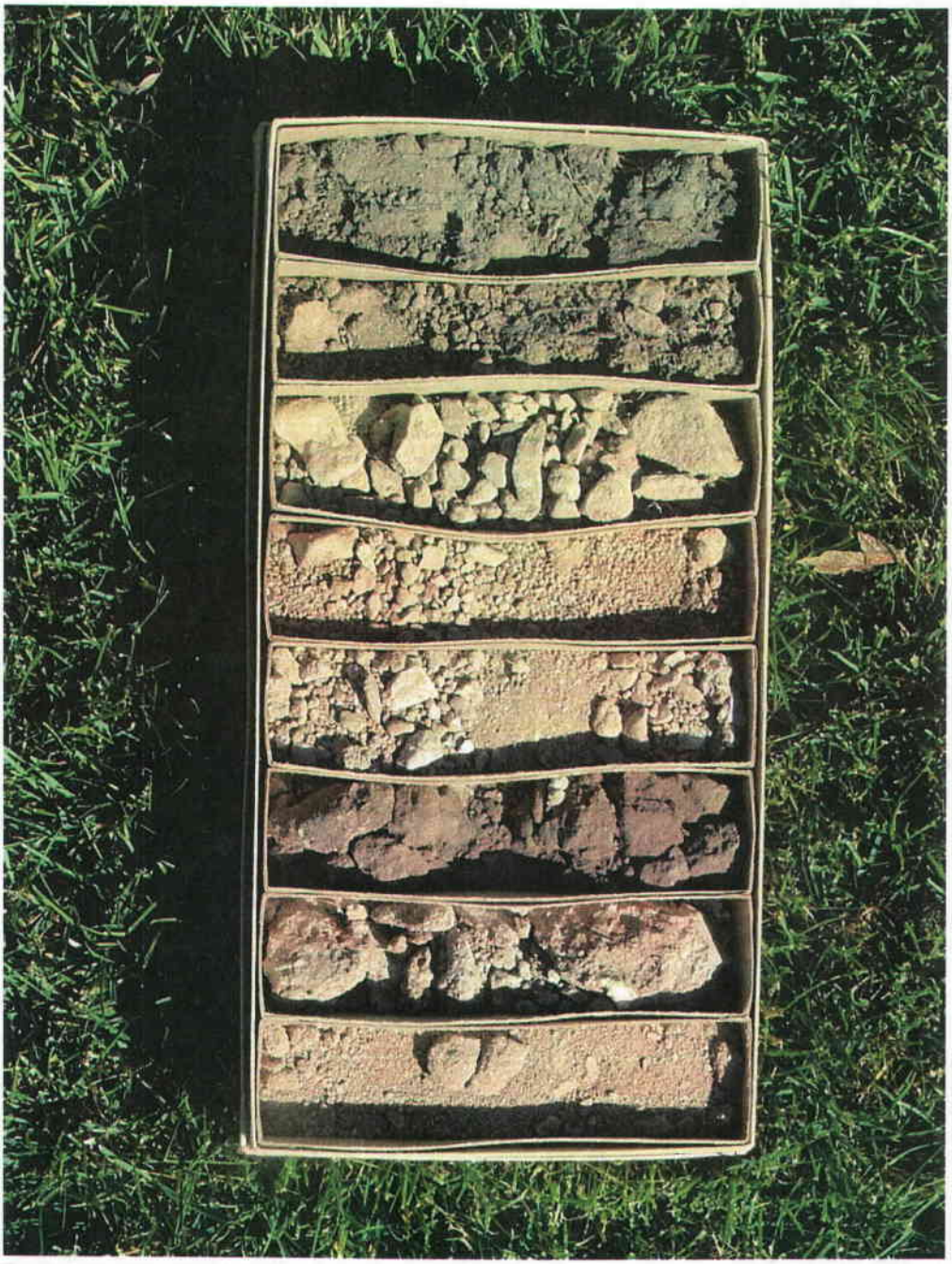


Photo 6. BC-GVH-02 soil pedon box. The Oi horizon is not displayed in box. Potential topsoil salvage depth is limited to the top trays 1 (A, 0-3 inches) and 2 (Bt, 3-12 inches) at the top of box. Soil material in tray 3 (BC, 12-20 inches) has 12 percent calcium carbonate with 40 percent rock fragments and was determined to not be suitable for topsoil salvage. The upper calcic horizon is contained in trays 4 (2CA, 20-38 inches) and 5 (3Bk, 38-45 inches) from the top. Tray 5 (4A, 45-51) inches contains a buried surface. The lower calcic horizon is in trays 7 (5Bk, 51-72 inches) and 8 (6C, 72-84 inches).

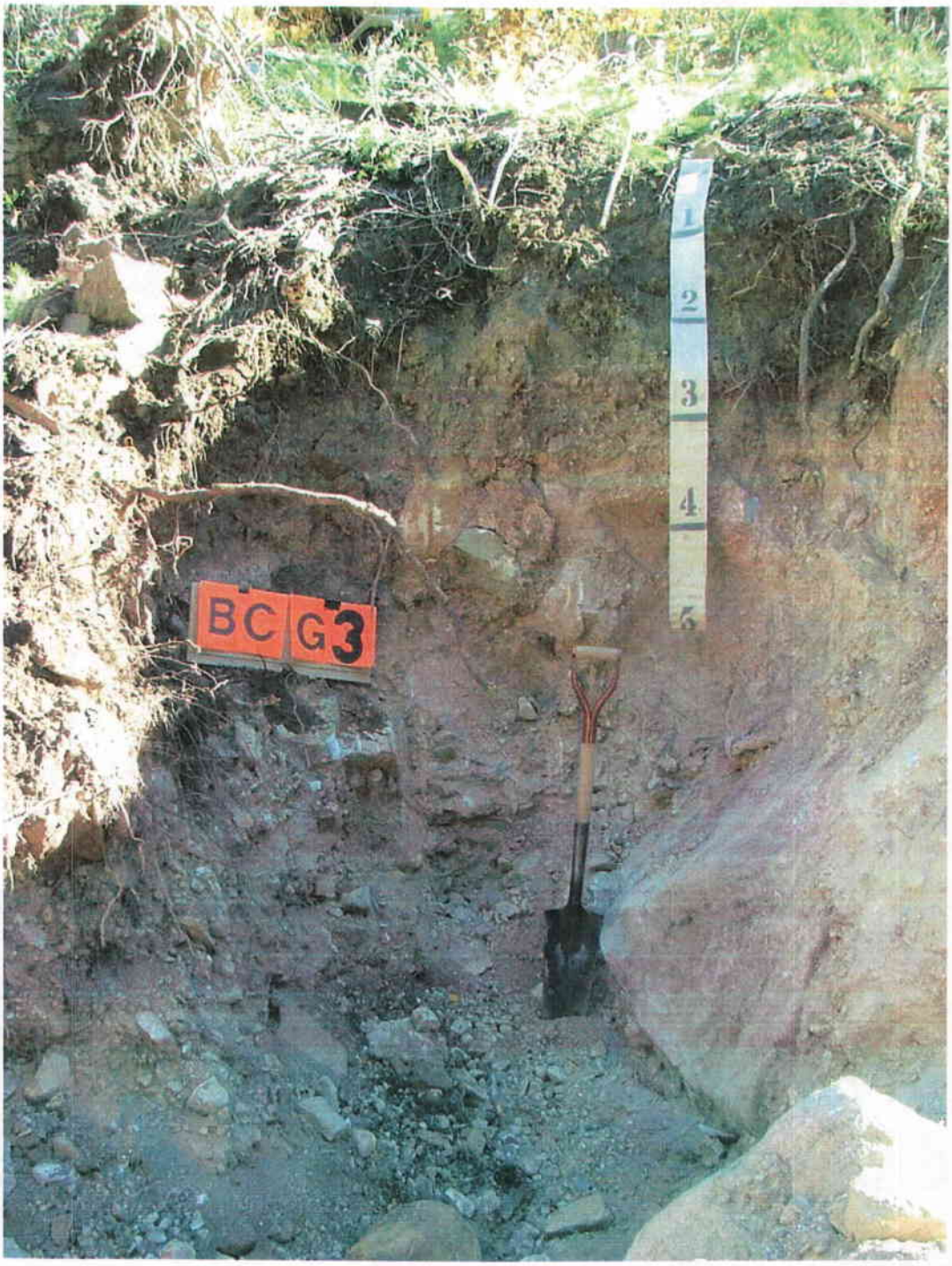


Photo 7. Soil profile BC-GVH-03 located near west end of Bear Canyon soils evaluation area. This soil was correlated to the Aagard series (Calcic Pachic Argicryoll, fine-loamy, mixed, superactive). Large boulders can be seen on the right next to the shovel and in the lower right.

Photo 8. Location of soil profile BC-GVH-03 on convex portion of a mountain footslope. This site is located between two sandstone outcrops (one is at left in photo).

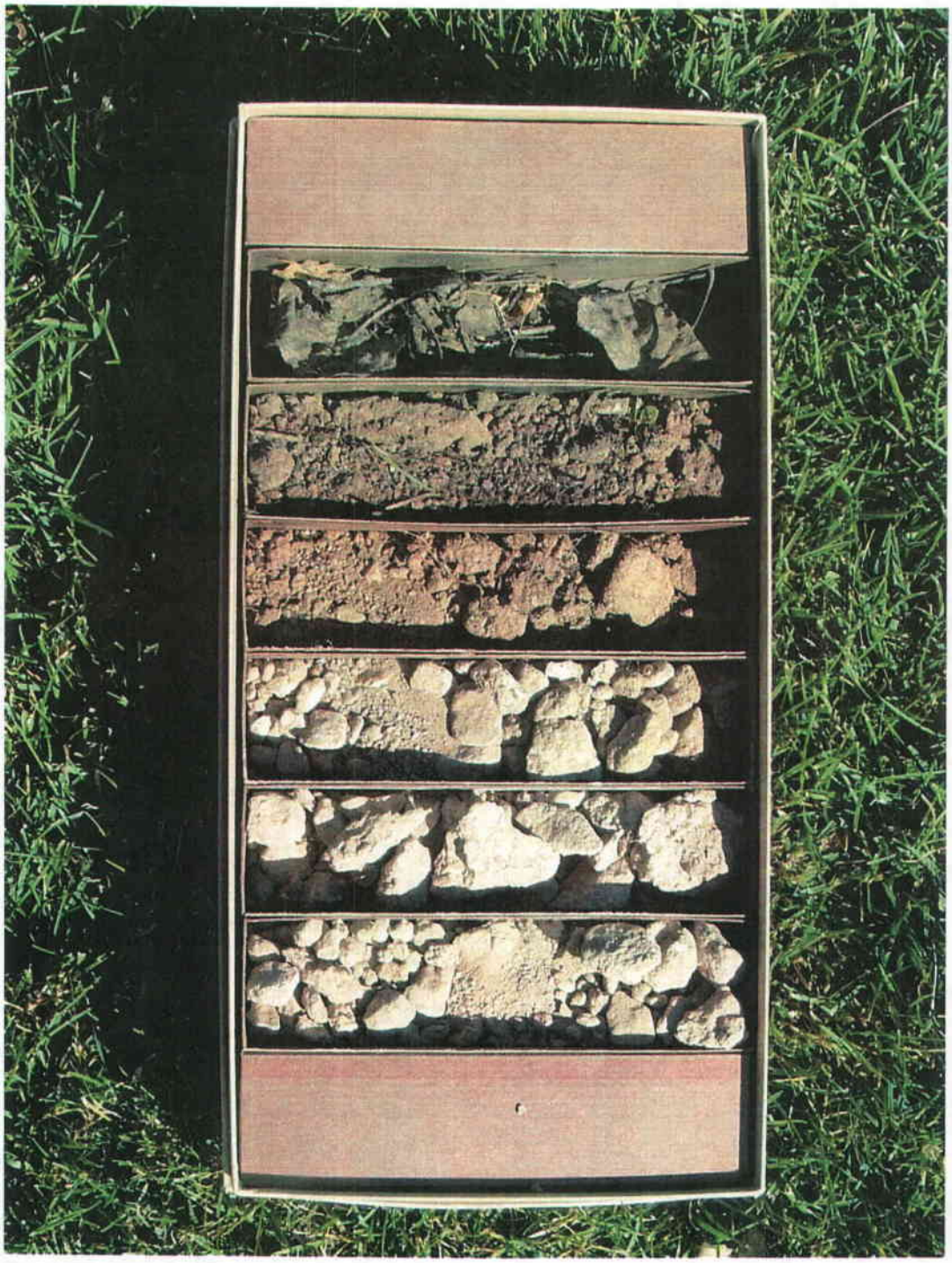


Photo 9. BC-GVH-03 soil pedon box. The Oi horizon (needles, leaves, and twigs) is in the top tray. Potential topsoil salvage depth is limited to trays 2 (A, 0-4 inches) and 3 (Bt, 4-17 inches) from the top. The calcic horizon is contained in trays 4 (BC, 17-30 inches), 5 (2CA, 30-57 inches), and 6 (3Bk, 57-90 inches) from the top. Soil texture in tray 6 is extremely stony loamy sand.

Literature Cited

Munsell Soil Color Charts, 2002.

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 Resource Conservation Service, National Soil Survey Center, Lincoln, NE.

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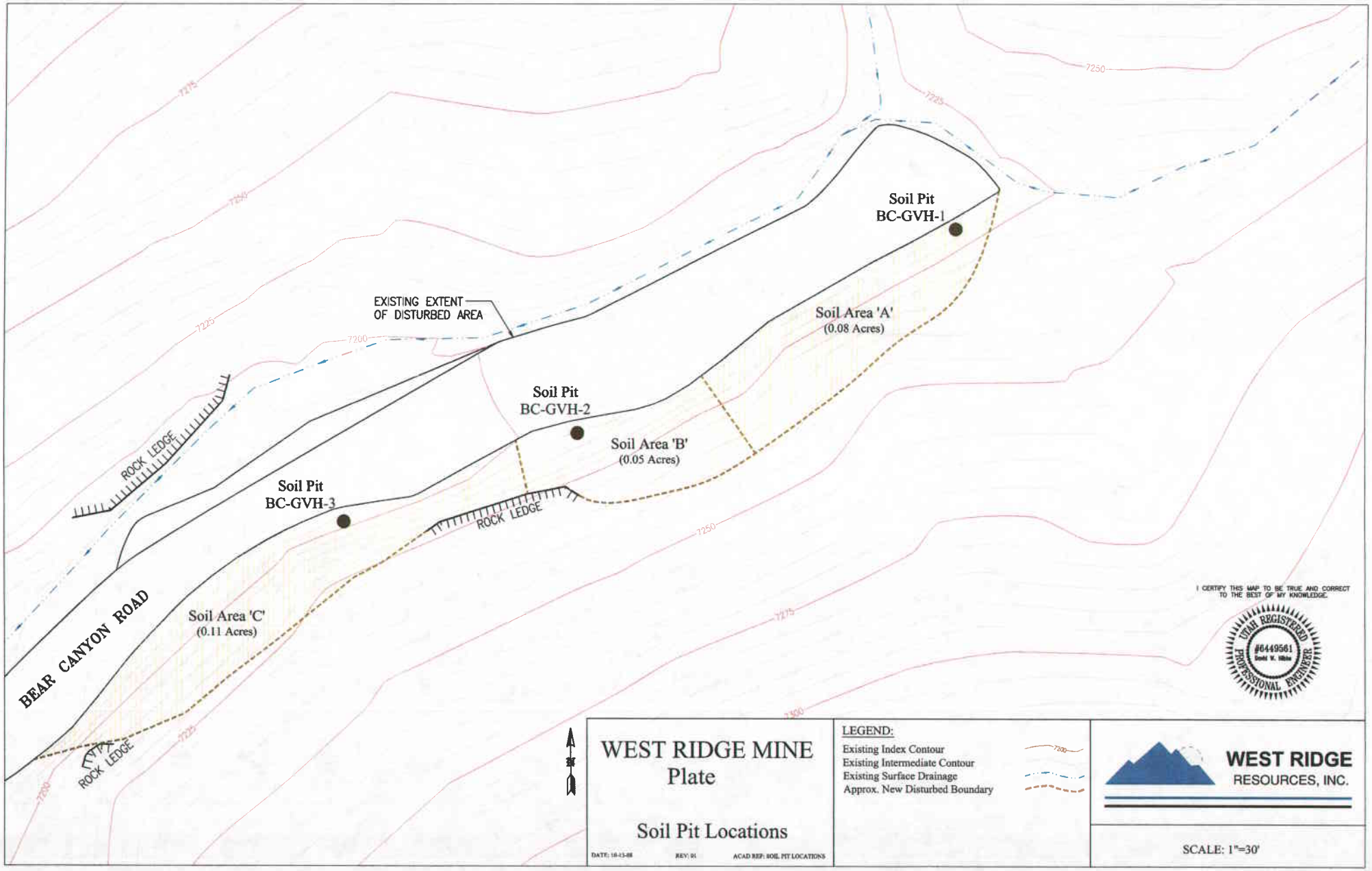
USDA – Natural Resource Conservation Service, 2008. Official Soil Series Descriptions (http://soils.usda.gov/technical/classification/osd/).

Utah Division of Oil, Gas, and Mining, October 2005. Guidelines for Management of Topsoil and Overburden.


Soil Pit
BC-GVH-1
EXISTING EXTENT
OF DISTURBED AREA
Soil Area 'A'
(0.08 Acres)
Soil Pit
BC-GVH-2
Soil Area 'B'
(0.05 Acres)
ROCK LEDGE
Soil Pit
BC-GVH-3
ROCK LEDGE
BEAR CANYON ROAD
Soil Area 'C'
(0.11 Acres)
TYP.
ROCK LEDGE
7200
7225
7250
7275
7300
I CERTIFY THIS MAP TO BE TRUE AND CORRECT
TO THE BEST OF MY KNOWLEDGE.
UTAH REGISTERED
#6449561
PROFESSIONAL ENGINEER
WEST RIDGE MINE
Plate
Soil Pit Locations
DATE: 10-13-08
REV: 01
ACAD REF: SOIL PIT LOCATIONS
LEGEND:
Existing Index Contour
Existing Intermediate Contour
Existing Surface Drainage
Approx. New Disturbed Boundary
WEST RIDGE
RESOURCES, INC.
SCALE: 1"=30'

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: BC-GVH-1 DRAFT 3/2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):
Skeletal - Anagnard	A		Calcic Pachic Argicryoll Lo-skel, mix, super,	Ustic

Describer(s):	Date:	Weather:	Temp.: Air: 56 Soil: Depth:	Latitude: ° ' "N	Datum:	Location:
Bob Long	10-7-08	Clear		Longitude: ° ' "W	1983	Sec. 3 T. 14S R. 13E

UTM: Zone:	mE:	mN:	Topo Quad:	Site ID:	Yr:	State:	County:	Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID:	Stop #:	Interval:
12	547614	4387082	Mt. Bartles QZ						Westridge				

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity:	Slope Shape: (Up & Dn / Across)
Mo	Mo			7215	NNW 350	8 40 avg	Simple	Concave / Convex

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:
Footslope	Lower 1/3						Bear Canyon

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability:	Land Cover / Use:
Well	No	No	SM	K_{sat}: mod slow	Mixed Conifer Maple

Parent Material:	Bedrock: Kind:	Fract.:	Hard.:	Depth:	Lithostrat. Units:	Group:	Formation:	Member:
colluvium/residuum	sandstone					Castle Peak		

Erosion: Kind:	Degree:	Runoff:	Surface Frag %:	GR:	CB:	ST:	BD:	CN:	FL:	Diagnostic Horz. / Prop.:	Kind:	Depth:
None		mod slow	Kind:	—	—	5	15	—	—	Mollic		0-17"

P. S. Control Section:	Ave. Clay %:	Ave. Rock Frag %:	
Depth Range: 17-34"	30	45	Argillic 17-34" Calcic-1 17-44" Calcic-2 36-84"

VEGETATION:

SYMBOL	COMMON NAME	
	Douglas Fir	
	Mtn Snowberry	
	Bigtooth maple	
	Aspen	

MISCELLANEOUS FIELD NOTES / SKETCH:

Component Name: Agard-skeletal | Map Unit Symbol: A | Date: 10-2-08

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Kind, % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Mst	Stk	Pls	Mottles % Sz Cn Col Mst Sp Loc
1	cut	2-0"	Oi	CS	Leaves, needles & twigs									
2		0-3"	A1	CS	10YR 4/2	10YR 3/1	GRV L	GR 30 SAng CB 10 SS	1 vfm sbk 2 mgr	so	so	ss	sp	—
3		3-12"	A2	CW	10YR 4/3	10YR 3/2	GRV L	GR 30 SAng CB 10 SS	2fm sbk	sh	vfr	ss	sp	—
4		12-17"	2A	CS	10YR 3/2	10YR 2/1	L	—	2fm sbk	sh	vfr	ss	sp	—
5		17-34"	2 Btk	CW	10YR 6/3	10YR 5/3	GRV CL	GR 40 SAng CB 3 ST 2 SS	3m sbk	h	fr	s	p	—
6		34-44"	3A	CS	10YR 5/3	10YR 4/2	GRV SCL	GR 25 SAng CB 3 ST 2 SS	2f sbk	h	vfr	ss	sp	—
7		44-56"	3 Bw	CS	10YR 5/3	10YR 4/3	SCL	GR 4 SAng CB 1 SS	1fm sbk	sh	vfr	so	sp	—
8		56-84	4 Bk		10YR 5/2	10YR 4/2	GRV SCL	GR 25 SB 10 ST 5	2fm sbk	h	vfr	ss	sp	—
9														
10														

BC-GYH-1

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Det Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth) (agent)	Effer	Clay %	CCE	Notes
1	—									
2	—			2vff 2mc	2vff 2mc	7.6	NE	22 40	6	M
3	—			2vff 2mc	2vff 2mc	7.6	VS	22 40	11	M
4	—	—		2vff 2mc	2vff 2mc	7.9	SL	24 30	8	M
5	—	15 CAC BRF/5f 1-2 mm CAM PF		2vff 1mc	2vff 1mc	8.4	ST	30 35	16	SM
6	—	10 CAC BRF 0-1 mm	—	2vff 1mc	2vff 1mc	8.2	SL	26 50	15	SM
7	—	2 CAC BRF 1-2 mm	—	2vff 1mc	2vff 1mc	8.2	SL	20 60	10	SM
8	—	40 CAC ARF 1-2 mm	—	2vff 1mc	2vff 1mc	8.4	ST	24 50	8	Dry
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: BGGVH-2 DRAFT 3/2002

Series or Component Name: Northorn	Map Unit Symbol: B	Photo #:	Classification: Calcic Argicryolls fine-loamy, mix, super	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: 10-7-08	Weather: clear Temp.: Air: 50 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum: 1983	Location: Sec. 3 T. 14S R. 13E

UTM: Zone: 12	mE: 547580	mN: 4387075	Topo Quad: Mt Boulder	Site ID: Yr: State: County: Pedon #:	Soil Survey Area: Westridge	MLRA / LRU:	Transect: ID: Stop #: Interval:	

Landscape: Mo	Landform: Mo	Microfeature:	Anthro:	Elevation: 7205	Aspect: N	Slope (%): 5 24	Slope Complexity: Complex	Slope Shape: (Up & Dn / Across) concave / convex

Hillslope Profile Position: Footslope	Geom. Component: Lower 1/3	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area: Bear Canyon	

Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status: Sat -	Permeability: K_{sat}: mod	Land Cover / Use: Mixed Conifer

Parent Material: Alluvium over colluvium	Bedrock: Kind:	Fract.:	Hard.:	Depth: Sandstone	Lithostrat. Units:	Group: Castlegate Formation: Member:

Erosion: Kind: No	Degree:	Runoff: Mod	Surface Frag %: Kind:	GR: -	CB: -	ST: 5	BD: 10	CN: -	FL: -	Diagnostic Horz. / Prop.: mollic	Kind:	Depth: 0-12"	

P. S. Control Section: Depth Range: 3-12"	Ave. Clay %: 26%	Ave. Rock Frag %: 30%	argillic 3-12" calcic-1 20-45" calcic-2 51-72"

VEGETATION:

SYMBOL	COMMON NAME	
	Douglas fir	
	Aspen	
	Mtn snowberry	
	Bigtooth maple	

MISCELLANEOUS FIELD NOTES / SKETCH:

Topsoil 0-12"

North end of Rock outcrop

Component Name: Northorn | Map Unit Symbol: B | Date: 10-7-08

BC-GVH-2

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	Pit	2-0"	Oi	as	Leaves, needles & twigs									
2	Pit	0-3"	A	as	10YR 4/3	10YR 3/2	ST SiL	GR 5 sand CB 5 ST 8 SS	2 m sbk 2 f gr	sh	vfr	ss	sp	—
3	Pit	3-12"	Bt	cw	10YR 5/3	10YR 3/3	GR SCL	GR 20 CB 5 ST 5	2 m sbk	h	fr	ss	sp	—
4	Pit	12-20"	BC	as	10YR 6/3	10YR 5/3	GR SCL	GR 40	2 f m sbk	sh	vfr	so	po	—
5	Pit	20-38"	2 CA	as	10YR 6/2	10YR 4/3	SL	GR 10	m	sh	vfr	so	po	—
6	Pit	38-45	3 BK	as	10YR 6/3	10YR 4/3	GRx SCL	GR 60 CB 10	m	h	vfr	ss	sp	—
7	Pit	45-51	4 A	as	10YR 4/2	10YR 3/2	SiL	CB 10	2 m sbk	h	fr	s	sp	—
8	Pit	51-72	5 Bk	cs	10YR 6/3	10YR 4/3	GRx CL	GR 50 CB 15 ST 5	2 m sbk	h	fr	s	p	—
9	Pit	72-84	6 C		10YR 6/3	10YR 5/3	GR LS	GR 10 CB 5	SG	lo	lo	so	po	—
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	Sand	CCE	Notes
1	—										
2	—	—	—	2 vff 2 m 1 c	1 vft	7.8	VS	20	20	2	
3	—	—	45 CLF PF/BR	3 vf 2 f 1 m c	1 vft	7.9	VS	26	54	8	
4	—	40 CAC 1-3 mm BRF	—	2 vff 1 m c	2 vfi	8.0	ST	22	50	12	
5	—	10 1-2 mm CAC ARF	—	2 vff 1 m c	2 vfi	8.1	ST	14	55	19	1-2" A at 24"
6	—	70 1-2 mm CAC ARF	—	2 vf 1 f	1 vft	8.2	VE	24	55	15	
7	—	—	—	1 vff	2 vfi	7.9	SL	24	15	5	
8	—	25 f CAM TH 70 1-4 mm CAC ARF	—	2 vf 1 f 1 m c	1 vft	8.4	VE	32	35	15	
9	—	—	—	1 vff	3 vfi	8.1	ST	6	84	9	
10											

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: BC-GVH3 DRAFT 3/2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):
Aagard	C		Calcic Pachic Argicryoll fine-loamy, mixed, super	USTIC

Describer(s):	Date:	Weather:	Temp.: Air: 48 Soil: Depth:	Latitude: ° ' "N	Datum:	Location:
Bob Long	10-7-08	Clear		Longitude: ° ' "W	1983	Sec. 3 T. 14S R. 13E

UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:
12/547545/4387050	Mt Bartles		Westridge		

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity:	Slope Shape: (Up & Dn / Across)
Mo	Mo			7195	N 6°	8	complex	convex / convex

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:
Footslope	Lower 1/3						Bear Canyon

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability: K_{sat}:	Land Cover / Use:
Well	No	No	0-17" moist 17-30" S.M		

Parent Material:	Bedrock: Kind:	Fract.:	Hard.:	Depth:	Lithostrat. Units: Group:	Formation:	Member:
Colluvium	Sandstone				Castlegate		

Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:
None	Mod	- - 5 15	Mollic 0-17"

P. S. Control Section: Depth Range:	Ave. Clay %:	Ave. Rock Frag %:	
4-24	25	15	Argillic 4-30 Calcic 17-90"

VEGETATION:

SYMBOL	COMMON NAME	
	Douglas Fir	
	Aspen	
	Rocky Mtn Juniper	
	Mtn Snowberry	
	Bigtooth maple	

MISCELLANEOUS FIELD NOTES / SKETCH:

Dry below 30"

Topsoil 0-30"

South end of Rock Outcrop

calcic below 30"

V. Stony below 30"

Component Name: AAGARD | Map Unit Symbol: C | Date: 10-7-2008

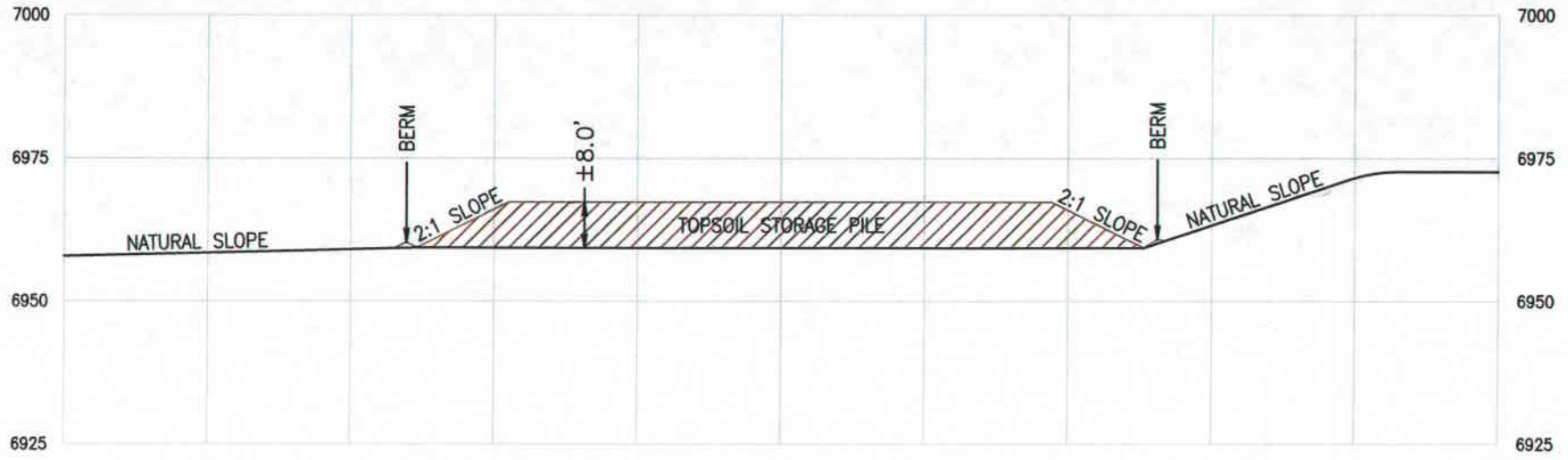
BC-GVH-3

	Obser. Method	Depth (in) ~~(cm)~~	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Kind % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	Pit	2-0"	Oi	as	leaves, needles, & twigs									—
2	Pit	0-4"	A1	cs	10YR 4/3	10YR 3/2	GR L	GR 10 S-ang ST 5 SS	1 m sbk ~~1f~~ gr	sh	vfr	ss	sp	—
3	Pit	4-17"	Bt	cw	10YR 5/3	10YR 3/3	GR L	GR 10 CB 3 ST 2	2 m sbk	sh	vfr	ss	sp	—
4	Pit	17-30"	Btk	cw	10YR 6/2	10YR 5/3	GRV SCL	GR 30 CB 5 ST 5	3 m sbk	h	fr	ss	sp	—
5		30-57"	2BK1	gs	10YR 6/3	10YR 5/4	STV CL	GR 10 CB 10 ST 20	3 m sbk	h	fr	s	p	—
6		57-90"	3BK2		10YR 7/3	10YR 6/3	STX SCL	GR 30 CB 10 ST 30	2 m sbk	h	fr	ss	sp	—
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	—	—			—				—
2	—	—	—	3vf 2f 1mc	2vfi	7.6	NE	21 40	3	
3	—	—	40 CLF PF/BG	2vff 1mc	2vffi	7.9	VS	25 40	7	
4	—	40 CAC BRF 1-2mm	35 CLF BG	2vf 1f 2mc	1ft	8.2	ST	26 50	18	
5	—	50 mc CAM PF 40 CAC ARF 2-4mm	—	2vf 1fm	1vft	8.4	VE	30 30	18	
6	—	50 mc CAM PF 70 CAC ARF 2-4mm	—	1vff	1vft	8.4	VE	24 56	25	
7										
8										
9										
10										

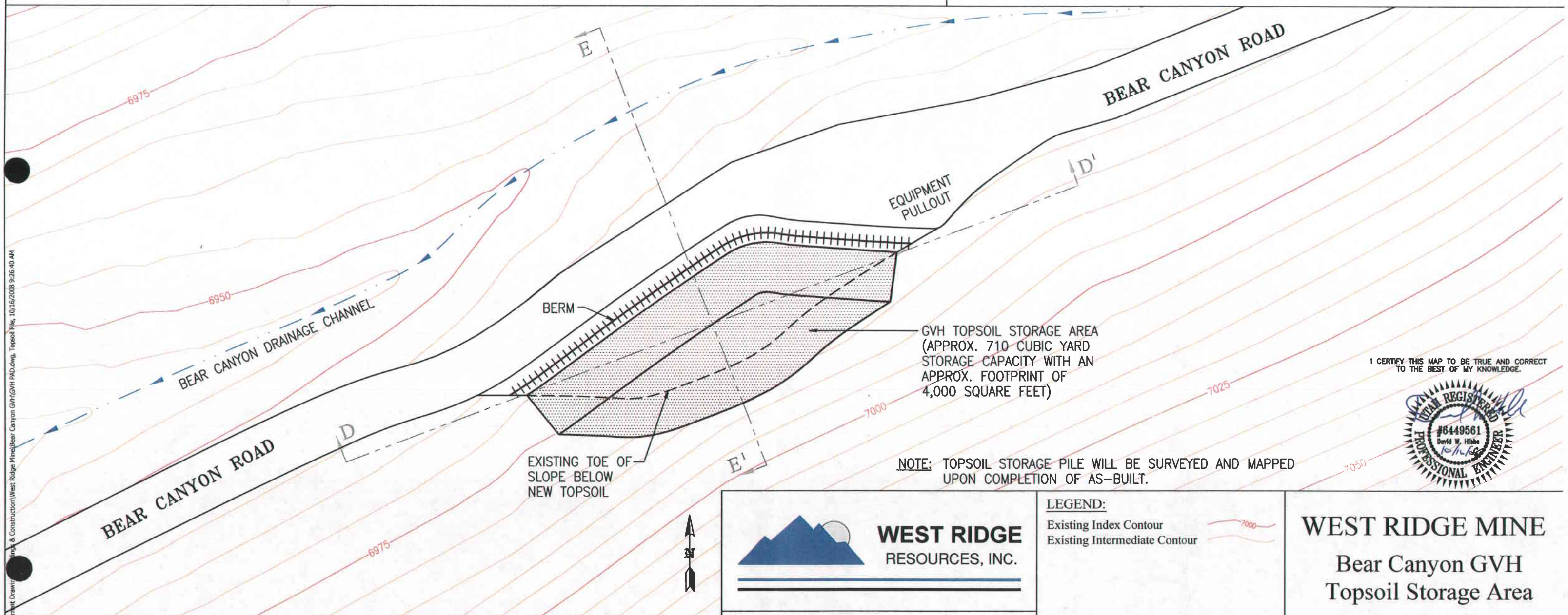
ATTACHMENT 3

TOPSOIL STORAGE AREA



SECTION D-D[1]

SECTION E-E[1]



TOPSOIL STORAGE AREA PLAN

NOTE: TOPSOIL STORAGE PILE WILL BE SURVEYED AND MAPPED UPON COMPLETION OF AS-BUILT.

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

UTAH REGISTERED #6449561 David W. Hibbs 10/16/08 PROFESSIONAL ENGINEER

WEST RIDGE RESOURCES, INC.

SCALE: 1"=30'

LEGEND:

Existing Index Contour 7000

Existing Intermediate Contour

WEST RIDGE MINE

Bear Canyon GVH Topsoil Storage Area

DATE: 10-16-08 REV: 01 ACAD REF: GVH PAD

G:\Shared\Current Drawings & Construction\West Ridge Mine\Bear Canyon GVH\GVH PAD.dwg, Topsoil Pile, 10/16/2008 9:26:40 AM

ATTACHMENT 4

VEGETATION REPORT
MT. NEBO SCIENTIFIC

MT NEBO SCIENTIFIC, INC.
research & consulting

October 15, 2008

HAPPY HALLOWEEN

Dave Shaver
ANDALEX RESOURCES
P.O. Box 902
Price, Utah 84501

Dear Dave:

Enclosed please find one bound copy of the following report for the West Ridge Mine.

Vegetation of the
GVH Site in
Bear Canyon,
Book Cliffs, Utah

For the
West Ridge Mine,
Carbon County, Utah

An electronic file of the report was also submitted in an email to you previously. Please call if you have questions or comments.

Sincerely,

(Transmitted Electronically)

Patrick D. Collins, Ph.D.
Biologist/Environmental Consultant

Enclosures

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

Vegetation of the GVH Site in Bear Canyon, Book Cliffs, Utah

For the
West Ridge Mine,
Carbon County, Utah

Right Fork of Bear Canyon

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

ANDALEX RESOURCES
Post Office Box 902
Price, Utah 84501

October 2008

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INTRODUCTION

Operations at the West Ridge Mine has found it necessary to construct a gas vent hole (GVH) as a safety measure to continue mining activities in their underground coal mine. The proposed GVH site is located in the right (east) fork of Bear Canyon within the Book Cliffs plateau in Carbon County, Utah. The site is less than one-quarter acre in size (0.24 acre).

This report provides the results from quantitative sampling the plant community that will be disturbed as a result of the drilling activities necessary to construct the GVH. The native plant community that will be disturbed is a Douglas Fir/ Maple community. This report also provides data from a "reference area" that could be used for future revegetation success standards following final reclamation of the site. Results from threatened, endangered and sensitive plant survey as well as a vegetation and sample location map of the area have also been provided herein.

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 GVH site on September 24, 2008. The reference area proposed for this site was sampled in the growing season of 1998.

Sampling Design and Transect/Quadrat Placement

Transect lines for vegetation sampling were placed randomly within the boundaries of the proposed disturbed and reference areas. 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 notes such as: slope, exposure, grazing use, disturbance and/or other appropriate notes. Plant nomenclature follows "A Utah Flora" (Welsh et al., 2003).

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

Statistical Analyses

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

Photographs

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

Threatened & Endangered Plant Species

Prior to recording quantitative data on the plant communities, a sensitive plant species survey was conducted. To initiate the study, appropriate agencies had been consulted and other sources were reviewed (sensitive species files at *Mt. Nebo Scientific, Inc.*) for potential plant species that are known to be rare, endemic, threatened, endangered or otherwise sensitive in the study area.

Raw Data

The raw data for cover and density have been summarized on a spreadsheet and is available upon request.

RESULTS

Proposed Disturbed Douglas Fir/Maple Community

The plant community proposed for disturbance by construction of the GVH site is that of a

Douglas Fir/Maple community. Dominants, and equally represented in the understory cover estimates, were Douglas fir (*Pseudotsuga menziesii*) and bigtooth maple (*Acer grandidentatum*). These tree species also dominated the overstory cover. Grasses and forbs played a relatively minor role in the plant cover of the community. For a list of all species present in the sample quadrats along with their cover and frequency values, refer to Table 1.

The total living cover including overstory and understory cover of the proposed disturbed Douglas Fir/Maple community was estimated at 82.25 %; 46.00% of this value was comprised of understory and 36.25% was from overstory cover (Table 2-A). The understory composition consisted of 91.74% woody species (Table 2-B).

Woody species density was also sampled at the site. As shown on Table 3, the total density of the area was 2,254 individuals per acre and was dominated by Douglas fir, bigtooth maple and Rocky Mountain juniper (*Juniperus scopulorum*).

Douglas Fir/Maple Reference Area ("New")

A Douglas Fir/Maple plant community was sampled in 1998 and was established as a reference area to be used for future revegetation success standards for specific areas at the West Ridge mine site following final reclamation. This reference area was called "new" because there was another Douglas Fir/Maple Reference area established earlier, but because it was necessary to later disturb this reference area due to changes to the surface facilities of the mine site, the "new"

reference area was later established.

Cover and frequency by species are shown on Table 4. Overstory dominant species by cover and frequency were bigtooth maple and Douglas fir. The most common understory woody species were bigtooth maple, mountain lover *(Pachistima myrsinites)* and Oregon grape (*Mahonia repens*). Most common forbs were aster (*Aster* sp.) and pinnate tansy mustard (*Descurainia pinnata*). Finally, the most common grasses by cover and frequency were muttongrass (*Poa fendleriana*) and smooth brome (*Bromus inermis*).

The mean total living cover of this community was estimated to be 63.63%, 31.38% of which was overstory and 32.25% was understory cover (Table 5-A). Trees and shrubs were the dominant lifeform of the understory species and comprised 61.57% of the cover, whereas, forbs and grasses comprised 25.33% and 13.11%, respectively (Table 5-B).

Woody species density measurements resulted in 2,256 individuals per acre (Table 6). The dominant woody species by density were bigtooth maple, mountain lover and Douglas fir.

Threatened, Endangered & Sensitive Plants

A threatened, endangered and sensitive plant survey was conducted at the GVH site. A small population of the sensitive plant species called canon sweetvetch (*Hedysarum occidentalis* var. *canone*) was located at the site and will likely be disturbed by the proposed construction activities.

DISCUSSION

Statistical analyses were employed to compare the cover and woody species density of the proposed disturbed GVH site in Bear Canyon with the reference area. The total living cover, or overstory and understory cover combined, was significantly greater in the area proposed for disturbance when compared to the Douglas Fir/Maple Reference Area (Figure 1). Interestingly, the woody species densities of the two areas were nearly identical; a Student's t-test analysis reflects this similarity by showing a t-value of -0.005 (Figure 2).

Because there was a significant difference in the cover values of the two areas, there are some options and considerations for establishment for standards of revegetation success for the GVH site in Bear Canyon. One idea is that the West Ridge Mine operator could have another reference area sampled later and compared to the GVH site. Next, representatives from DOGM and the West Ridge Mine could agree that the proposed reference area would be appropriate for final revegetation success standards, even though the cover value is less than that of the area proposed for disturbance.

The author of this report favors the later scenario. I believe the Douglas Fir/Maple Reference Area (1998) would be an appropriate area for revegetation success standards at the time of final reclamation for the following reasons.

1. Because the GVH site was quite small (0.24 acres), sample quadrats were placed relatively close to each other as compared to larger sample areas. This meant localized "patches" for the cover of plants were weighted higher in this sample area. When larger areas are sampled using random methods, distances between quadrats are greater, differences from these isolated patches are minimized, and variability between quadrats usually reflect a sample mean closer to the true mean for the entire plant community.

2. Several areas with this same plant community have been sampled previously in the West Ridge Mine area, all of which had cover values closer the Douglas Fir/Maple Reference Area (1998). A summary of these results have been provided in Table 7 below.

Table 7: A comparison of mean percent total living cover value in several Douglas Fir/Maple plant communities near the West Ridge Mine site.

	PERCENT TOTAL LIVING COVER
Proposed Disturbed Douglas Fir/Maple Community (1997)	55.50
Douglas Fir/Maple Reference Area (1997)	65.75
Douglas Fir/Maple Community "New" Reference Area (1998)	63.63
Proposed Disturbed Douglas Fir/Maple Community in Bear Canyon's Left Fork (2008)	69.75
Proposed Disturbed Douglas Fir/Maple Community for Bear Canyon GVH Site (2008)	82.25

SUMMARY

A small area has been chosen for construction of a gas vent or GVH site for the West Ridge Mine as a safety measure for underground mining conditions. Construction of this site will result in disturbance to a native plant community, a Douglas Fir/Maple community. A reference area to represent future revegetation success standards for this same plant community had already been established prior to any surface disturbance for construction of the mine facility (1997-98). This same reference area has been proposed to be used for the revegetation standard for the GVH site in Bear Canyon with final approval required by biologists from the State of Utah, Division of Oil, Gas & Mining.

SUMMARY TABLES
&
FIGURES

Table 1. West Ridge Mine: Proposed Disturbed Bear Canyon GVH Site.
Total Cover, Standard Deviation and Frequency by Species (2008).

Douglas Fir / Maple Community	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
Acer grandidentatum	9.25	19.38	20.00
Juniperus scopulorum	4.50	13.59	10.00
Populus tremuloides	5.75	14.94	15.00
Pseudotsuga menziesii	16.75	22.38	40.00
UNDERSTORY			
TREES & SHRUBS			
Acer glabrum	0.75	2.38	10.00
Acer grandidentatum	10.50	16.35	40.00
Juniperus scopulorum	8.75	14.39	30.00
Pachistima myrsinites	4.50	8.79	30.00
Populus tremuloides	1.75	5.76	10.00
Pseudotsuga menziesii	10.50	13.31	45.00
Purshia tridentata	1.00	4.36	5.00
Symphoricarpos oreophilus	4.50	8.50	30.00
FORBS			
Apocynum canabinum	0.25	1.09	5.00
Fragaria vesca	0.25	1.09	5.00
Hedysarum occidentalis canone	0.75	3.27	5.00
Solidago sp.	1.50	4.77	10.00
GRASSES			
Bromus carinatus	1.00	2.55	15.00

Table 2. West Ridge Mine: Proposed Disturbed Bear Canyon GVH Site. Total Cover, Standard Deviation and Sample Size (2008).

Douglas Fir/ Maple Community	Mean Percent	Standard Deviation	Sample Size
A. TOTAL COVER			
Overstory (O)	36.25	19.74	20
Understory (U)	46.00	14.37	20
Litter	26.00	20.16	20
Bareground	10.25	7.98	20
Rock	17.75	13.65	20
O + U	82.25	16.69	20
B. % COMPOSITION			
% COMPOSITION			
Trees & Shrubs	91.74	14.20	20
Forbs	5.94	14.10	20
Grasses	2.32	5.53	20

Table 3. West Ridge Mine: Proposed Disturbed Bear Canyon GVH Site Woody Species Densities (2008).

Douglas Fir/ Maple Community	
Species	Individuals Per Acre
Acer glabrum	197.21
Acer grandidentatum	422.59
Cercocarpus montanus	28.17
Juniperus scopulorum	338.07
Pseudotsuga menziesii	760.66
Pachistima myrsinites	225.38
Populus tremuloides	28.17
Purshia tridentata	28.17
Ribes cereum	28.17
Rosa woodsii	28.17
Symphoricarpos oreophilus	169.03
Sambucus caerulea	
TOTAL	2253.80

Table 4. West Ridge Mine: Reference Area. Total Cover, Standard Deviation and Frequency by Species (1998).

Douglas Fir/ Maple Community Reference Area (New)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY COVER			
Acer grandidentatum	15.88	21.30	50.00
Juniperus scopulorum	1.38	6.22	5.00
Pseudotsuga menziesii	14.13	20.67	45.00
UNDERSTORY COVER			
TREES & SHRUBS			
Acer grandidentatum	6.18	11.30	47.50
Juniperus scopulorum	1.30	2.90	20.00
Mahonia repens	3.33	5.82	40.00
Pachistima myrsinites	5.73	11.04	35.00
Pseudotsuga menziesii	1.95	6.19	6.00
Symphoricarpos oreophilus	1.43	3.35	20.00
FORBS			
Antennaria parvifolia	0.25	1.09	5.00
Artemisia dracunculus	0.88	3.33	10.00
Aster sp.	3.13	7.65	30.00
Circium sp.	0.13	0.78	2.50
Descurania pinnata	1.78	7.12	10.00
Erigeron engelmannii	0.25	1.09	5.00
Erysimum asperum	0.13	0.78	2.50
Fragaria vesca	0.38	1.73	5.00
Mitella stauropetala	0.05	0.31	2.50
Senecio pudicus	0.15	0.79	5.00
Smilacina racemosa	0.33	1.03	10.00
Stellaria jamesiana	0.03	0.16	2.50
Taraxicum officinale	0.13	0.78	2.50
Thalictrum fendleri	0.13	0.78	2.50
Viola adunca	0.13	0.78	2.50
GRASSES			
Bromus inermis	1.25	5.67	7.50
Poa fendleriana	2.90	4.15	45.00
Poa pratensis	0.38	1.73	5.00

Table 5. West Ridge Mine: Reference Area. Total Cover, Standard Deviation and Sample Size (1998).

Douglas Fir/ Maple Community Reference Area (New)	Mean Percent	Standard Deviation	Sample Size
A. TOTAL COVER			
Overstory Cover (O)	31.38	25.69	40
Understory Cover (U)	32.25	19.27	40
Cryptogams	0.25	1.09	40
Litter	18.20	12.80	40
Bareground	8.20	9.39	40
Rock	9.73	9.67	40
O+U	63.63	13.51	40
B. % COMPOSITION			
Trees & Shrubs	61.57	33.67	40
Forbs	25.33	29.49	40
Grasses	13.11	19.14	40

Table 6. West Ridge Mine: Reference Area. Woody Species Densities (1998).

Douglas Fir/ Maple Community Reference Area (New)	
Species	Individuals Per Acre
Acer grandidentatum	874.13
Cercocarpus ledifolius	28.20
Juniperus scopulorum	141.00
Juniperus osteosperma	14.10
Pseudotsuga menziesii	310.18
Pachistima myrsinites	549.86
Rosa woodsii	14.10
Symphoricarpos oreophilus	296.08
Sambucus caerulea	28.20
TOTAL	2255.83

Figure 1. A statistical comparison (Student's t-tests) of the **total living cover** between the proposed disturbed GVH site and the reference area.

	$\bar{x}$	s	n	t	df	SL
Bear Canyon GVH						
Proposed Disturbed:	82.25	16.69	20			
DF/M Reference Area:	63.63	13.51	40			
t-test				4.648	58	p<0.01

$\bar{x}$ = mean
s = standard deviation
n = sample size
t = Student's t-value
df = degrees of freedom
p = probability
SL= Significance Level
N.S.=Non-Significant
DF/M = Douglas Fir/Maple

Figure 2. A statistical comparison (Student's t-tests) of the **woody species density** between the proposed disturbed GVH site and the reference area.

	$\bar{x}$	s	n	t	df	SL
Bear Canyon GVH						
Proposed Disturbed:	2253.80	853.56				
DF/M Reference Area:		2255.83	1548.09			
t-test				-0.005	58	N.S.

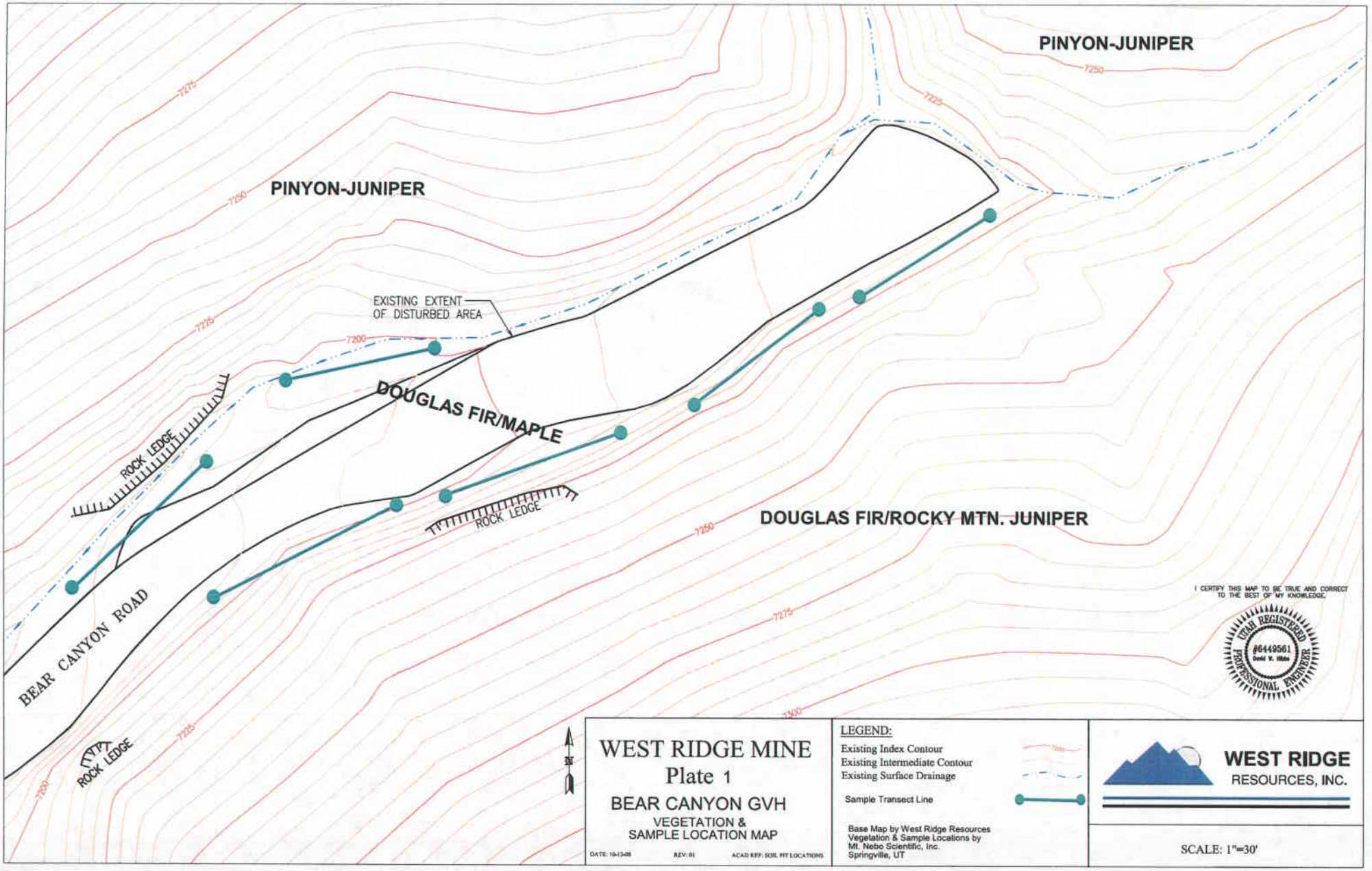
$\bar{x}$ = mean
s = standard deviation
n = sample size
t = Student's t-value
df = degrees of freedom
n/a = not applicable
p = probability
SL= Significance Level
N.S.=Non-Significant
DF/M = Douglas Fir/Maple

COLOR PHOTOGRAPHS OF THE SAMPLE AREAS

Bear Canyon GVH: Proposed Disturbed Douglas Fir/Maple Community

Douglas Fir/Maple Reference Area

VEGETATION &
SAMPLE LOCATION MAP


PINYON-JUNIPER
PINYON-JUNIPER
EXISTING EXTENT OF DISTURBED AREA
DOUGLAS FIR/MAPLE
ROCK LEDGE
ROCK LEDGE
ROCK LEDGE
DOUGLAS FIR/ROCKY MTN. JUNIPER
BEAR CANYON ROAD
7275
7250
7225
7200
7300
I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.
UTAH REGISTERED
#6449561
David V. Hibbs
PROFESSIONAL ENGINEER
WEST RIDGE MINE
Plate 1
BEAR CANYON GVH
VEGETATION & SAMPLE LOCATION MAP
DATE: 10-13-08
REV: 01
ACAD REF: SOIL PIT LOCATIONS
LEGEND:
Existing Index Contour
Existing Intermediate Contour
Existing Surface Drainage
Sample Transect Line
Base Map by West Ridge Resources
Vegetation & Sample Locations by
Mt. Nebo Scientific, Inc.
Springville, UT
WEST RIDGE
RESOURCES, INC.
SCALE: 1"=30'

ATTACHMENT 6

CULTURAL RESOURCES SURVEYS
GVH SITE AND TOPSOIL STORAGE AREA
SENCO-PHENIX ARCHEOLOGICAL

SENCO-PHENIX

An Intensive Cultural Resource Survey and Inventory of the Block Area for the Proposed Gob Vent Hole in the Right Fork of the Bear Creek Canyon Area

SITLA Land (ML 49287)

Carbon County, Utah

PERFORMED FOR
West Ridge Mine of
UtahAmerican Energy, Inc.

In Accordance with
Utah State Guidelines
Antiquities Permit #U08SC0871s

SPUT-582
September 30, 2008

John A. Senulis

Direct Charge of Fieldwork

ARCHEOLOGICAL CONSULTING SERVICES • 1405 West 620 North • Price, Utah 84501 • PHONE 435.613.9091 • FAX 435.613.9116

UTAH SHPO

COVER SHEET

Project Name: An Intensive Cultural Resource Survey and Inventory of the Block Area for the Proposed Gob Vent Hole in the Right Fork of the Bear Creek Canyon Area, SITLA Land (ML 49287)

UTAHAMERICAN Energy, Inc.
West Ridge Mine

State # U08SC0871s

Report Date: September 30, 2008 County (ies): Carbon,

Principal Investigator/ Field Supervisor: John A. Senulis/John Senulis

Records Search/Location/Dates: September 10, 2008, Price River Field Office of the BLM

Acreage Surveyed: 8 acres

Intensive Acres: 8 Recon/Intuitive Acres: 0

U.S.G.S. 7.5 Quads: Mt. Bartles, UT (1972)

Sites Reported	Number	Smithsonian Site #(s):
Archeological Sites:	0	
Revisit (No IMACS update)	0	
Revisit (IMACS update attch.)	0	
New Sites (IMACS attached)	0	
Archeological Site Total:	0	
Historic Structures:		
(USHS Site Form Attached)		
Total NRHP Eligible Sites,		

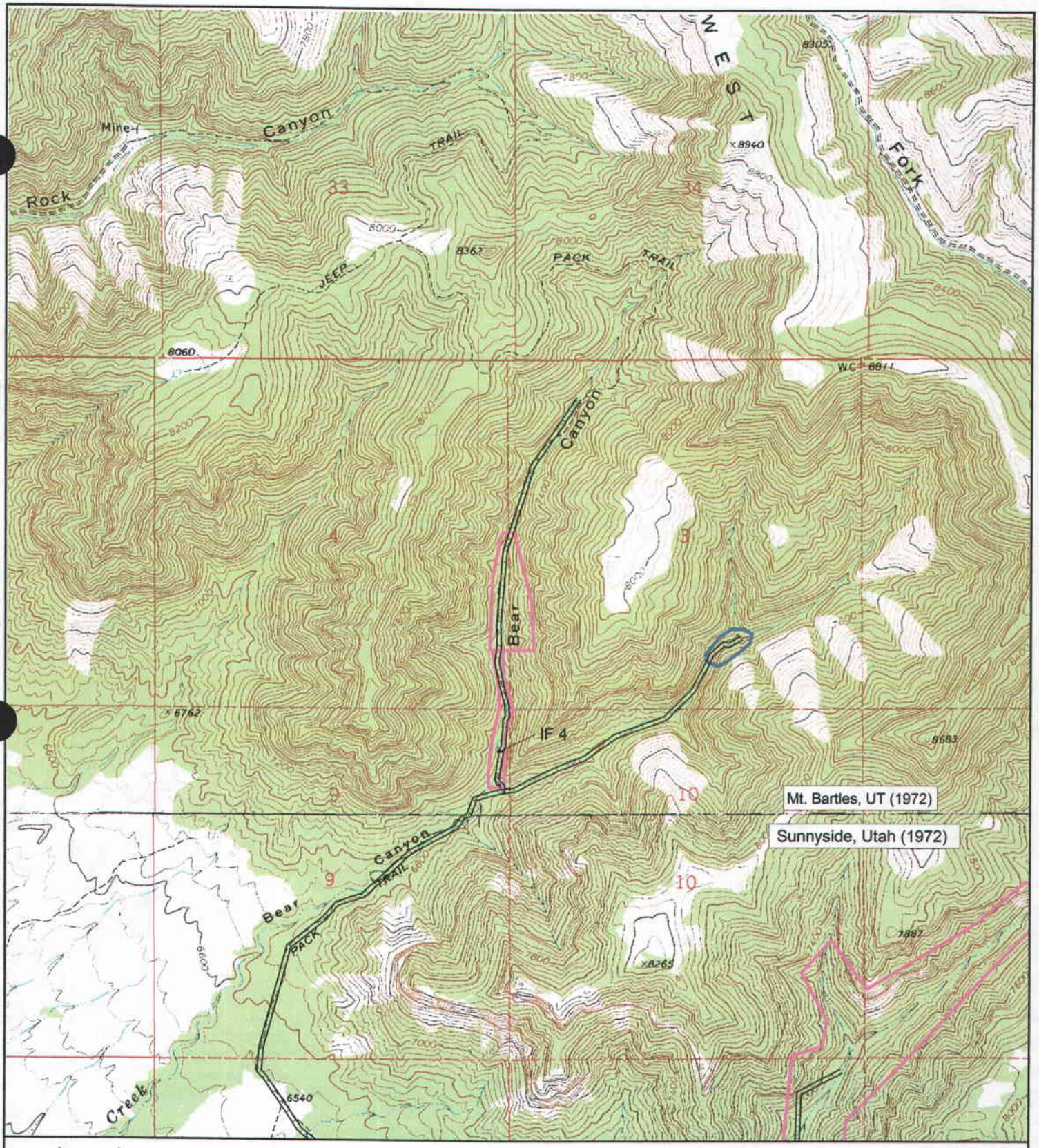
Checklist of Required Items:

1. X 1 Copy of Final Report
2. X Copy of U.S.G.S. 7.5' map showing surveyed/excavated area
3. Completed IMACS Site Inventory Forms Including
   - _____Parts A and B or C
   - _____IMACS Encoding Form
   - _____Site Sketch Map
   - _____Photographs
   - _____Copy of USGS 7.5' Quad with Smithsonian site Number
4. X Completed Cover Sheet

Abstract

The West Ridge Mine of UtahAmerican Energy, Inc. has proposed a gob vent hole in the Right Fork of Bear Creek Canyon. SENCO-PHENIX performed an intensive cultural resource survey on the proposed project. 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 without stipulations is recommended.



SENCO-PHENIX

N

Current Survey

Previous Survey

Eligible Sites

Ineligible Sites

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

Gob Vent Hole Block
West Ridge Mine
UtahAmerican Energy
Carbon County, Utah
Section 3, T14S, R13E
September 2008
SPUT-582
(ML 49287)

Project Location

The proposed gob vent hole will be in the Right Fork of Bear Creek Canyon at the end of an existing road in the SW/SE ¼ of Section 3, T14S, R13E, Carbon County, Utah. The survey was on lands managed by SITLA. The proposed project is noted on the enclosed copy of U.S.G.S. 7.5' composite Quad: Mount Bartles, Utah (1972) & Sunnyside, Utah (1972).

Environment

The project area is along an intermittent branch of the Bear Creek drainage. Elevation ranges from 7200 to 7300 feet. The general topography is extremely rugged with huge boulders and rock ledges lining the perimeter of the narrow and steep canyon. Soils are light tan sandy clay loam with gravels and boulders. Vegetation falls within the Ponderosa Pine community. In addition to Ponderosa Pine, trees included Douglas fir, Rocky Mountain Maple, and Rocky Mountain Juniper. In the narrow canyon bottom, understory vegetation included sagebrush, rabbit brush, bitterbrush and various grasses and forbs. There was very little evidence of deer or elk utilizing the dry canyon. There is no permanent water in the project area.

Previous Research

A file search by John Senulis of SENCO-PHENIX at the Price River Field Office of the BLM on September 10, 2008 revealed that the following projects are reported for the general project area. There are no studies in the specific project area:

- 1980-1986, Asa Neilson for various organizations, primarily BYU Museum of Peoples and Cultures, surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (81-31, 83-959, 86-597)
- 1997-1998, SENCO-PHENIX surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (97-016, 98-027)
- 2007, Montgomery Archeological Consultants surveyed a well pad and access corridor south of the current project area. No cultural resources were located. (07-1112)
- 2008, SENCO-PHENIX surveyed a block and access corridor in the Left Fork of Bear Creek Canyon. No significant cultural resources were located. (08-737)

Methodology

John & Jeanne Senulis of SENCO-PHENIX performed a Class III intensive walkover survey on September 29, 2008. An approximate eight acre block was surveyed for the proposed project. Transect spacing was variable due to the steep terrain. Special attention was given to those areas of subsurface soil exposure from animal burrowing 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** without stipulations is recommended.

These recommendations are subject to modification and review by the SITLA land managers and the Utah SHPO.

SENCO–PHENIX

An Intensive Cultural Resource Survey and Inventory of the Block Areas for the Proposed Topsoil Storage Areas in the Right Fork of Bear Creek Canyon

BLM and SITLA Land (ML 49287)

Carbon County, Utah

PERFORMED FOR
West Ridge Mine of
UtahAmerican Energy, Inc.

In Accordance with BLM and
Utah State Guidelines
Antiquities Permit **#U08SC0909bs**

SPUT–583
October 8, 2008

John A. Senulis

Direct Charge of Fieldwork

ARCHEOLOGICAL CONSULTING SERVICES • 1405 West 620 North • Price, Utah 84501 • PHONE 435.613.9091 • FAX 435.613.9116

UTAH SHPO
COVER SHEET

Project Name: An Intensive Cultural Resource Survey and Inventory of the Block Areas for the Proposed Topsoil Storage Areas in the Right Fork of Bear Creek Canyon

UtahAmerican Energy, Inc.
West Ridge Mine

State # U08SC0909bs

Report Date: October 8, 2008 County (ies): Carbon,

Principal Investigator/ Field Supervisor: John A. Senulis/John Senulis

Records Search/Location/Dates: September 10, 2008, Price River Field Office of the BLM

Acreage Surveyed: 8 acres
Intensive Acres: 8 Recon/Intuitive Acres: 0

U.S.G.S. 7.5 Quads: Mt. Bartles, UT (1972)

Sites Reported	Number	Smithsonian Site #(s):
Archeological Sites:	0	
Revisit (No IMACS update)	0	
Revisit (IMACS update attch.)	0	
New Sites (IMACS attached)	0	
Archeological Site Total:	0	
Historic Structures:		
(USHS Site Form Attached)		
Total NRHP Eligible Sites,		

Checklist of Required Items:

1. X 1 Copy of Final Report
2. X Copy of U.S.G.S. 7.5' map showing surveyed/excavated area
3. Completed IMACS Site Inventory Forms Including
   - _____Parts A and B or C
   - _____IMACS Encoding Form
   - _____Site Sketch Map
   - _____Photographs
   - _____Copy of USGS 7.5' Quad with Smithsonian site Number
4. X Completed Cover Sheet

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE

Summary Report of Cultural Resources Inspection

State Proj. No: # U08SC0909bs.

1. Report Title: **An Intensive Cultural Resource Survey and Inventory of the Block Areas for the Proposed Topsoil Storage Areas in the Right Fork of Bear Creek Canyon**

2. Report Date: October 8, 2008 3. Date(s) of Survey: October 8, 2008

3. Development Company: UtahAmerican Energy, Inc. (West Ridge Mine)
4. Responsible Institution: SENCO-PHENIX

6. Responsible Individuals
   Principal Investigator: John Senulis
   Field Supervisor: John Senulis
   Report Author(s): John Senulis

7. BLM Field Office: Price River Field Office

8. County (ies): Carbon

9. Fieldwork Location:
   USGS Map: **Mt. Bartles, Utah (1972)**

   Twn: 14S Range: 13E Section: 10

   Twn: Range: Section:

   Twn: Range: Section:

10. Record Search:
    Location of Records Searched: Price Field Office

    Date of Record Search: September 10, 2008

11. Description of Examination Procedures: Class III walkover inventory with transects spaced no further than 15 meters

12. Area Surveyed:

		BLM	OTHER FED	STATE	PRIVATE
Linear Miles	Intensive:				
	Recon/Intuitive:				
Acreage	Intensive:	4		4	
	Recon/Intuitive:				

13. Sites Recorded:

		BLM		OTHER FED		STATE		PRIVATE	
		#	Smithsonian Site Numbers	#	Smithsonian Site Numbers	#	Smithsonian Site Numbers	#	Smithsonian Site Numbers
Revisits (no IMACS form)	NR Eligible								
	Not Eligible								
Revisits (updated IMACS)	NR Eligible								
	Not Eligible								
New Recordings (IMACS)	NR Eligible								
	Not Eligible								

Total Number of Archeological Sites: 0

Historic Structures (USHS Form):

Total National Register Eligible Sites: 0

14. Description of Findings:
15. Collection Yes___ No x_

(If Yes) Curation Facility: Accession Number(s):

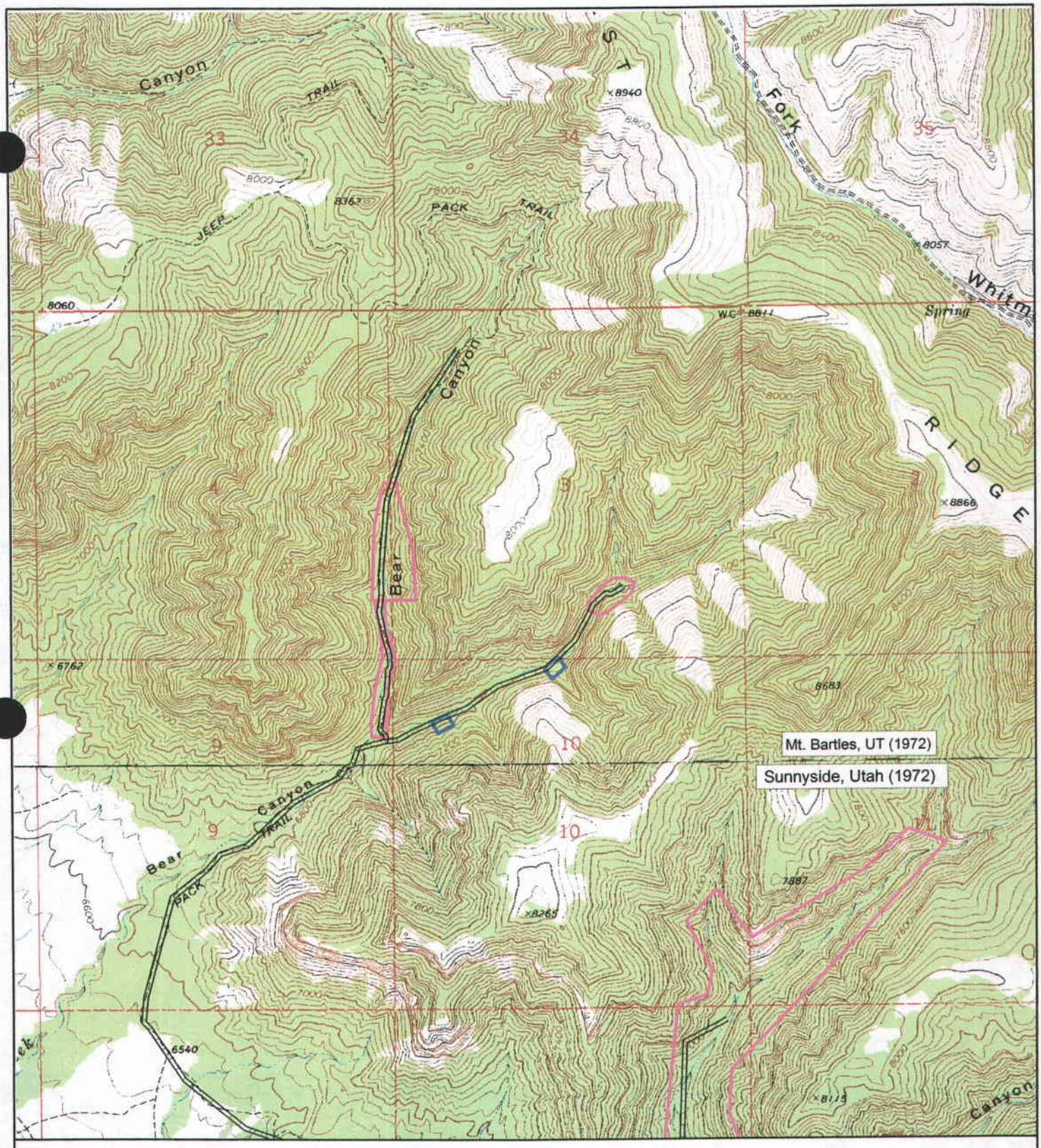
16. Conclusion/Recommendations: Archeological Clearance without stipulations

8100-3 Form

Abstract

The West Ridge Mine of UtahAmerican Energy, Inc. has proposed two topsoil storage areas in the Right Fork of Bear Creek Canyon. SENCO-PHENIX performed an intensive cultural resource survey on the proposed project. 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** without stipulations is recommended.



SENCO-PHENIX

N

Current Survey

Previous Survey

Eligible Sites

Ineligible Sites

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

Topsoil Storage Blocks
West Ridge Mine
UtahAmerican Energy
Carbon County, Utah
Section 10, T14S, R13E
October 2008
SPUT-583
(ML 49287)

Project Location

The proposed topsoil storage areas will be in the Right Fork of Bear Creek Canyon along an existing road in the NE/NW (BLM) and NW/NW (SITLA) ¼s of Section 10, T14S, R13E, Carbon County, Utah. The survey was on lands managed by the BLM and SITLA. The proposed project is noted on the enclosed copy of U.S.G.S. 7.5' composite Quad: Mount Bartles, Utah (1972) & Sunnyside, Utah (1972).

Environment

The project area is along an intermittent branch of the Bear Creek drainage. Elevation ranges from 7100 to 7200 feet. The general topography is extremely rugged with huge boulders and rock ledges lining the perimeter of the narrow and steep canyon. Soils are light tan sandy clay loam with gravels and boulders. Vegetation falls within the Ponderosa Pine community. In addition to Ponderosa Pine, trees included Douglas fir, Rocky Mountain Maple, and Rocky Mountain Juniper. In the narrow canyon bottom, understory vegetation included sagebrush, rabbit brush, bitterbrush and various grasses and forbs. There was very little evidence of deer or elk utilizing the dry canyon. There is no permanent water in the project area.

Previous Research

A file search by John Senulis of SENCO-PHENIX at the Price River Field Office of the BLM on September 10, 2008 revealed that the following projects are reported for the general project area. There are no studies in the specific project area:

- 1980-1986, Asa Neilson for various organizations, primarily BYU Museum of Peoples and Cultures, surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (81-31, 83-959, 86-597)
- 1997-1998, SENCO-PHENIX surveyed various parcels south and east of the current project area. No significant cultural resources were located near the current project area. (97-016, 98-027)
- 2007, Montgomery Archeological Consultants surveyed a well pad and access corridor south of the current project area. No cultural resources were located. (07-1112)
- 2008, SENCO-PHENIX surveyed a block and access corridor in the Left Fork of Bear Creek Canyon. No significant cultural resources were located. (08-737)
- 2008, SENCO-PHENIX surveyed a block for a gob vent hole in the Right Fork of Bear Canyon. No cultural resources were located. (08-871)

Methodology

John & Jeanne Senulis of SENCO-PHENIX performed a Class III intensive walkover survey on October 8, 2008. Two approximate four acre blocks were surveyed for the proposed project. Transect spacing was variable due to the steep terrain. Special attention was given to those areas of subsurface soil exposure from animal burrowing and erosion. All field notes are on file at the offices of SENCO-PHENIX in Price, Utah.

Findings and Recommendations

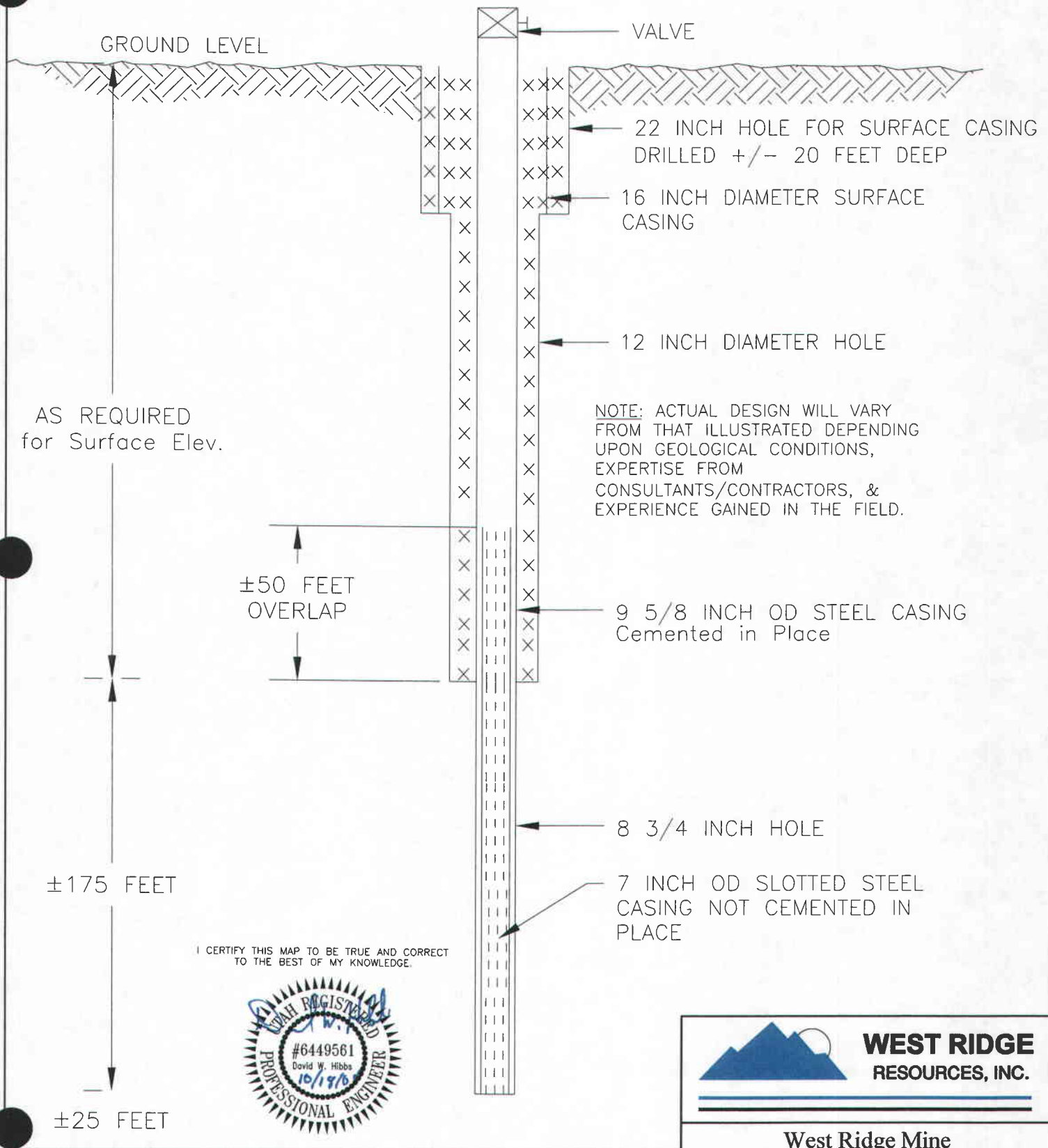
No cultural resources were located and the potential for undetected remains is remote. A finding of no effect is appropriate and archeological clearance without stipulations is recommended.

These recommendations are subject to modification and review by the BLM and SITLA land managers and the Utah SHPO.

ATTACHMENT 7

GVH OPERATIONAL DRAWINGS

TYPICAL GVH DRILL HOLE DESIGN



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

UTAH REGISTERED PROFESSIONAL ENGINEER
#6449561
David W. Hibbs
10/14/08

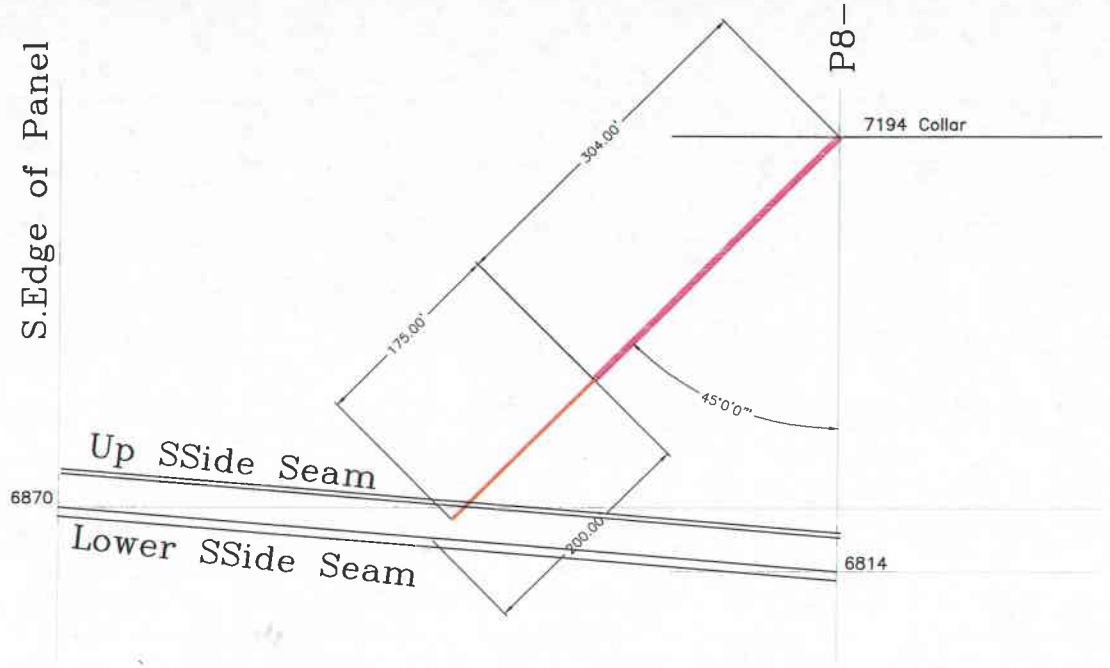
WEST RIDGE RESOURCES, INC.

West Ridge Mine
Gob Ventilation Drill Hole
Proposed Typical Configuration

Scale: Not To Scale

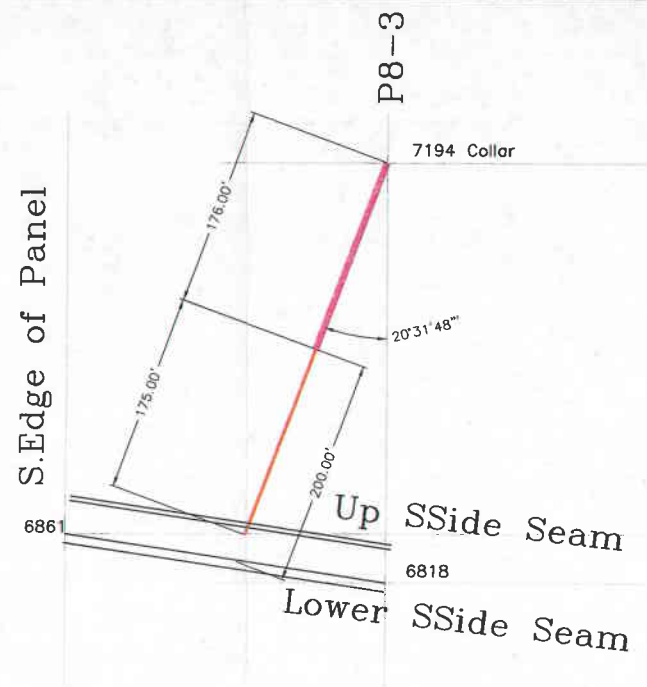
DATE: 10-15-08

ACAD REF: TYPICAL GVH

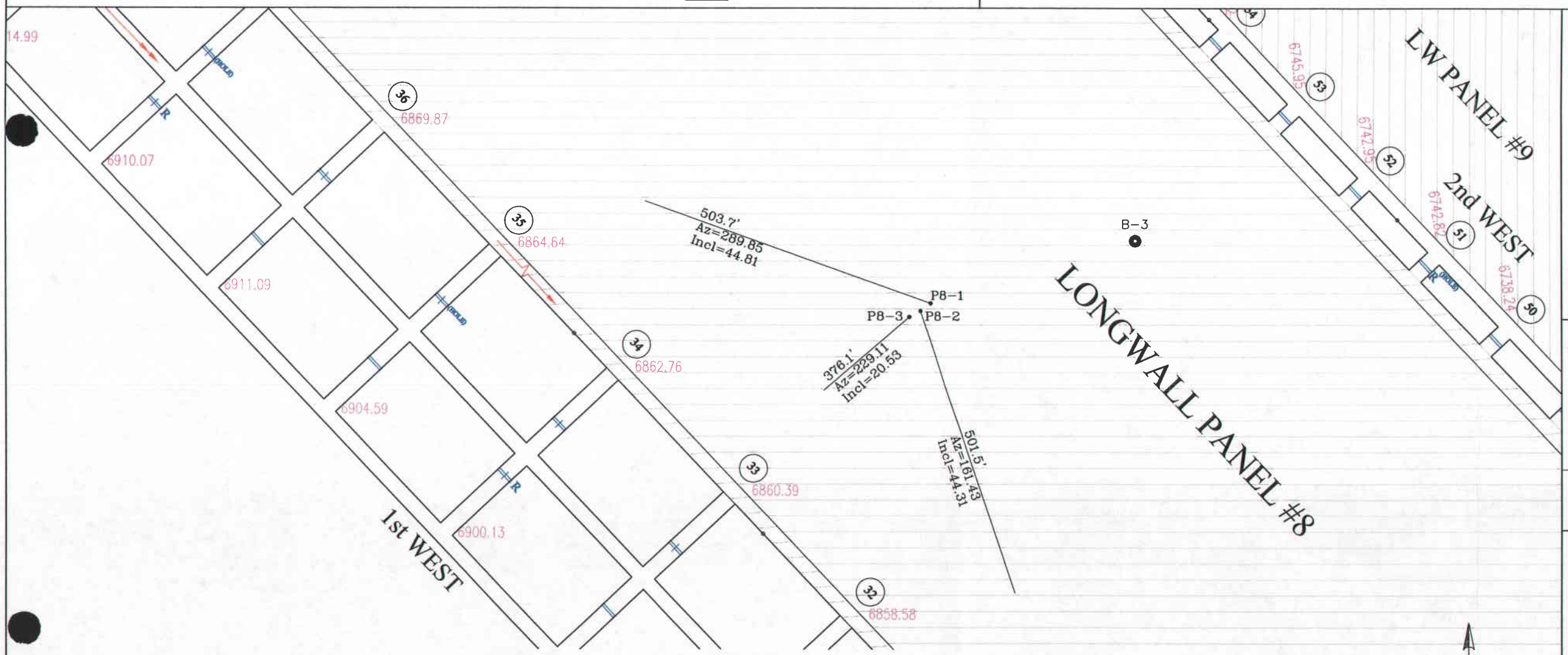


BOREHOLE P8-1

NOTE: BOREHOLE P8-2 IS SIMILAR.



BOREHOLE P8-3



BOREHOLE / PARTIAL MINE PLAN

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

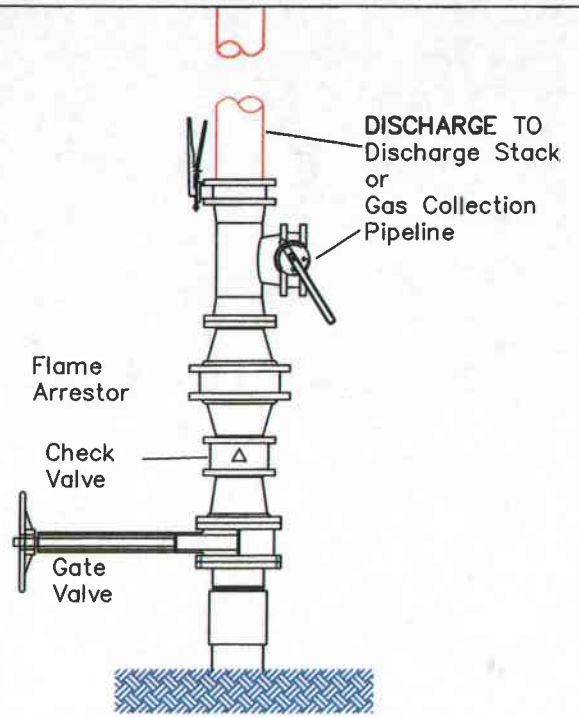
WEST RIDGE
RESOURCES, INC.

SCALE: 1"=30'

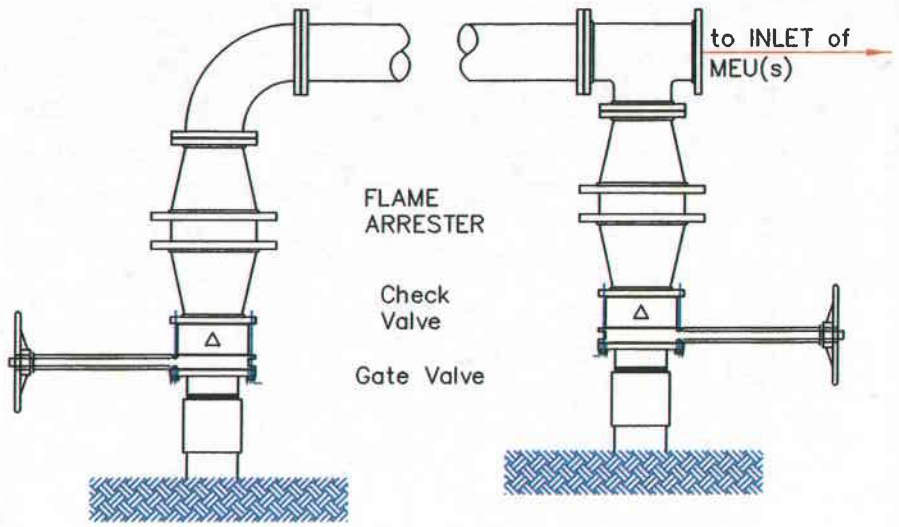
WEST RIDGE MINE

Bear Canyon GVH
Borehole Plan and Details

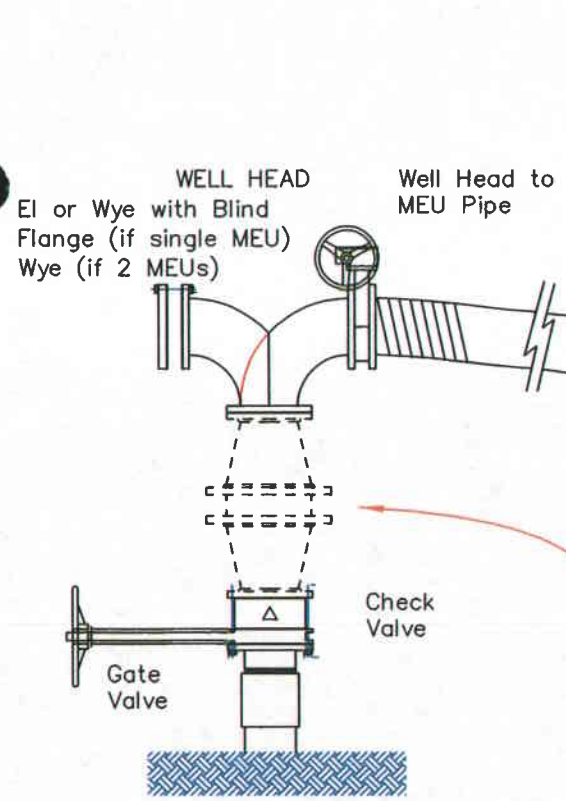
DATE: 10-15-08 REV: 01 ACAD REF: GVH P-8-3



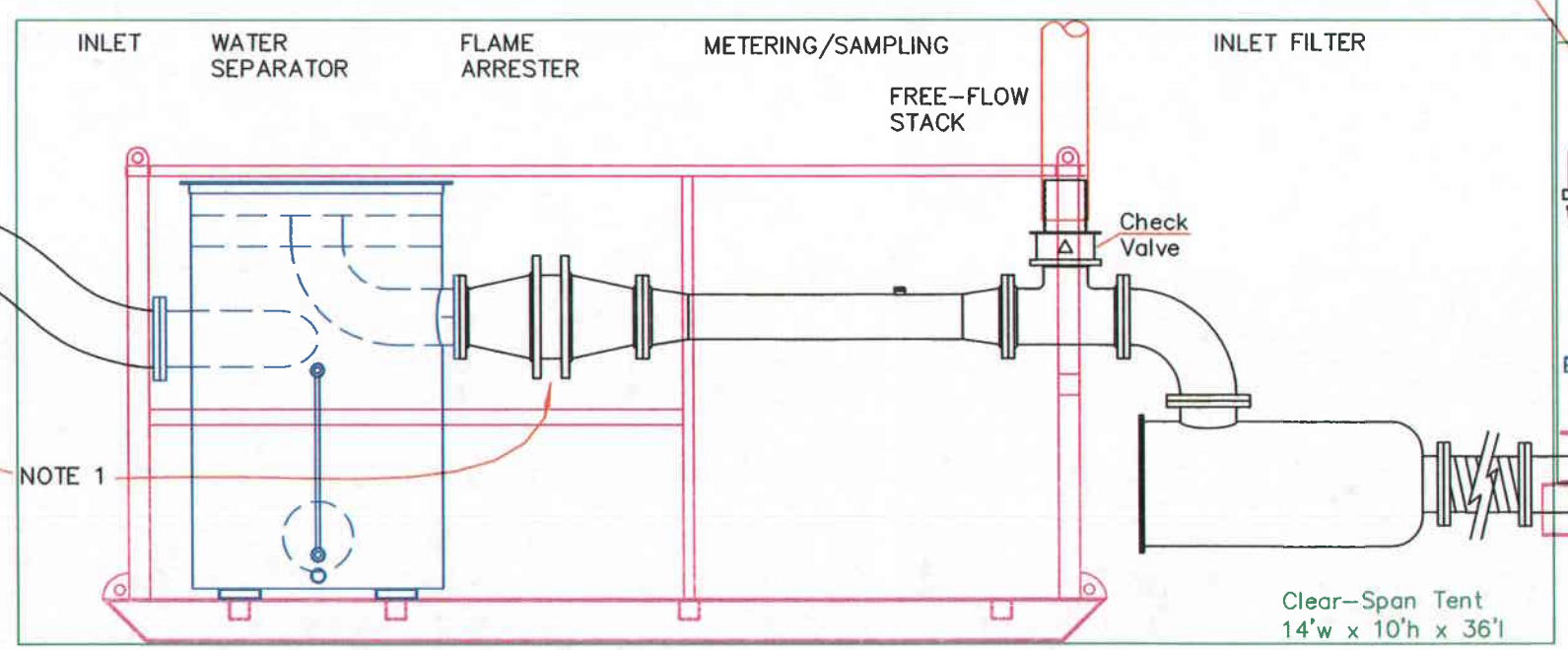
TYPICAL NATURAL
VENTILATING WELL



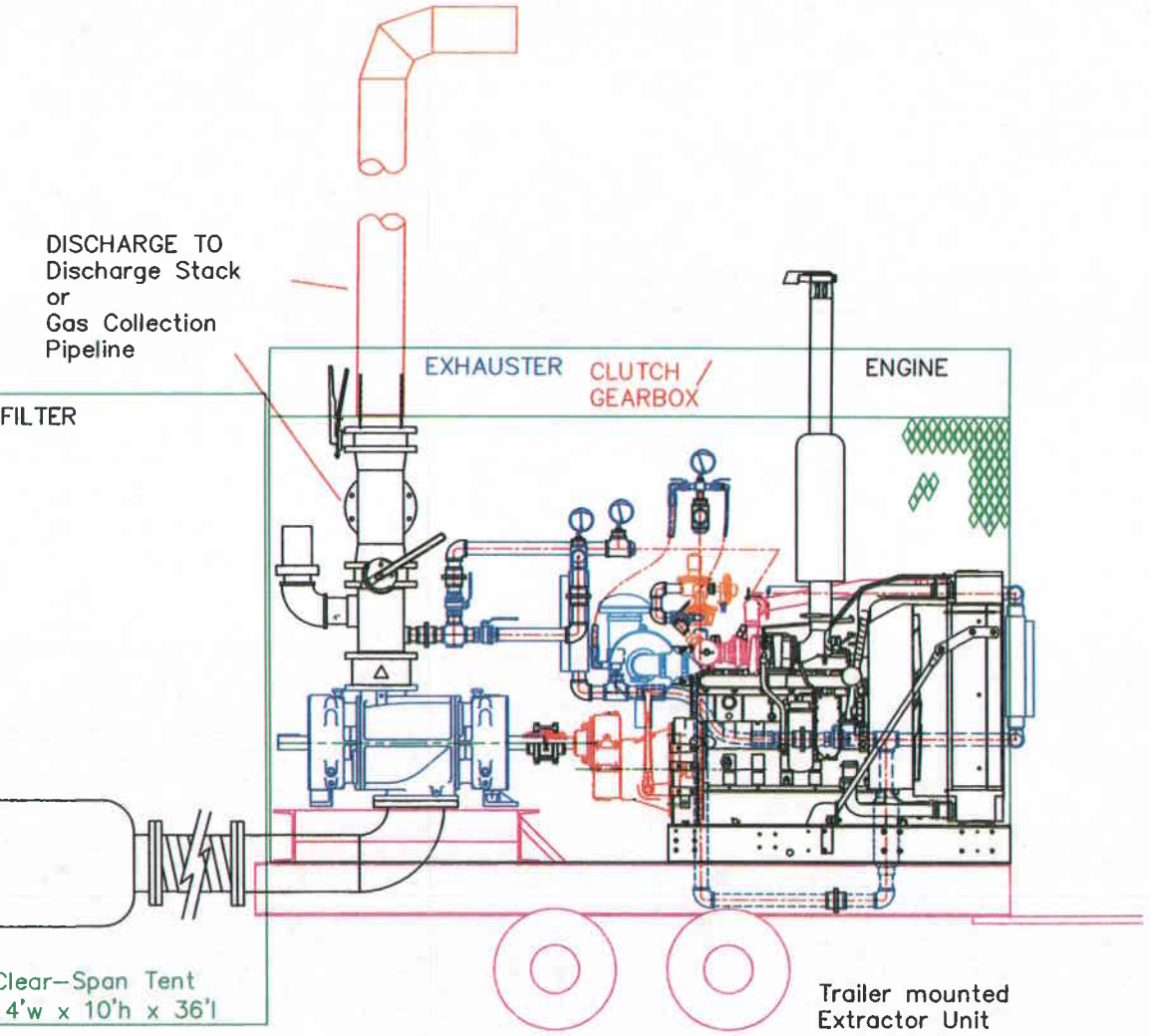
TYPICAL MULTIPLE WELLS to MEU(s)



TYPICAL SINGLE WELL
with 1 or 2 MEUs



NOTE 1
For single well connected to
single/multiple MEUs, Flame Arrester may
be located on well or MEUs



Trailer mounted
Extractor Unit
10'w x 15½ 'l
including tongue

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

UTAH REGISTERED
#6449561
David W. Hibbs
PROFESSIONAL ENGINEER
10/15/08

WEST RIDGE
RESOURCES, INC.

SCALE: NONE

WEST RIDGE MINE

Gob Gas Vent Hole
Methane Extractor Unit

DATE: 10-15-08 REV: 01 ACAD REF: GVH Piping

ATTACHMENT 8

SLOPE STABILITY ANALYSIS
BLACKHAWK ENGINEERING

STABILITY ANALYSIS
FOR
BEAR CANYON GVH DRILLING

CUT SLOPE RECLAMATION
WEST RIDGE MINE

PREPARED BY: DAN W. GUY, P.E.
BLACKHAWK ENGINEERING, INC.
OCTOBER 2008

Introduction:

This report is an evaluation of the expected factors of safety based on the proposed cut slope reclamation on the Bear Canyon GVH Drill Pad. The reclaimed section was evaluated at a slope of 1.5H:1V and the expected slope height of 23' to ensure a minimum factor of safety of 1.30 could be achieved. An additional calculation was run on a slope height of 30' to allow for any variance in actual cut slope heights.

Procedure:

Soil characteristics for the reclaimed area have been estimated based on similar soils which have been sampled and analyzed for stability at the West Ridge Mine. The parameters were taken directly from Appendix 5-9, "Alternate Highwall Area Reclamation Using a Smaller Verical Angle Slope", West Ridge Mine.

Both sites are in the Blackhawk Formation with very similar characteristics.

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 and internal friction angle, as well as 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 Hoeck Method for stability analyses was selected for the following reasons:

This method provides for a "worst-case" scenario by using a circular failure prediction based on the total height of the slope.

The proposed reclaimed slopes are comparable to other reclaimed slopes in this area that have been designed, approved and successfully reclaimed based on the Hoeck Method of stability analyses.

As mentioned above, the density, cohesion and internal friction angle of the proposed backfill material were taken from West Ridge Mine soil samples taken in similar conditions.

Slope heights and angles were taken from the cross-sections included in this submittal. These numbers were then applied to the equations on the Circular Failure Charts No. 1 and No. 5 to determine the Static Safety Factor for Dry and Saturated Conditions, respectively (Figures 1 and 2). It should be noted that the cut slope height of 23' and reclaimed slope angle of 1.5H:1V (33.69°) represent the probable "worst-case" scenario of the cut slope reclamation. This is shown on the attached Figure 3, "Cut Slope Reclamation – Typical Section". A calculation was also run on a cut slope height of 30' in case the height may vary slightly.

Based on the proposed soil characteristics and slope angles, a factor of safety of 2.83 for saturated conditions and 3.60 for dry conditions can be achieved for the proposed slopes of 1.5H:1V (33.69°) up to 23' in height. A factor of safety of 2.40 for saturated conditions and 3.17 for dry conditions can be achieved for the same slope at a height of 30'.

Summary:

Calculations show safety factors well in excess of the required 1.30 can be achieved for reclaimed cut slopes of 1.5H:1V (33.69°) and up to 30' in height. This is not inconsistent with the natural conditions of the area, and will allow for complete reclamation of all cut slopes created by the emergency drilling pads.

TABLE 1
CALCULATION SUMMARY

			Proposed
Slope Height (H)	-	23'	30'
Slope Angle	-	33.69° (1.5H:1V)	33.69° (1.5H:1V)
Safety Factor (Dry)	-	3.60	3.17
Safety Factor (Saturated)	-	2.83	2.40

*Density (γ)	=	121.6 pcf
*Cohesion (c)	=	771.7 psf
*Internal Friction Angle (φ)	=	38.4°

*Taken from Appendix 5-9, "Alternate Highwall Area Reclamation Using a Smaller Vertical Angle slope", West Ridge Mine.

FIGURES

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

ϕ=Internal Friction Angle

(DRYCONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

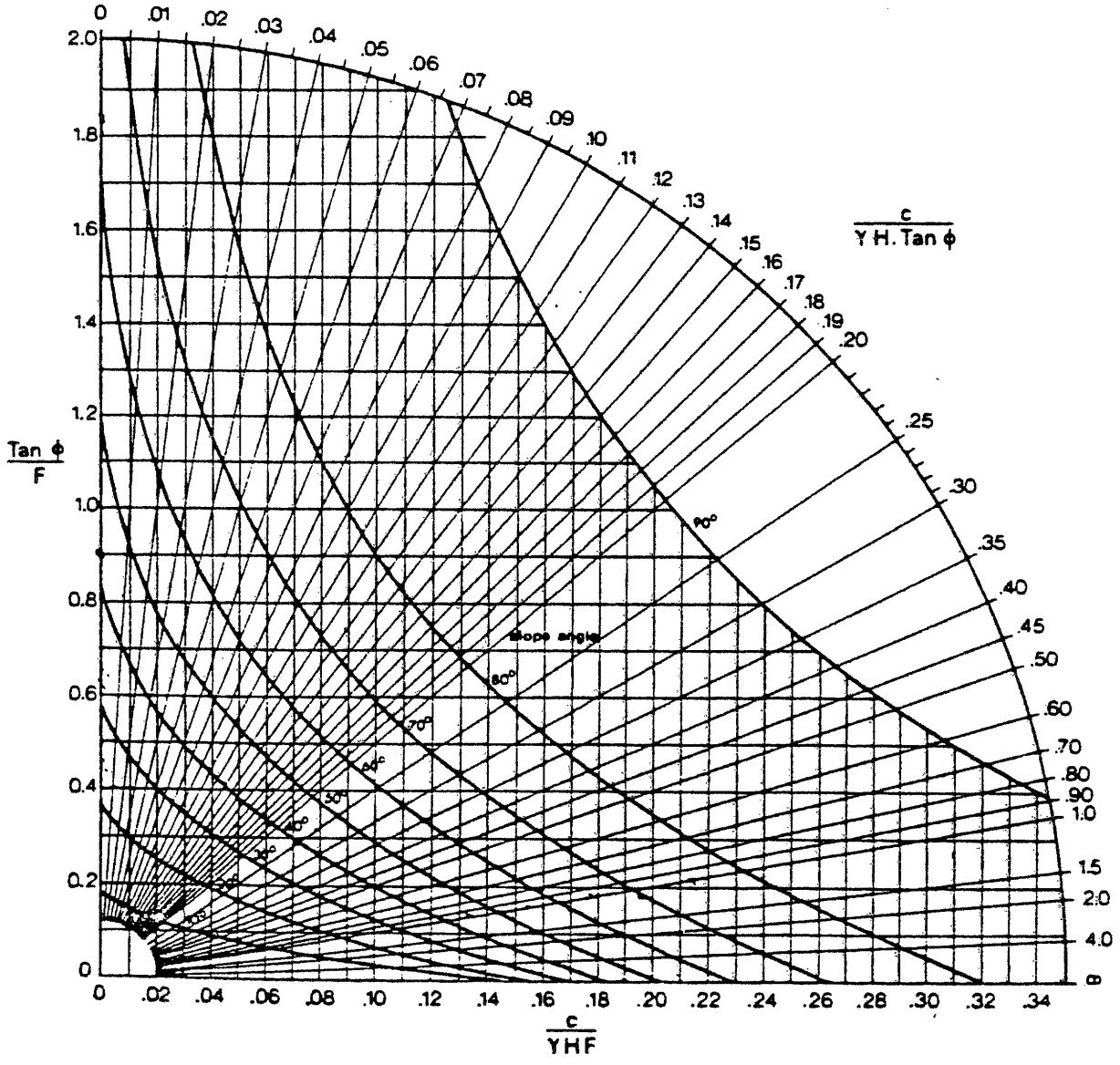


Figure 1

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

ϕ=Internal Friction Angle

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

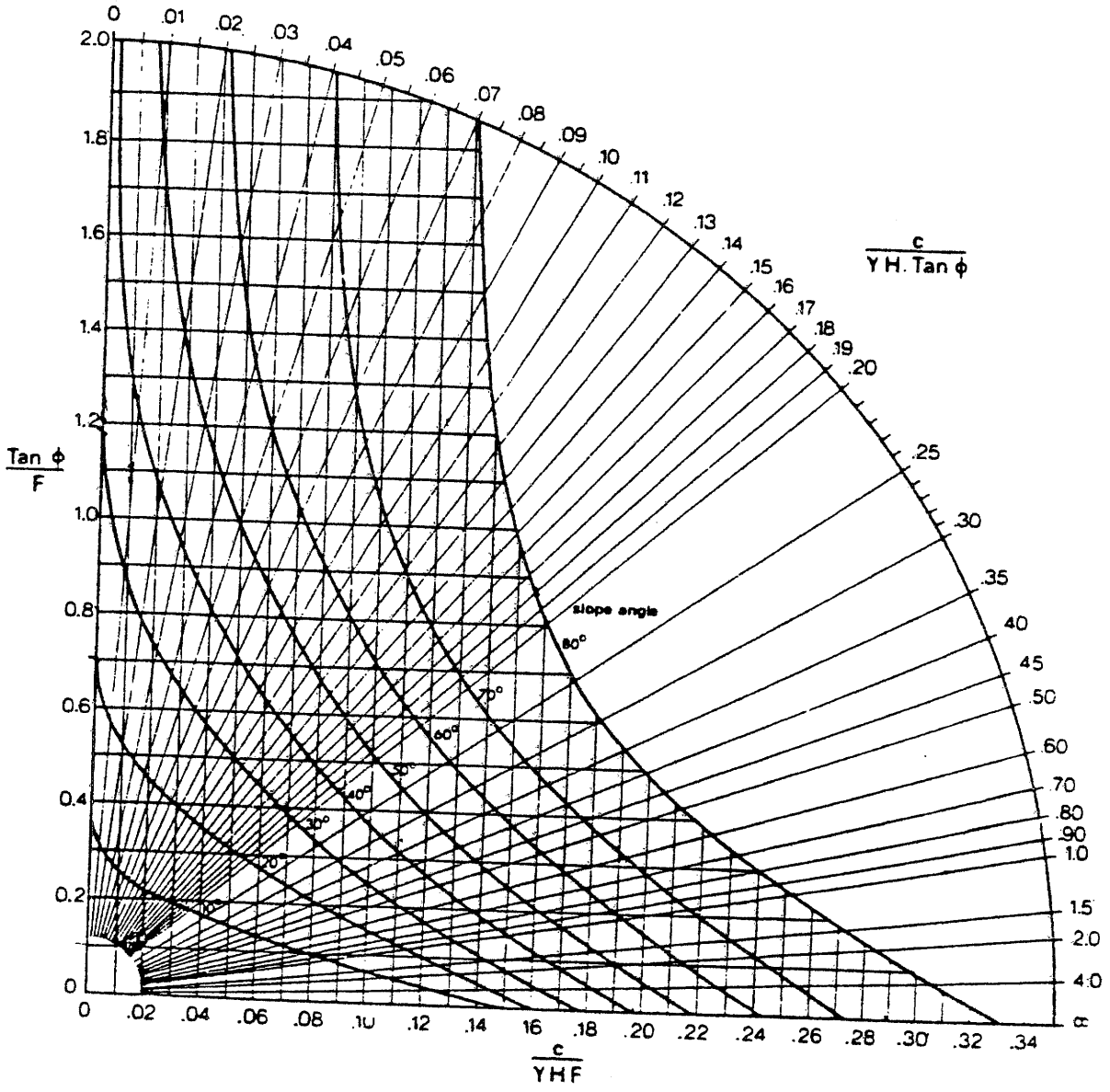


Figure 2

ATTACHMENT 9

SITLA CORRESPONDENCE

Shaver, Dave

From: John Blake [jblake@utah.gov]
Sent: Wednesday, October 15, 2008 8:42 AM
To: Shaver, Dave
Cc: Daron Haddock; Tom Faddies
Subject: Re: West Ridge Mine, GVH installlation, ML 49287

Dear Mr. Shaver,

The Trust Lands Administration received fee simple title to the lands described below in your E-mail through the 1998 Utah Schools and Federal Land Exchange Act, P.L. 105-335. Andalex Resources, Inc. and Intermountain Power Agency obtained coal lease ML 49287 covering the subject lands on April 1, 2004. West Ridge Resources is the operator of the leasehold estate.

Section 8.1 of the lease agreement provides that the Lessee may use the surface estate to the extent reasonably necessary for the economic operation of the leasehold. Your request to construct a GVH and stockpile area as described below in your E-mail appear to meet that criteria and are hereby granted approval to proceed by the Lessor. This approval applies only to the specific operations described below in Sections 3 and 10, T14S, R13E, SLB&M. Any other permits, access, rights of way or operations upon or across any other lands as may be necessary to achieve such operations shall be the sole responsibility of the Lessee.

I note that the lands within ML 49287 are not presently under lease for oil and gas. Andalex Resources, Inc. is hereby given approval from the Trust Lands Administration to vent non-economic quantities of methane gas from the leasehold estate pursuant to the proposed operations in an environmentally sound and safe manner. In the event that venting of the methane gas becomes economical then Andalex Resources, Inc. must obtain oil & gas rights and pay royalties the Trust Lands Administration upon such gas production. Non-economical venting of the gases, however, does not require the payment of royalties.

Thank you for your notification.

John T. Blake
Trust Lands Administration.

>>> "Shaver, Dave" <dshaver@coalsource.com> 10/14/2008 5:37 PM >>>
Dear Mr. Blake

As you are aware, West Ridge Resources is pursuing plans to permit and construct a gob gas vent hole (GVH) installation in the Right Fork of Bear Canyon over the worked out longwall cave area of the West Ridge Mine. This installation is required by MSHA as a safety concern for the underground workforce, due to the high rate of methane liberation from the longwall panel. Toward this end we are presently engaged in an emergency permitting submittal with DOGM for this installation. The purpose of this email is to obtain SITLA concurrence for our proposal.
The GVH installation is to be located on SITLA coal lease ML 49287 in NW1/4NE1/4SW1/4SE1/4 of Section 3, T14S, R13E. It will occupy an area of about 0.25 acres in a narrow strip immediately adjacent to the Bear Canyon Road. Associated with the installation will be a topsoil storage area, also located on ML 49287, in NW1/4SE1/4NW1/4NW1/4 of Section 10, T14S, R13E. It will occupy an area of about 0.1 acres. It also will be located immediately adjacent to the Bear Canyon Road. As you know, the Bear Canyon Road is an existing public road. Attached is a map showing the location of the proposed facilities. Please note that the affected surface area is owned by SITLA. We request your concurrence with this proposal in terms of lease surface activities, and in terms of mine-related facilities located within 100' of a public road. Please note that the methane gas will be vented to atmosphere, and we make no claims to associated gas rights. Our only purpose is to liberate the methane from the underground works for safety sake, as mandated by MSHA.
Also be advised that the GVH installation, and topsoil storage, will be permitted, constructed, operated, bonded and reclaimed under a SMCRA permit amendment to be approved

and issued by DOGM. Please call me if you have questions or comments. Your expedient review of this request is appreciated.

Dave Shaver
Project Engineer, Agent
West Ridge Resources, Inc.
435-888-4017

State of Utah
School & Institutional
Trust Lands Administration

Jon M. Huntsman, Jr.
Governor

Kevin S. Carter
Director

675 East 500 South, Suite 500
Salt Lake City, UT 84102-2818
801-538-5100
801-355-0922 (Fax)
www.trustlands.com

Wednesday, October 22, 2008

Dave Shaver, Project Engineer/Agent
West Ridge Resources, Inc.
P.O. Box 910
East Carbon, Utah 84520-0910

RE: Bear Canyon Road Status, West Ridge Mine C0070041, lease ML 49827

Dear Mr. Shaver:

In response to your request regarding the status of the Bear Canyon road and upgrades to that road from the intersection of the C Canyon road up to the site proposed for the gob vent hole installation in the Right Fork of Bear Canyon.

Federal right-of-way U 01756 was issued on 9/3/1951 as a tramroad and was constructed and used in the 1950's for oil & gas and coal lease activities. See attached BLM Plat. SITLA is the surface owner and maintains jurisdiction over portions of that road which are on Trust Lands including portions of T 14S R13 E Sections 3, 10, and 16. SITLA maintains this public road for multiple land use including oil and gas leasing, coal and other minerals, industrial use and grazing.

SITLA approved the upgrading of the Bear Canyon road by West Ridge on September 17, 2008 in anticipation of the construction of a gob vent hole installation on Section 3, immediately adjacent to the existing road. SITLA maintains jurisdiction over the use, maintenance and upgrading of this road on Trust Lands. Such activities within this existing public road are not considered by SITLA to be surface coal mining activities subject to permitting by DOGM.

Any upgrades to the road or maintenance performed on the road will remain under the jurisdiction of SITLA regardless of the duration or use by West Ridge. The existing road will remain in place and under SITLA's jurisdiction to support other land use activities even following the use and eventual reclamation of the gob vent hole installation.

SITLA concurs that the gob vent hole installation facility is a coal mine related surface activity and should be under DOGM permit requirements. The existing road however will remain as a public use road where it exists on Trust Lands.

Please let us know if you have any other questions or concerns regarding use of the Bear Canyon road or construction of the gob gas vent hole installation.

Sincerely,

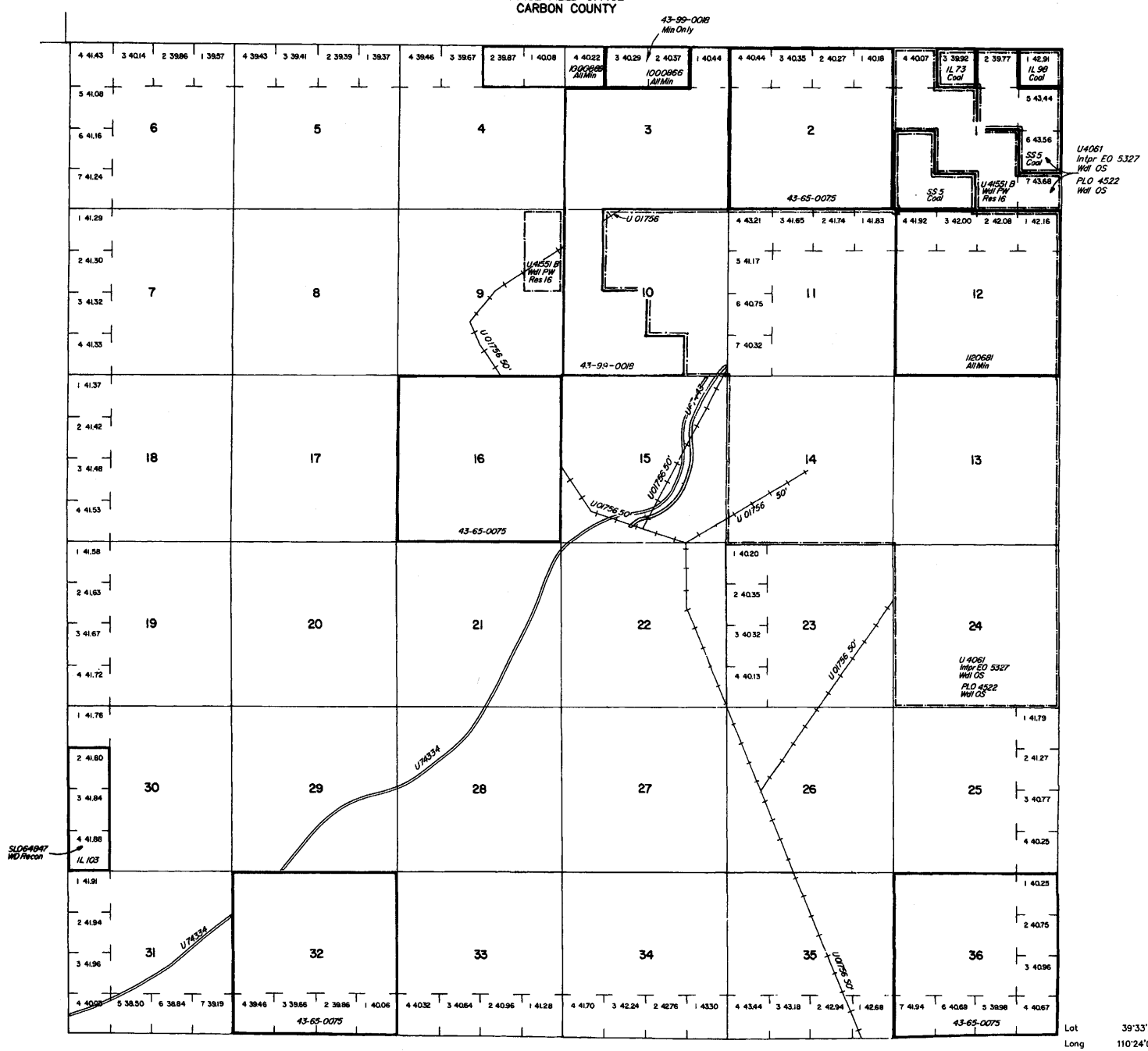
/S/

J. Randall Harden
Minerals Resource Specialist

CC: Tom Faddies, John Blake, Daron Haddock (DOGM)

TOWNSHIP 14 SOUTH RANGE 13 EAST OF THE SALT LAKE MERIDIAN, UTAH

PRICE FIELD OFFICE
CARBON COUNTY



STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

INDEX TO SEGREGATED TRACTS				
RESURVEY	ORIGINAL SURVEY			
TRACT NO	T	R	SEC	SUBDIVISION

FOR ORDERS AFFECTING DISPOSAL OR USE OF UNIDENTIFIED LANDS WITHDRAWN FOR CLASSIFICATION, MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES, REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.

Lat 39°33'24"N
Long 110°24'03"W

WARNING STATEMENT
This plat is the Bureau's Record of Title, and should be used only as a graphic display of the township survey data. Records hereon do not reflect title changes which may have been affected by lateral movements of rivers or other bodies of water. Refer to the cadastral surveys for official survey information.

CURRENT TO		
7-12-2007	PV	VJ
	OG	

T 14 S
R 13 E

Shaver, Dave

From: Randy Harden [randyharden@utah.gov]
Sent: Thursday, November 06, 2008 3:40 PM
To: Shaver, Dave; Daron Haddock
Cc: Chris Fausett; John Blake; Tom Faddies; Tom Mitchell
Subject: Bear Canyon Road
Attachments: Randy Harden.vcf

Daron/Dave,

As per our discussions, Dave Shaver will be submitting an application for an easement with Trust Lands for the Bear Canyon Road up to the gob vent hole. That easement will be assigned to Carbon County % Andalex Resources. Chris Fausett will be coordinating the easement and Trust Lands is willing to accept the assignment of the easement to the county.

Hopefully, the assignment of the lease can stipulated in the approval of the amendment so that there are no delays in drilling the necessary gob gas vent holes as required by MSHA to continue mining operations at West Ridge.

Thanks,

Randy Harden

ATTACHMENT 10

HYDROLOGY REPORT
PETERSEN HYDROLOGIC

PETERSEN HYDROLOGIC, LLC

15 October 2008

Mr. Dave Shaver
West Ridge Resources, Inc.
P.O. Box 902
Price, Utah 84501

Dave,

At your request, we have evaluated the probable hydrologic consequences relating to the proposed installation and operation of the West Ridge Panel 8 gob gas vent holes (GVH) in Bear Canyon. We are providing this letter report to present the findings of a hydrogeologic investigation we have performed in this regard and to describe the probable hydrologic consequences of the GVH drilling and operational activities.

This report includes the following sections:

- Methods of Study
- Physical setting
- Geologic Setting
- Hydrologic Conditions
- Probable Hydrologic Consequences
- References Cited

2695 N. 600 E. LEHI, UTAH 84043 (801) 766-4006

Methods of Study

On 7 October 2008 we made a site visit to the GVH drilling site in the right fork of Bear Canyon. During this visit we examined the Bear Canyon surface-water systems adjacent to the GVH drilling site. The stream channel characteristics and the shallow alluvial and colluvial sediments in the canyon were observed. The geologic and hydrogeologic conditions at the drilling site and adjacent areas were observed and photographed.

Information regarding proposed GVH drilling plans and pertinent hydrogeologic reports and maps were obtained and reviewed as part of this investigation.

Physical Setting

The GVH area is situated in the right fork of Bear Canyon in the southwest quarter of the southeast quarter of Section 3, Township 14 South, Range 13 East, in Carbon County, Utah. The Bear Canyon GVH area overlies the previously mined Panel 8 longwall panel at the West Ridge Mine and is designed to vent gasses from the longwall gob area in the underground coal mine workings for mine safety purposes. The venting of the gas will occur through drill holes advanced from the land surface in Bear Canyon to the underlying mine gob area. The underground mine workings are separated from the overlying land surface in Bear Canyon by approximately 380 feet of overburden (Personal communication, Dave Shaver, 2008). Current plans call for the installation of three drillholes at the GVH site. Based on current plans the holes will be drilled at 45 degree angles into the mine, and will have individual depths (lengths) of 504, 376, and 502 feet.

Geologic Setting

The land surface in Bear Canyon at the GVH site is underlain by sandstone bedrock of the Cretaceous Castlegate Sandstone formation. In some areas, the bedrock is directly exposed at the land surface, while in other areas relatively thin deposits of alluvium, colluvium, and soil are present.

The stream channel substrate in the right fork of Bear Canyon Creek near the GVH exists either directly on Castlegate Sandstone bedrock or on thin deposits of alluvium overlying the sandstone bedrock.

The rock strata comprising the overburden between the Panel 8 mine workings and the land surface in Bear Canyon near the GVH consists of rocks of the Castlegate Sandstone and the Cretaceous Blackhawk Formation. The Castlegate Sandstone consists predominantly of lenticular fluvial sandstones interbedded with minor siltstone or claystone layers. The Blackhawk Formation in the region consists of interbedded sandstones, siltstones, claystones and coal deposits. The bedrock strata locally dip at approximately three to eight degrees to the northeast. Major faulting has not been observed in the GVH area (Mayo and Associates, 1997).

Hydrologic Conditions

Groundwater and surface-water systems in the West Ridge Mine permit and adjacent area have previously been characterized by Mayo and Associates (1997). During the 7 October 2008 site visit to the GVH area, no springs or seeps were observed. Wetness in the near-surface unconsolidated sediments in the vicinity of the GVH was likewise not observed, which suggests a lack of appreciable groundwater baseflow discharge locally. Because the GVH location is near the up-dip ends of the Castlegate and Blackhawk geologic formations (which have been truncated by the erosional Book Cliffs escarpment), regional, long-flowpath type groundwater systems are likely not present in the area.

In previous spring and seep surveys in the area, no springs or seeps were identified in either the Castlegate Sandstone or the Blackhawk Formation in the vicinity of the GVH drill sites (Mayo and Associates, 1997). It should be noted that two seeps discharging at less than 1 gallon per minute each were previously identified in the two upper forks of the right fork of Bear Canyon Creek above the GVH area (S-27 and S-28; Mayo and Associates, 1997). However, these seeps discharge from the Price River Formation

topographically and stratigraphically above the drilling area and thus are not of concern in this investigation.

The right fork of Bear Canyon Creek appears to be an ephemeral drainage (Mayo and Associates, 1997). No discharge was present in the drainage during the 7 October 2008 site visit. The complete absence of flow in the creek in areas where the stream channel sits directly on clean bedrock surfaces demonstrates that there is at present no appreciable alluvial groundwater system associated with Bear Canyon Creek in the vicinity of the GVH area.

Probable Hydrologic Consequences

Adverse impacts to the hydrologic balance resulting from the installation and operation of the Bear Canyon GVH system are not anticipated. The basis for this conclusion is summarized below.

The gob vent holes will be constructed in a manner that minimizes the potential for adverse impacts to groundwater and surface-water resources and the hydrologic balance in the area. The proposed construction designs for the GVH holes include a nominal 20 foot length of 16-inch non-perforated steel surface casing that will be cemented in place. The surface casings will isolate the wells from surface-water, soil moisture, and any shallow groundwater potentially present in the upper 20 feet and will prevent shallow water from entering the GVH wells. From approximately 20 to 200 feet below the surface, the proposed well construction plans call for the placement of 9.625-inch non-perforated steel casing that will be cemented into place. The cemented steel well casing will isolate groundwaters that may be present in bedrock groundwater systems in the upper 200 feet from the GVH wells and prevent the inflow of groundwater into the wells.

Proposed construction plans call for the lower approximately 150 feet of the GVH wells to be cased with 8.75-inch slotted steel casing that will be left open to the rock strata and will not be cemented. The purpose of the slotted steel casing is to allow the drainage of

gob gasses into the well bore in the fractured rock strata overlying the Panel 8 gob. While there is the potential for drainage of some Blackhawk Formation groundwater into the GVH holes in the 150 feet interval overlying the longwall gob, the potential for appreciable or sustained groundwater drainage through these wells is minimal. This is because 1) groundwater systems in the Blackhawk Formation occur in hydraulically isolated groundwater partitions that are not in hydraulic communication with adjacent groundwater partitions, which limits the amount of groundwater that could potentially be drained, 2) the GVH holes are situated near the up-dip ends (outcrop locations) of the Castlegate Sandstone and Blackhawk Formation which limits groundwater recharge potential and the potential for the interception of regional groundwater systems, and 3) the 150-foot interval of the Blackhawk Formation overlying the gob area was likely intensely fractured as a result of the longwall mining prior to the construction of the wells which would likely have drained the groundwater partitions immediately overlying the gob area at the time of mining. For these reasons, the potential for drainage of appreciable groundwater or surface-water resources through the GVH drill holes is considered low.

The potential for detrimental impacts to the ephemeral Bear Canyon Creek drainage or any associated alluvial groundwater systems is considered remote. As discussed above, appreciable baseflow alluvial groundwater systems were not identified near the GVH location during the 7 October 2008 visit. Additionally, because the GVH well bores will be hydraulically isolated from the upper approximately 200 feet, the potential for impacts to water quality in the drainage are unlikely The implementation of appropriate sediment control management practices will minimize the potential for increased sediment yield from the GVH site during the construction and operational phases of the GVH system.

Prior to final reclamation, all drillholes will be plugged and sealed in accordance with State and Federal regulations. The casings will be plugged at the bottom to hold the concrete. A lean concrete mixture will be poured into the casing until the concrete is

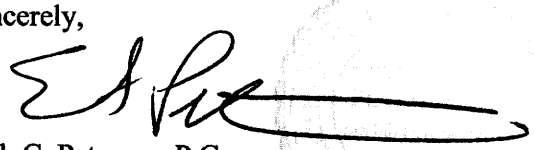
within five feet of the surface. At that time the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed. In this manner, the potential for any long-term impacts to the hydrologic balance resulting from the GVH system will be minimized.

References Cited

Mayo and Associates, 1997, Investigation of surface-water and groundwater systems in the West Ridge Area, Carbon County, Utah: unpublished consulting report, 80 p.

Please feel free to contact me should you have any questions in this regard.

Sincerely,



Erik C. Petersen, P.G.
Principal Hydrogeologist
Utah PG #5373615-2250

ATTACHMENT 11

DRAINAGE CONTROL PLAN
BLACKHAWK ENGINEERING

DRAINAGE CONTROL PLAN
FOR
GOB GAS VENT HOLE SITE

BEAR CANYON
WEST RIDGE MINE

PREPARED BY: DAN W. GUY, P.E.
BLACKHAWK ENGINEERING, INC.
OCTOBER 2008

DRAINAGE CONTROL PLAN
GOB GAS VENT HOLE SITE

I. Introduction

This report will provide the drainage control plan and calculations for the proposed gob gas vent hole site in Bear Canyon, above the East Ridge Mine. The parameters used in the calculations (i.e. rainfall, runoff curve number, etc.) were taken directly from Appendix 7-4, "West Ridge Mine Sedimentation and Drainage Control Plan (As Constructed)". Drainage area and slopes were measured directly from the maps provided with the proposal.

General Plan

The proposed drill pad and blower location is a very small area located just south of the existing public road in Bear Canyon. The new disturbance is proposed to be approximately 0.246 acres. Due to the extremely small surface area and limited space for a sediment pond, this site will be treated as an Alternate Sediment Control Area (ASCA). The majority of the natural runoff above the site is diverted around and north of the turnaround and road through an existing ditch. This report will discuss only the drainage that will actually be affected by the new construction.

It is proposed to first remove the topsoil from the proposed disturbed area and store it in a protected location elsewhere in the canyon. The proposed drill pad and blower location site will then be constructed. Due to the narrow canyon, the pad areas will be created by cutting into the existing hillside, creating a small cut slope along the south side of the pad. Runoff from above and on the pad areas will be collected in an adequately sized cut ditch at the toe of the cut slope. The pad and existing road will also be sloped toward this ditch. All runoff from the pad and road area will then flow into the ditch, through a series of excelsior logs place at 50' intervals as energy dissipaters, through a final set of 4 closely-spaced excelsior logs for sediment control and then into the natural channel below the site. The entire drainage ditch will be rip-rapped for added protection. The average slope of the drainage ditch is approximately 8.11%; however, the slope does steepen at the lower end of the pad to approximately 11.17%. Rip-rap sizing is based on the expected flow velocities in this steepest, worst-case section of the ditch. Rip-rap sizing is based on the Rip-Rap Chart, Figure 2 in Appendix 7-4 of the West Ridge MRP. The cut slopes will be pocked and reseeded and covered with woodstraw, and the pad and road areas will be graveled. This will further enhance the erosion protection on the site.

Calculations

Runoff calculations and ditch sizing were calculated using the computer program "Office of Surface Mining Watershed Model", Storm Version 6.20 by Gary E. McIntosh. Runoff curve numbers and rip-rap sizing were taken from Appendix 7-4. Drainage areas and slopes were measured directly from the enclosed maps. All calculations are based on the 10 year-24 hour precipitation event for this area.

The following are the specific parameters used for the runoff calculations at this site:

10 year-24 hour precipitation	=	**2.00"**
Runoff Curve Number (Undisturbed)	=	**64**
Runoff Curve Number (Disturbed)	=	**90**
Undisturbed Runoff Area	=	**2.790 ac.**
Undisturbed Runoff Slope	=	**60.45%**
Existing Road Area	=	**0.305 ac.**
New Disturbed Area	=	**0.246 ac.**
Disturbed Runoff Slope	=	**8.11%**
Manning's n for Ditch	=	**0.035**
Average Ditch Slope	=	**8.11%**
Maximum Ditch Slope	=	**11.17%**

Peak flows were calculated for the undisturbed slope drainage to the pad area and for the pad and road area. These flows were added together for a total peak flow to be routed through the ditch. Calculations are included in Attachment A of this report.

The following are the results of the calculations:

Peak Flow - Undisturbed	=	**0.06 cfs**
Peak Flow - Disturbed	=	**0.53 cfs**
Peak Flow - Total	=	**0.59 cfs**
Average Ditch Flow Depth	=	**0.42 ft.**
Average Ditch Flow Velocity	=	**3.39 fps**
Maximum Ditch Flow Depth	=	**0.39 ft.**
Maximum Ditch Flow Velocity	=	**3.82 fps**

Proposed Construction

Based on the calculated peak flow runoff for this site, the following proposed hydrologic controls will provide adequate protection:

1. **Ditch Size - Triangular/Minimum 12" depth**
2. **Rip-Rap Size – 3" D_{50}/Minimum 6" Depth**
3. **Velocity Control – Excelsior Logs – 50' spacing along Ditch**
4. **Sediment Control - Excelsior Logs - 4 Rows Minimum 5' apart**

It is proposed to construct a triangular shaped ditch with maximum average of 1:1 slopes and minimum depth of 12" along the base of the cut slope along the entire length of the disturbed area. The entire ditch will be armored with 3" Minimum D50 rip-rap. Excelsior logs will also be placed at 50' intervals along the ditch as energy dissipaters. The lower end of the ditch will pass through a series of at least 4 rows of excelsior logs for velocity and sediment control, and then to the natural channel below the site. Excelsior logs will be installed per manufactures recommendations.

Conclusion:

Due to the small size of the site and installation of the proposed sediment and erosion controls, there should be no adverse effects to the surface hydrology of this area.

ATTACHMENT A

HYDROLOGY CALCULATIONS

Project Title = WEST RIDGE GVH UNDIST 10/24
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1

Curve number	=	64.0
Area	=	2.8 acres
Hydraulic length	=	670.00 Feet
Elevation change	=	405.0 feet.
Concentration time	=	0.09 hours
Concentration time type	=	SCS Upland Curves
Unit hydrograph type	=	Forested

-- Total Area = 2.8 acres

-- Storm data

Total precipitation	=	2.0 inches
Storm type	=	SCS Type 2 storm, 24 hour storm
Peak Discharge	=	0.06 cfs
Discharge volume	=	0.03 acre ft

Project Title = WEST RIDGE GVH DIST 10/24
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1

Curve number	=	90.0
Area	=	0.6 acres
Hydraulic length	=	370.00 Feet
Elevation change	=	30.0 feet.
Concentration time	=	0.04 hours
Concentration time type	=	SCS Upland Curves
Unit hydrograph type	=	Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation	=	2.0 inches
Storm type	=	SCS Type 2 storm, 24 hour storm
Peak Discharge	=	0.53 cfs
Discharge volume	=	0.05 acre ft

Title of run: WEST RIDGE GVH AVG.

Solving for	Depth Normal

Triangle

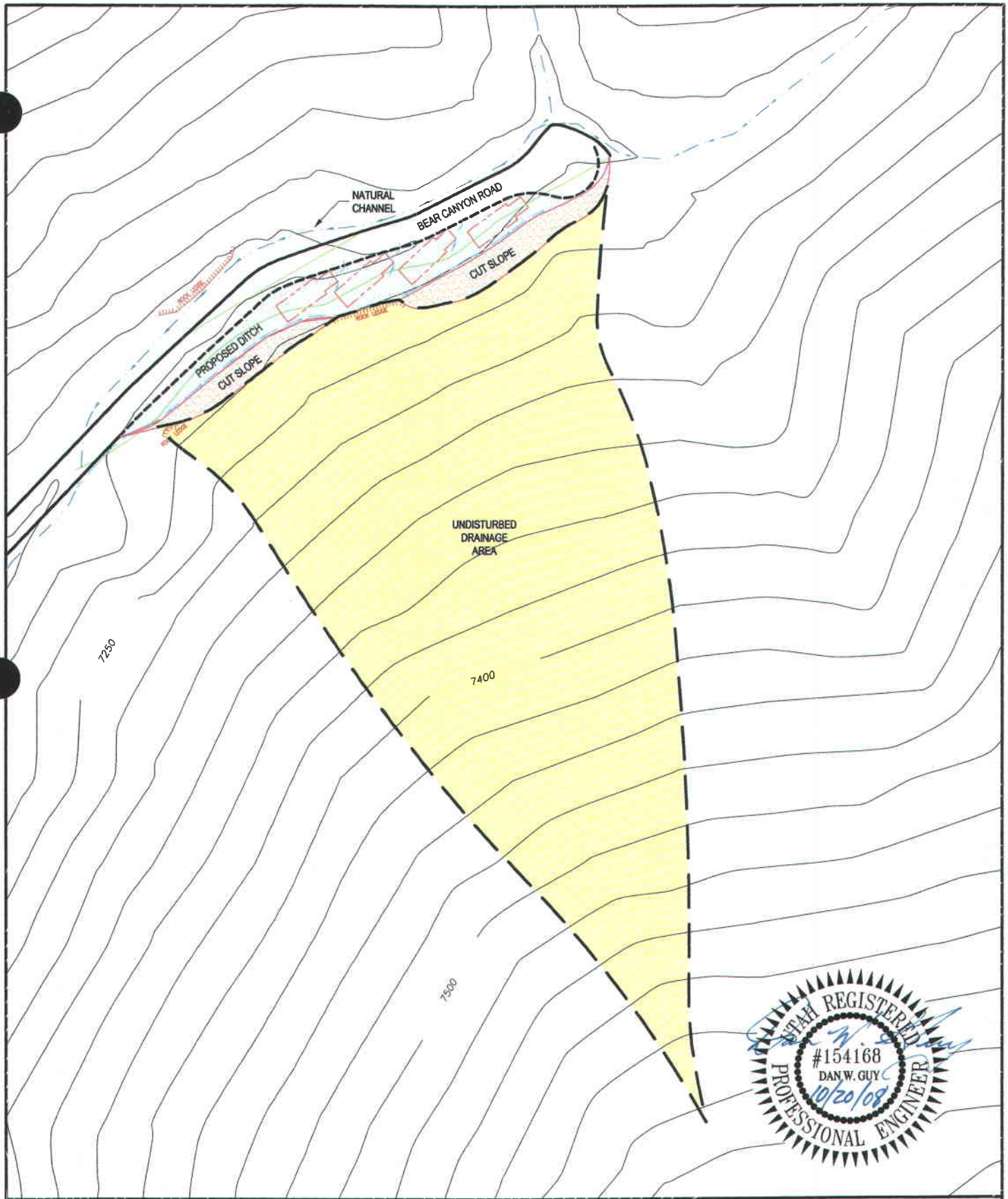
Flow depth (ft)	0.42
First Side slope	1.0
Second Side slope	1.0
Slope of diversion	0.0811
Manning"s n	0.035
CFS	0.59
Cross section area (sqft)	0.17
Hydrualic radius	0.15
fps	3.39
Froude number	1.55

Title of run: WEST RIDGE GVH MAX.

Solving for	Depth Normal

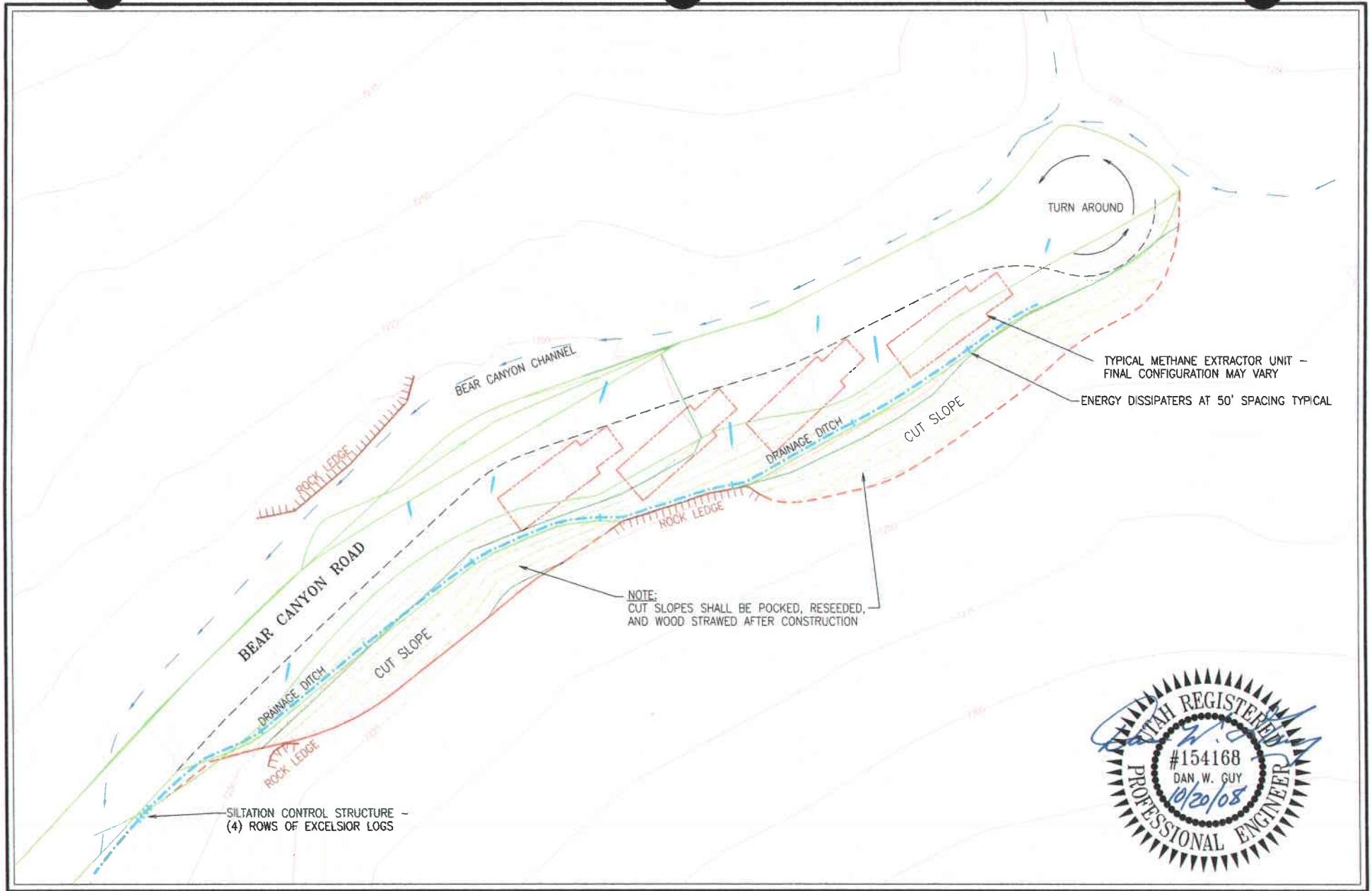
Triangle

Flow depth (ft)	0.39
First Side slope	1.0
Second Side slope	1.0
Slope of diversion	0.1117
Manning"s n	0.035
CFS	0.59
Cross section area (sqft)	0.15
Hydrualic radius	0.14
fps	3.82
Froude number	1.80



BEAR CANYON HYDROLOGY
WEST RIDGE MINE
UNDISTURBED DRAINAGE AREA
FIGURE 1

BLACKHAWK ENGINEERING, INC.



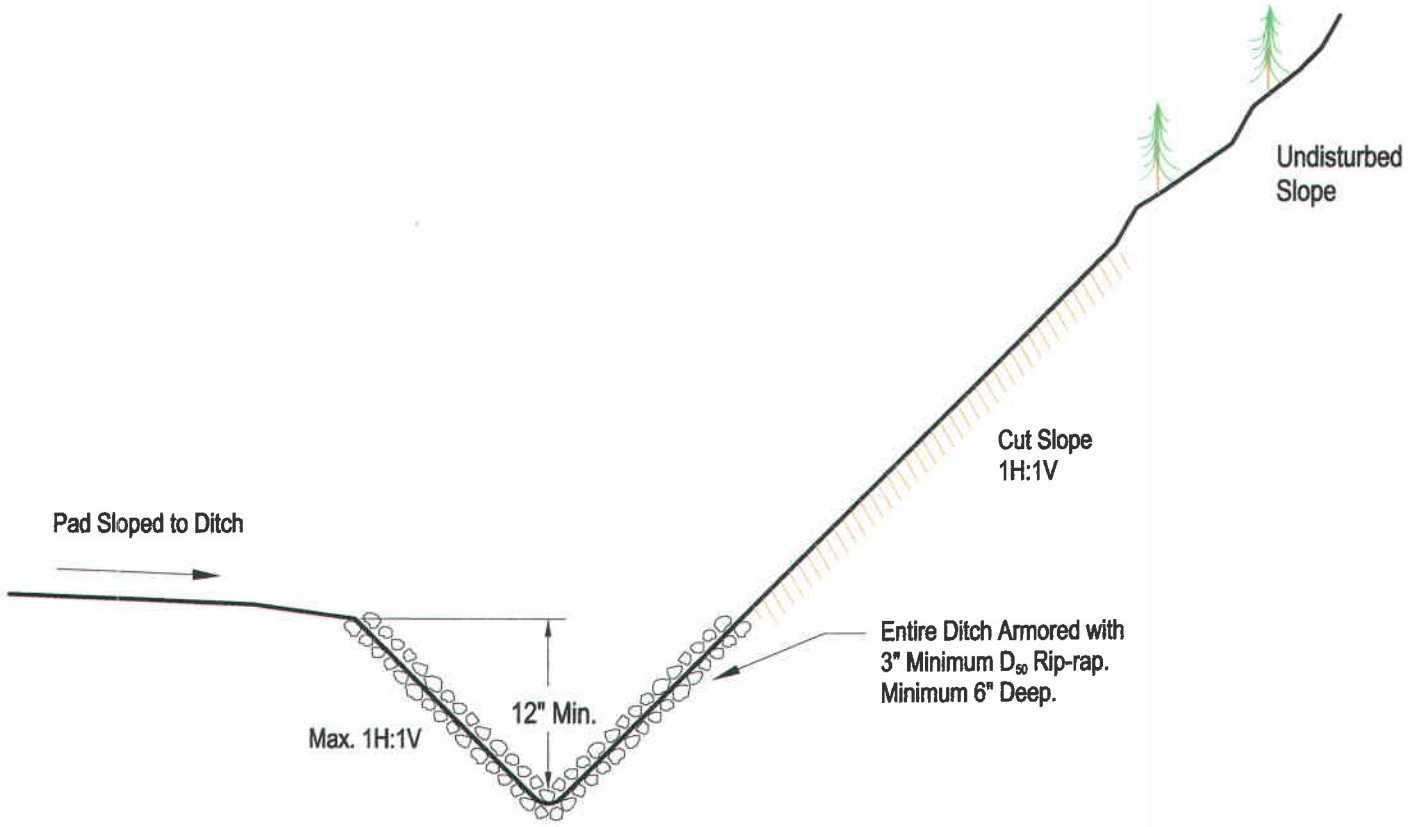
UTAH REGISTERED
#154168
DAN W. GUY
10/20/08
PROFESSIONAL ENGINEER

N

NOTE:
ALL PAD AND ROAD AREA ABOVE CHANNEL CROSSING TO BE GRAVELED

BEAR CANYON HYDROLOGY
WEST RIDGE MINE
DRAINAGE PLAN
FIGURE 2

BLACKHAWK ENGINEERING, INC.



TYPICAL SECTION

UTAH REGISTERED
#154168
DAN W. GUY
10/20/08
PROFESSIONAL ENGINEER

NOTE:

Ditch Side Slopes may vary - Average Side Slopes will not exceed 1H:1V.

BEAR CANYON GVH
WEST RIDGE MINE
DRAINAGE DITCH
FIGURE 3

BLACKHAWK ENGINEERING, INC.

ATTACHMENT 12

TOWER (CENTENNIAL) GVH
C/007/019
BONDING CALCULATIONS

Current Tower Bond

Bonding Calculations
Centennial Mine C/007/019

Bond Summary

Direct Costs

Subtotal Demolition and Removal	$371,538.00	
Subtotal Backfilling and Grading	$426,800.00	
Subtotal Revegetation	$210,074.00	
Direct Costs	$1,008,412.00	
Indirect Costs		
Mob/Demob	$100,841.00	10.0%
Contingency	$50,421.00	5.0%
Engineering Redesign	$25,210.00	2.5%
Main Office Expense	$68,572.00	6.8%
Project Mainagement Fee	$25,210.00	2.5%
Subtotal Indirect Costs	$270,254.00	26.8%
Total Cost	$1,278,666.00	
Escalation factor		0.012
Number of years		4
Escalation	$62,490.00	
Reclamation Cost	$1,341,156.00	
Bond Amount (rounded to nearest $1,000)	$1,341,000.00	
2009 Dollars		
Bond Posted	$1,520,000.00	
Difference Between Cost Estimate and Bond	-$179,000.00	
Percent Difference	13.35%	

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Task ID	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
2359		Gob Vent Well 10 thru 17																			
		7A is a redrill																			
		Structure's Demolition Cost	Mechanical equipment heavy	15055 300 3600	805	/ton							4			8	tons		32	tons	25760
		Plug Well	Plug Well	AML3	5000	EA.										8	EA		8	EA	40000
		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																			
																					65760
		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																			65760

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Tower GVH Demolition

Task ID		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
	Gob Hole 10 thru 17															
	Grading 5,000 CY per hole															
	Grading															
	Backfill and rough grade pond, canyon and bench areas															
	D7R: Series II (9-55) (2nd2004)	10585	41.1	0.1	52	163.24	1	163.24	$/HR	40000	CY	250	CY/HR	160	HR	26118
	Subtotal															26118
	Topsoil 1,600 CY per hole															
	Haul and spread topsoil															
	D7R: Series II (9-55) (2nd2004)	13720	53.4	0.1	52	196.49	1	196.49	$/HR	12800	CY	250	CY/HR	51.2	HR	10060
	Subtotal															10060
	Support Personel															
	4,000 gal H2O truck Diesel (20-16) (2N04)	3350	19.85	0.1	42	84.77	1	84.77	$/HR					32	HR	2713
	Subtotal															2713
	Total															38891

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Tower GVH
Earthwork

Ref.	Description	Materials
	Gob Holes New	
	Ground Preparation	
	Gouging/Pocking	Excavation Bulk Bank 2 CY (322BL)
	Assume vol = area(18.1 AC) x 1 ft.	
	Seed for hydromulch	Seed Mix for Centennial Drainage
	Hydroseed application	Hydro Spreader (equip. & labor) B-81 80MS
	Mulch material	Hay 1" material only 029105000250
	Hydroseed application	Hydro Spreader (equip. & labor) B-81
	Subtotal	
	Reseeding	
	Assume 25% reseeding rate	
	Subtotal	
	Total	

Tower GVH
Reveg

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area
M023154240260	1.7	/CY					
Centennial 001	447.7	$/AC					
Reveg002	19.13	/MSF					8
							8
Reveg001	68	/MSF					
Reveg005	19.13	/MSF					8
							8

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City & Wiring

Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit
3200					CY		3200	CY
					AC		8	AC
					AC		348	MSF
					AC		8	AC
					AC		348	MSF

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MAY 11 2007

Oil, Gas & Mining

Cost
5440
3582
6657
544
6657
22880
5720
5720
28600

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Current West Ridge Bond

West Ridge Mine C/007/041 Task 2233 Bond Amount Revised April 2007

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$303,444.00	
Subtotal Backfilling and Grading	$777,302.00	
Subtotal Revegetation	$142,999.00	
Direct Costs	$1,223,745.00	
Indirect Costs		
Mob/Demob	$122,375.00	10.0%
Contingency	$61,187.00	5.0%
Engineering Redesign	$30,594.00	2.5%
Main Office Expense	$83,215.00	6.8%
Project Mainagement Fee	$30,594.00	2.5%
Subtotal Indirect Costs	$327,965.00	26.8%
Total Cost	$1,551,710.00	
Escalation factor		0.038
Number of years		3
Escalation	$183,702.00	
Reclamation Cost	$1,735,412.00	
Bond Amount (rounded to nearest $1,000) 2011 Dollars	$1,735,000.00	
Bond Posted 2004	$2,117,000.00	
Difference Between Cost Estimate and Bond	$382,000.00	
Percent Difference	22.02%	

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ATTACHMENT 13

RECLAMATION SEED MIXES

TABLE 3-1
REVEGETATION TIMETABLE

Refer to Table 5-1, Reclamation Time Table - West Ridge Mine for details of entire reclamation schedule.

YEAR 1	BEGIN	END
Reseed/ mulch	following regrading	October 31

YEAR 2 - 4	BEGIN	END
Perform Maintenance Work On Site	as needed	
Perform Annual Qualitative Vegetation Monitoring	June	June
Perform Quantitative Vegetation Monitoring During Second & Third Years	June	August

YEAR 5 - 10	BEGIN	END
Perform Quantitative Vegetation Monitoring During Fifth, Ninth and Tenth Years	June	August
Obtain Bond Release	September	

TABLE 3-2B

MINESITE RECLAMATION -FINAL RECLAMATION
SPECIES LIST AND SEEDING RATE
SEED MIXTURE FOR THE DOUGLAS FIR/MAPLE COMMUNITY

RATE SCIENTIFIC NAME	COMMON NAME	BROADCAST #PLS LBS/ACRE
GRASSES		
Elymus trachycaulus	Slender Wheatgrass	2.0
Elymus lanceolatus	Thickspike Wheatgrass	2.0
Elymus spicatus	Bluebunch Wheatgrass	3.0
Poa pratensis	Kentucky Bluegrass	0.2
Stipa comata	Needle-and-thread	2.0
Poa fendleriana	Muttongrass	0.3
Stipa hymenoides	Indian ricegrass	2.0
FORBS		
Achillea millefolium	Yarrow	0.1
Aster chilensis	Pacific Aster	0.1
Geranium viscosissimum	Sticky Geranium	1.0
Hedysarum boreale	Northern Sweetvetch	1.5
Hedysarum occidentale var. canone	Canyon Sweetvetch	0.0*
Linum lewisii	Lewis Flax	1.0

TABLE 3-2B (CONTINUED)

TREES/SHRUBS		
Acer glabrum	Rocky Mountain Maple	2.5
Prunus virginiana	Chokecherry	2.0
Rhus trilobata	Squawbush	1.0
Symphoricarpos oreophilus	Snowberry	0.5
	TOTAL	212

The following would be planted as five gallon containerized plants along the reclaimed channel. The plants would be spaced about five feet apart along each side.

Amelanchier alnifolia	Serviceberry
Cercocarpus ledifolius	Mountain Mahogany

* To be determined by future field tests and on-site seed availability.

TABLE 3-3

MINESITE RECLAMATION -INTERIM RECLAMATION SPECIES LIST AND SEEDING RATE INTERIM REVEGETATION SEED MIXTURE FOR TEMPORARY DISTURBANCE AT THE MINESITE

SCIENTIFIC NAME	COMMON NAME	BROADCAST RATE #PLS LBS/ACRE
GRASSES		
Elymus lanceolatus	Thickspike Wheatgrass	4.5
Elymus smithii	Western Wheatgrass	5.0
Poa pratensis	Kentucky Bluegrass	0.4
Stipa hymenoides	Indian Ricegrass	4.0
Elymus spicatus	Bluebunch Wheatgrass	6.0
FORBS		
Achillea millefolium	Yarrow	0.1
Artemisia ludoviciana*	Louisiana sage	0.1
Hedysarum occidentale var. canone	Canyon Sweetvetch	0.0**
	TOTAL	20.1

* Subject to availability

**Hedysarum occidentale var. canone (Canyon Sweetvetch) will be seeded on the topsoil stockpile only as an interim revegetation measure and to propagate seed. The seeding rate would be determined by future field tests and on-site seed availability.

TABLE 3-4

REVEGETATION MONITORING SCHEDULE

QUALITATIVE OBSERVATIONS

	YEAR									
	1	2	3	4	5	6	7	8	9	10
TYPE OF REVEGETATION										
Permanent Revegetation	X	X	X	X	X	X	X	X	X	X
Interim Stabilization	X	X	X	X	X	X	X	X	X	X
Test Plots/Field Trials	X	X	X	X	X	X	X	X	X	X

QUANTITATIVE OBSERVATIONS

	YEAR									
	1	2	3	4	5	6	7	8	9	10
PARAMETER										
Cover		X	X		X				X	X
Frequency		X	X		X				X	X
Woody Plant Density		X		X				X	X	X
Productivity:										
Test Plots					X					X
All Other Revegetation								X	X	X

Final Seed Mix

Seed Mix for Crandall mine Drill Pads and roads

Revisited September 14, 2007

Species	Variety	Common Name	Pounds/ Acre (PLS)	seeds/lbs	seeds/acre	Seeds/ft^2
Bromus marginatus	var. Garnet	Mountain Brome	2.5	90,000.00	225000.0	5.2
Elymus trachycaulus ssp. Traychycaulus	var. Primar	Slender Wheatgrass	2	159,000.00	318000.0	7.3
Dactylis glomerata	var. Paiute	Dryland Orchardgrass	2	654,000.00	1308000.0	30.0
Poa alpina		Alpine Bluegrass	1	1,000,000.00	1000000.0	23.0
Elymus lanceolatus ssp. Lanceolatus	var. Critana	Thickspike Wheatgrass	2	154,000.00	308000.0	7.1
Phleum pratense		Timothy	1	1,300,000.00	1300000	29.84
Festuca rubra		Red Fescue	1	500,000.00	500,000.00	11.48
Festuca trachyphylla		Hard Fescue	1	565,000.00	565,000.00	12.97
Secale cereale		Cereal Rye	9	18,000.00	162,000.00	3.72
Triticum aestivum x Secale cereale	QuickGuard Sterile Triticale	Triticale	10	13,000.00	130,000.00	2.98
Heliiomris multiflora		Showey Goldeneye	0.25	1,055,000.00	263,750.00	6.05
Vicia americana		American vetch	0.5	33,000.00	16,500.00	0.38
Artemisia ludoviciana		Prairie sage	0.1	4,500,000.00	450,000.00	10.33
Achillea millefolium	var. occidentalis	Westren yarrow	0.2	2,770,000.00	554000.0	12.7
Total			**32.55**		**7100250.0**	**163.0**

East Mtn Drillhole Reclamation
Alternate Seed Mix

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ATTACHMENT 14

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN (SPCC)

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN (SPCC)

WEST RIDGE
RESOURCES, INC.

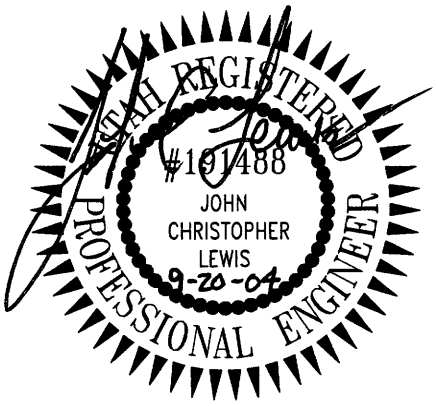
WEST RIDGE MINE

794 North C Canyon Road
East Carbon, Utah 84520
Telephone: (435) 888-4000 Fax: (435) 888-4002

September 20, 2004

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC)
40CFR112.7

Being a Professional Engineer, licensed and practicing in the State of Utah, I have reviewed West Ridge Resources, Inc.'s Spill Prevention Control and Counter Measure Plan (SPCC) date 20 September 2004 and attest that it has been prepared in accordance with 40 CFR Part 112.7 and prudent engineering practices.



WEST RIDGE MINE
SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN
40 CFR 112.7

The following Spill Prevention Control and Countermeasure Plan is written in accordance with the guidelines of 40 CFR 112.7 for the West Ridge Mine, Carbon County, Utah. The proposed mine facility is to be located approximately 6 miles northeast of East Carbon City, Utah, in Township 14 South, Range 13 East, portions of Sections 10,11,14 and 15, for a total of approximately 29 acres. Surface facilities have been constructed to support underground coal mining activities conducted by West Ridge Resources, Inc. This plan shall apply to surface fuel and lubricant storage areas within the proposed mine yard.

REGULATORY REQUIREMENTS:

40 CFR 112.7 (a)

The facility has not experienced any spill events in the past.

40 CFR 112.7 (b)

Gasoline and diesel storage tanks will be located within the mine facility area near the building area, as shown o Map 5-5. Gasoline and diesel will be stored in surface storage tanks of a maximum 2,000 gallons each. The tanks will be constructed and recommended for fuel storage use. Visual observations will be made on the tanks for signs of deterioration and leakage. The fuel will be utilized for mine related equipment.

Fuel storage tanks will be situated so that if one of the tanks were to leak or rupture, the contents of the largest tank would be contained within a concrete or steel enclosure.

Five gallon containers of oil and grease will also be stored in the mine yard area. These containers will be stored within a fire resistant area to keep rain and snow off the containers and prevent accidental contact form moving equipment. Containers will be stored on a concrete slab or other impermeable surface capable of containing spillage to prevent soil contamination in the event of a spill or leak.

Although the storage tanks will be designed for storage of petroleum products and will be tested prior to being put into service, the possibility exists that a tank could leak or rupture. If discharge occurred, contents for the tank (up to 2,000 gallons) would be contained within the storage areas. Immediate action would be taken to remove the spilled fuel from the storage site and properly dispose of if it at a treatment facility.

Spillage from the oil and grease storage site would also be contained at the site within an impervious containment structure. If necessary, absorbent materials will be used to contain the spill.

40 CFR 112.7 (c)

A discussed in (b) above, enclosure and containment at the storage site will act as a primary measure of control. Should the enclosure leak, rupture or otherwise be rendered inadequate, runoff from the enclosure site would flow to the sediment pond as secondary measure containment. The sediment pond has been designed to contain runoff from the yard area and is constructed at the south end of the mine yard. All drainage from the mine yard will flow to and be contained within the pond. The sediment pond would be used only as a secondary line of defense. Efforts will be made to prevent spills from reaching the pond through primary containment and rapid remedial response using absorbent material.

The sediment pond is designed to contain all runoff, from the mine site area, as a result of a 10 year-24 hour precipitation event. Should a significant runoff event occur, water would be held in the pond until suspended solids had settled (or a minimum of 24 hours) then, if it met quality requirements of the UPDES discharge permit issued for the facility, would be decanted into the natural drainage channel. Water held in the pond would not be discharged unless it met the standard for quality under the UPDES discharge permit issued for the facility. The primary spillway of the sediment pond will be equipped with am oil skimmer to prevent any oil or grease from discharging into the natural drainage.

The sediment pond has been designed in accordance with State regulations and guidelines. Runoff from the disturbed area, plus adjacent undiverted drainage areas, will be contained within the pond. Design calculations for the pond also include a storage volume for three years of sediment accumulation from contributing areas. A maximum of 60 percent of this storage volume will be utilized. Sediment will be cleaned out of the pond upon reaching the 60 percent level, thus restoring 100% of the sediment volume.

Ditches within the mine yard have been designed and constructed to divert water away from natural channels and convey the flow to the sediment pond. The ditches have been sized to handle the flow of a 10 year-24 hour precipitation event.

The approximate distance to any flowing stream is about 8.5 miles to the Price River. Grassy Trail Creek would be the closest receiving water and this creek only experiences intermittent flows during runoff events.

Absorbent material would be kept on-hand at the warehouse to control spills.

40 CFR 112.7 (d)

A description of proposed structures to control and contain accidental discharges is presented in (c) above.

40 CFR 112.7 (e)

Drainage from the mine site will be routed to the sediment pond for containment as described above in 112.7(c). The conveyance system, composed of ditches and culverts, has been deigned to operate efficiently by gravity flow of drainage.

Bulk oil will no be stored in tanks at the mine site. However, in the event a tank containing diesel or gasoline ruptured and was contained by the sediment pond, the stored material will be pumped out into a tanker truck disposed of at a commercial treatment facility.

There will be no buried petroleum storage tanks at the mine site.

INSPECTION AND RECORDS

All storage tanks containing petroleum products will be inspected visually on a daily basis.

Storage containment facilities will be inspected visually on a weekly basis.

Ditches and culverts will be inspected visually on a weekly basis.

The sediment pond will be inspected visually on a weekly basis.

Should any leak or spill be detected, action will be taken to immediately stabilize conditions and initiate remedial action.

SECURITY

Access to the storage locations at the mine site will be restricted. Locks will be placed on all dispensing devices to prevent unauthorized discharge.

PERSONNEL, TRAINING AND SPILL PREVENTION PROCEDURES

Employees at the mine site will receive training regarding the proper use and operation of the storage sites and sediment pond. Spill prevention briefings will be incorporated into weekly safety and training meetings held with the employees at the site. Employees will be instructed in how to respond to emergency situations at the facility.

SPCC PLAN SUMMARY

- **Fuel will be contained in steel construction storage tanks that are built, designed and approved for the storage of petroleum products. The tanks will be tested prior to their use as a precaution against leaks.**

- **Primary containment of any leakage from the fuel storage tanks will be provided at the storage tank location. Primary containment will consist of concrete alls or a steel liner sufficient to contain the contents of the largest storage tank. Total containment at the site will be considered a first line of defense. Absorbent materials will be used, where necessary, to minimize impact of any leak or spill.**

- **The storage location for oil and grease will be fire-resistant and have an impermeable floor to prevent subsurface contamination and sides to contain spillage within the storage site.**

- **Should the primary containment structures fail, drainage from the storage locations will be routed to and contained by the sediment pond. The sediment pond will be considered only as a secondary line of defense.**

- **Diversionary structures will be constructed at the mine sit to divert and convey a spill, in the event of an emergency, into the sediment pond. Storage in the sediment pond would preclude any discharge into natural drainage ways.**

- **Should a spill event occur, all oil/ fuel collected and contained within the sediment pond will be removed from the pond and disposed in an approved manner.**

- **The sediment pond will have sufficient capacity to contain run-off from the 10 year-24 hour precipitation event in the area as well as the maximum amount of oil/fuel stored in the largest tank on-site. The principal spillway of the sediment pond will be equipped with an oil skimmer.**

- **Visual inspection of all storage tanks will be conducted by a designed person on a routine basis. This inspection will also include an evaluation of the foundation supporting the tank.**

- **Storage tank valves that permit outward flow of the tank contents will be locked in a closed position when in a non-operating mode.**

- **The loading/unloading connections of all storage tanks will be securely capped.**

- **All personnel will be instructed in the operation and maintenance of the storage equipment to prevent discharge from the tanks.**

- **This plan will be posted at the site.**

EMERGENCY REPORTING PROCEDURES:

In the event of a spill, the Mine Superintendent or other mine personnel will contact the following personnel:

Person	Office Number	Home Number
Gary Gray	435/888-4015	637-3119
John Lewis	435/888-4016	613-0195

In the absence of the above personnel, the following person should be contacted:

Person	Office Number	Home Number
Darrel Leonard	435/888-4043	888-6639
Laine Adair	435/888-4000	472-3132

Reports on the spill be made to the EPA and the State of Utah at the following phone numbers:

Agency	Office Number
U.S. Environmental Protection Agency (EPA)	303/293-1788 or 800/424-8802 (24 hour)
Utah Bureau of Water Pollution Control	801/538/6146
Utah Division of Oil, Gas and Mining	801/538-5340
Utah Department of Health (24 hr Oil Spill Reporting Center)	801/538-6333

ATTACHMENT 15

MSDS SHEETS FOR DRILLING PRODUCTS

NL BAROID DRILLING FLUIDS,INC. -- QUICK-FOAM -- 9390-01-409-2597

========== Product Identification ==========

Product ID:QUICK-FOAM
MSDS Date:11/01/1995
FSC:9390
NIIN:01-409-2597
MSDS Number: CCSYH
=== Responsible Party ===
Company Name:NL BAROID DRILLING FLUIDS,INC.
Address:3000 N SAM HOUSTON PKY E
Box:1675
City:HOUSTON
State:TX
ZIP:77251
Country:US
Info Phone Num:713-987
Emergency Phone Num:713-987-4000
Preparer's Name:ENVIRONMENTAL SERVICES
CAGE:20064
=== Contractor Identification ===
Company Name:BAROID DRILLING FLUIDS,INC.
Address:3000 N SAM HOUSTON PKY E
Box:1675
City:HOUSTON
State:TX
ZIP:77251
Country:US
Phone:713-987-4000/713-987-5900
CAGE:20064

========== Composition/Information on Ingredients ==========

Ingred Name:ISOPROPYL ALCOHOL (SARA 313)
CAS:67-63-0
RTECS #:NT8050000
Fraction by Wt: 15%
Other REC Limits:NONE RECOMMENDED
OSHA PEL:400 PPM
ACGIH TLV:400 PPM/500STEL;9596

Ingred Name:ETHYL ALCOHOL (ETHANOL)
CAS:64-17-5
RTECS #:KQ6300000
Fraction by Wt: 5%
Other REC Limits:NONE RECOMMENDED
OSHA PEL:1000 PPM
ACGIH TLV:1000 PPM; 9596

========== Hazards Identification ==========

LD50 LC50 Mixture:ORAL LD50 (RAT) IS NOT DETERMINED.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:EYES-SEVERELY IRRITATING UPON CONTACT.
MAU INJURE EYE TISSUE IF NOT REMOVED PROMPTLY. SKIN-FREQUENT OR
PROLONGED CONTACT MAY IRRITATE AND CAUSE DERMATITIS, IRRITATING.
INHALATION-HIGH VAPOR CONCENTRAT IONS ARE IRRITATING TO EYES AND
RESPIRATORY TRACT. INGESTION-LOW ORDER OF TOXICITY.
Explanation of Carcinogenicity:NOT ON NTP, IARC OR OSHA LIST.
Effects of Overexposure:INHALATION-MAY CAUSE HEADACHES AND DIZZINESS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYE-IMMEDIATELY FLUSH EYES WITH LARGE AMOUNTS OF WATER FOR 15 MIN. GET PROMPT MEDICAL ATTENTION. SKIN-FLUSH WITH LARGE AMOUNTS OF WATER. USE SOAP. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION. INHAL ATION-REMOVE PERSON FROM EXPOSURE, ADMINISTER ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED. KEEP AT REST. CALL FOR PROMPT MEDICAL ATTENTION. INGESTION-IF CONSCIOUS, GIVE WATER & INDUCE VOMITING.

========== Fire Fighting Measures ==========

Flash Point Method:PMCC
Flash Point:74.0F,23.3C
Extinguishing Media:ALCOHOL TYPE FOAM OR DRY CHEMICAL. USE WATER SPRAY TO COOL FIRE EXPOSED SURFACES.
Fire Fighting Procedures:RESPIRATORY AND EYE PROTECTION REQUIRED FOR FIRE FIGHTING PERSONNEL.
Unusual Fire/Explosion Hazard:FLAMMABLE LIQUID, CAN RELEASE VAPORS THAT FORM FLAMMABLE MIXTURES AT TEMPERATURES AT OR ABOVE THE FLASHPOINT.

========== Accidental Release Measures ==========

Spill Release Procedures:ELIMINATE SOURCES OF IGNITION. PICK UP WITH SUITABLE NONCOMBUSTIBLE ABSORBENT. PREVENT LIQUID FROM ENTERING WATERWAYS. CONSULT AN EXPERT ON DISPOSAL OF RECOVERED MATERIAL.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN COOL AND WELL VENTILATED AREA, SEPERATE FROM OXIDIZING AGENTS.
Other Precautions:"EMPTY" CONTAINERS RETAIN PRODUCT RESIDUE AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:IF CONCENTRATIONS EXCEED TLV, USE A NIOSH APPROVED CHEMICAL CARTRIDGE RESPIRATOR.
Ventilation:MECHANICAL, GENERAL, ROOM VENTILATION TO MAINTAIN TLV.
Protective Gloves:CHEMICAL RESISTANT.
Eye Protection:GOGGLES OR SAFETY GLASSES W/SIDE SHIELD.
Other Protective Equipment:EYEWASH SHOWER, LONG SLEEVES.
Work Hygienic Practices:WASH THROUGHLY AFTER HANDLING.
Supplemental Safety and Health
QUICK-FOAM ID MODERATELY TOXIC TO FISH. DO NOT USE, SPILL OR DISCARD WHERE IT MAY LEACH, SPILL OR RUN OFF INTO WATERWAYS. KEEP AWAY FROM FLAMES OR SPARKS. EMPTY DRUMS SHOULD BE COMPLETELY DRAINED, PRO PERLY BUNGED AND PROMPTLY RETURNED TO ADRUM RECONDITIONER OR PROPERLY DISPOSED OF.

========== Physical/Chemical Properties ==========

HCC:F3
Boiling Pt:B.P. Text:NA
Melt/Freeze Pt:=-23.3C, -10.F
Decomp Temp:Decomp Text:NA
Vapor Pres:NA
Vapor Density:NA
Spec Gravity:1.02
pH:7.3-.8
Viscosity:NA

Evaporation Rate & Reference:NA
Solubility in Water:SOLUBLE
Appearance and Odor:LIGHT AMBER LIQUID, ALCOHOL ODOR.
Percent Volatiles by Volume:ND
Corrosion Rate:ND

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:SHORT CHAIN HYDROCARBONS, CARBON MONOXIDE, CARBON DIOZIDE.

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **EZ-MUD®**

Revision Date: 16-Feb-2004

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: EZ-MUD®
Synonyms: None
Chemical Family: Blend
Application: Shale Inhibitor

Manufacturer/Supplier

Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (800) 666-9260 or (713) 676-3000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Hydrotreated light petroleum distillate	64742-47-8	10 - 30%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview

May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin

Wash with soap and water. Get medical attention if irritation persists. Remove contaminated shoes and discard.

Eyes

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	> 200**Min:** > 200
Flash Point/Range (C):	Not Determined**Min:** > 93
Flash Point Method:	PMCC
Autoignition Temperature (F):	> 392
Autoignition Temperature (C):	> 200
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases. Use water spray to cool fire exposed surfaces.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 2, Flammability 1, Reactivity 0
HMIS Ratings:	Flammability 1, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store away from oxidizers. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	A well ventilated area to control dust levels. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator with a dust/mist filter. In high concentrations, supplied air respirator or a self-contained breathing apparatus.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	White to gray
Odor:	Mild hydrocarbon
pH:	6-8

Specific Gravity @ 20 C (Water=1):	1.0
Density @ 20 C (lbs./gallon):	8.3
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	347
Boiling Point/Range (C):	175
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	0.002
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	~ 70
Evaporation Rate (Butyl Acetate=1):	< 1
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Ammonia. Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause severe eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions.
Aggravated Medical Conditions	Lung disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability BOD(28 Day): 40% of COD

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: >1000 mg/l (Pimephales promelas)
Acute Crustaceans Toxicity:	TLM48: 98 mg/l (Acartia tonsa)
Acute Algae Toxicity:	EC50: 16.70 mg/l (Skeletonema costatum)

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging If empty container retains product residues, all label precautions must be observed. Store away from ignition sources. Transport with all closures in place. Return for reuse or disposal according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory All components listed on inventory.

EPA SARA Title III Extremely Hazardous Substances Not applicable

EPA SARA (311,312) Hazard Class Acute Health Hazard

EPA SARA (313) Chemicals This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).

EPA CERCLA/Superfund Reportable Spill Quantity For This Product Not applicable.

EPA RCRA Hazardous Waste Classification If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.

California Proposition 65 All components listed do not apply to the California Proposition 65 Regulation.

MA Right-to-Know Law Does not apply.

NJ Right-to-Know Law Does not apply.

PA Right-to-Know Law Does not apply.

Canadian Regulations

Canadian DSL Inventory All components listed on inventory.

WHMIS Hazard Class D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

ATTACHMENT 16

UPDATED T&E SPECIES LIST (2008)
MT. NEBO SCIENTIFIC

MT NEBO SCIENTIFIC, INC.
research & consulting

October 29, 2008

Dave Shaver
ANDALEX RESOURCES
P.O. Box 902
Price, Utah 84501

Dear Mr. Shaver:

In conversations with Joe Helfrich from the State of Utah, Division of Oil, Gas & Mining (DOGM), it was brought to my attention that more information is needed regarding potential threatened and endangered species within the proposed Bear Canyon GVH study site. Accordingly, I have prepared a table with the federally listed threatened, endangered and candidate plant and animal species for Carbon County, Utah (attached). The table also includes information about each species, their habitats and possible impacts (if any) that could occur as a result of construction of the proposed GVH site.

Additional information regarding sensitive species can be found in my report called:

Vegetation of the
GVH Site in
Bear Canyon,
Book Cliffs, Utah

for the
West Ridge Mine,
Carbon County, Utah
(October 2008)

Please call me if you have any questions or comments. Furthermore, biologists from DOGM may also call me regarding our studies in Bear Canyon.

Sincerely,

Patrick D. Collins, Ph.D.
Biologist/Environmental Consultant

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

Attachment (2 pages)
Letter Report to D. Shaver
October 29, 2008

Federally listed threatened, endangered & candidate species in Carbon County, Utah and notes regarding potential impacts as a result of the Bear Canyon GVH site.

Scientific Name	Common Name	Status*	Site-Specific Notes
Empidonax traillii extimus	Southwestern willow flycatcher	E	This species breeds in southwestern U.S. and winters in southern Mexico and Central America. It is a rare visitor of southern Utah. Its habitat is primarily riparian, most frequently occuring in dense willow stands. Although near a drainage, a well-defined riparian habitat is non-existent in the Bear Canyon study area. There should be no impacts to this species as a result of the Bear Canyon GVH site.
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 Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.
Gila elegans	Bonytail	E	The bonytail is a very rare minnow originally native to the Colorado River system. These rivers do not occur in Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.
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. This habitat and food source does not occur in the study area. There should be no impacts to this species as a result of the Bear Canyon GVH site.
Phacelia argillacea	Clay phacelia	E	The habitats of clay phacelia are usually found in pinyon-juniper and mountain brush plant communities, and typically in clay soils of the Green River formation. Although these plant communities occur near the study area, they are not within the area proposed for disturbance. Furthermore, the geologic formations of the study area are well below the Green River formation in geologic strata. There should be no impacts to this species as a result of the Bear Canyon GVH site.

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

Federally listed threatened, endangered & candidate species in Carbon County, Utah and notes regarding potential impacts as a result of the Bear Canyon GVH site.

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 Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.
Sclerocactus glaucus	Uinta Basin hookless cactus	T	*Sclerocactus glaucus* generally occurs on cobblely, gravelly, or rocky surfaces on river terrace deposits along the White and Green Rivers of Utah. *S. glaucus* occurs on varying exposures, but is more abundant on south facing exposures, and on slopes to about 30 percent grade; it is most abundant at the point where terrace deposits break from level tops to steeper side slopes. Plant communities and species associated with this species are bud sage, shadscale, black sagebrush and horsebrush. These plant communities nor habitats associate with them occur in the study area, therefore, there should be no impacts to this species as a result of the Bear Canyon GVH site.
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 Bear Canyon study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system. There should be no impacts to this species as a result of the Bear Canyon GVH site.

* Status
C = Candidate
E = Endangered
T = Threatened
Ex = Extirpated

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

ATTACHMENT 17

UPDATED BONDING INFORMATION PROVIDED BY DIVISION

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$352,937.00	
Subtotal Backfilling and Grading	$775,240.00	
Subtotal Revegetation	$196,409.00	
Direct Costs	$1,324,586.00	
Indirect Costs		
Mob/Demob	$132,459.00	10.0%
Contingency	$66,229.00	5.0%
Engineering Redesign	$33,115.00	2.5%
Main Office Expense	$90,072.00	6.8%
Project Mainagement Fee	$33,115.00	2.5%
Subtotal Indirect Costs	$354,990.00	26.8%
Total Cost	$1,679,576.00	
Escalation factor		0.032
Number of years		5
Escalation	$286,490.00	
Reclamation Cost	$1,966,066.00	
Bond Amount (rounded to nearest $1,000) 2011 Dollars	$1,966,000.00	
Bond Posted 2004	$2,117,000.00	
Difference Between Cost Estimate and Bond	$151,000.00	
Percent Difference	7.68%	

Ref.	Task	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 Warehouse 01																			107001
		Bathhouse 02																			23364
		Administration Office 03																			19016
		Powder Magazines 04																			466
		Overhead Conveyor 05																			8058
		Conveyor Bents 06																			1905
		Drive Unit 07																			1865
		Discharge Structure 08																			3370
		Bent Angle Bracing 09																			1000
		Reclaim Conveyor Stringers 10																			11442
		Crusher Building 11																			13384
		Reclaim Tunnel Headwall 12																			2333
		Loadout Conveyor 13																			1340
		Loadout Conveyor Bent 14																			167
		Mine Fan 15																			3121
		Ductwork Airlock 16																			6956
		Motor Room 17																			1091
		MCC 18																			959
		Portals 19																			20800
		Rock Dust Tanks 20																			4780
		Oil Grease Storage 21																			1215
		Dumpster Bay 22																			3336
		Monitoring Well 23																			5000
		Hilfiker Wall 24																			17760
		Guard Rail 25																			6939
		Bypass Culvert 26																			21169
		Culverts 27																			442
		Water Tanks 28																			4138
		Reclaim Vaults 29																			6146
		Reclaim Tunnel Semisphere 30																			3901
		Riprap 38																			9713
		Gob Gas Vent Hole																			40760
		Total																			352937

Ref.	Task	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 Warehouse 01																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	160	60	30								FT		288000	CF	86400
		Structure's Vol. Demolished																0.33	3520	CY	
		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	City Service Price	4	/CY													3520	CY	14080
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			100480
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	60	160	0.67								FT		238	CY	2337
		Concrete's Vol. Demolished																1.3	309	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													309	CY	464
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													309	CY	1171
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													309	CY	2549
		Subtotal																			6521
		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																			107001

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Bathhouse 02																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	40	120	12								FT		57600	CF	17280
		Structure's Vol. Demolished																0.33	704	CY	
		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	City Service Price	4	/CY													704	CY	2816
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			20096
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	40	120	0.67								FT		119	CY	1169
		Concrete's Vol. Demolished																1.3	155	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													155	CY	233
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													155	CY	587
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													155	CY	1279
		Subtotal																			3268
		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																			23364

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Administration Office 03																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	40	70	18								FT		50400	CF	15120
		Structure's Vol. Demolished																0.33	616	CY	
		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	City Service Price	4	/CY													616	CY	2464
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			17584
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	40	70	0.5								FT		52	CY	511
		Concrete's Vol. Demolished																1.3	68	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													68	CY	102
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													68	CY	258
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													68	CY	561
		Subtotal																			1432
		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																			19016

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Powder Magazines 04																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	8	8	8							2	FT		1024	CF	307
		Structure's Vol. Demolished																0.33	13	CY	
		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	City Service Price	4	/CY													13	CY	52
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			359
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	10	10	0.5							2	FT		4	CY	39
		Concrete's Vol. Demolished																1.3	5	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													5	CY	8
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													5	CY	19
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													5	CY	41
		Subtotal																			107
		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																			466

Ref.	Task	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 05																			
		Structure's Demolition Cost	Mixed Materials Bid. Large	02 41 16 13 0100	0.3	/CF	550	7	6								FT		23100	CF	6930
		Structure's Vol. Demolished																0.33	282	CY	
		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	City Service Price	4	/CY													282	CY	1128
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			8058
		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																			8058

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Conveyor Bents 06																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	50	15	1.5							4	FT		4500	CF	1350
		Structure's Vol. Demolished																0.33	55	CY	
		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	City Service Price	4	/CY													55	CY	220
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1570
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	4	20	1							4	FT		12	CY	118
		Concrete's Vol. Demolished																1.3	16	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													16	CY	24
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													16	CY	61
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													16	CY	132
		Subtotal																			335
		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																			1905

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Drive Unit 07																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	20	30	6								FT		3600	CF	1080
		Structure's Vol. Demolished																0.33	44	CY	
		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	City Service Price	4	/CY													44	CY	176
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1256
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	30	1								FT		22	CY	216
		Concrete's Vol. Demolished																1.3	29	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													29	CY	44
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													29	CY	110
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													29	CY	239
		Subtotal																			609
		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																			1865

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Discharge Structure 08																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	230	7	6								FT		9660	CF	2898
		Structure's Vol. Demolished																0.33	118	CY	
		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	City Service Price	4	/CY													118	CY	472
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			3370
		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																			3370

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Bent Angle Bracing 09																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	70	20	2								FT		2800	CF	840
		Structure's Vol. Demolished																0.33	34	CY	
		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	City Service Price	4	/CY													34	CY	136
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			976
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	2	30	0.67								FT		1	CY	10
		Concrete's Vol. Demolished																1.3	1	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													1	CY	2
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													1	CY	4
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													1	CY	8
		Subtotal																			24
		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																			1000

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Reclaim Conveyor Stringers 10																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	320	5	3								FT		4800	CF	1440
		Structure's Vol. Demolished																0.33	59	CY	
		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	City Service Price	4	/CY													59	CY	236
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1676
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	60	160	1								FT		356	CY	3496
		Concrete's Vol. Demolished																1.3	463	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													463	CY	695
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													463	CY	1755
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													463	CY	3820
		Subtotal																			9766
		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																			11442

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Crusher Building 11																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	24	50	30								FT		36000	CF	10800
		Structure's Vol. Demolished																0.33	440	CY	
		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	City Service Price	4	/CY													440	CY	1760
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			12560
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	24	50	0.67								FT		30	CY	295
		Concrete's Vol. Demolished																1.3	39	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													39	CY	59
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													39	CY	148
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													39	CY	322
		Subtotal																			824
		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																			13384

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Reclaim Tunnel Headwall 12																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	20	15	15								FT		4500	CF	1350
		Structure's Vol. Demolished																0.33	55	CY	
		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	City Service Price	4	/CY													55	CY	220
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1570
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Floor																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	15	1								FT		11	CY	108
		Concrete's Vol. Demolished																1.3	14	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													14	CY	21
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													14	CY	53
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													14	CY	116
		Subtotal																			298
		Wall's Demo. Cost																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	15	15	1							2	FT		17	CY	167
		Concrete's Vol. Demolished																1.3	22	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													22	CY	33
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													22	CY	83
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													22	CY	182
		Subtotal																			465
		Concrete Demolition																			
		Demolition Cost																			
		Concrete's Vol. Demolished																			
		Loading Cost																			
		Transportation Cost																			
		Disposal Costs																			
		Subtotal																			
		Total																			2333

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Loadout Conveyor 13																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	160	4	6								FT		3840	CF	1152
		Structure's Vol. Demolished																0.33	47	CY	
		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	City Service Price	4	/CY													47	CY	188
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1340
		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																			1340

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Loadout Conveyor Bent 14																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	20	8	1.5								FT		240	CF	72
		Structure's Vol. Demolished																0.33	3	CY	
		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	City Service Price	4	/CY													3	CY	12
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			84
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	4	12	1.5								FT		3	CY	29
		Concrete's Vol. Demolished																1.3	4	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													4	CY	6
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													4	CY	15
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													4	CY	33
		Subtotal																			83
		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																			167

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Mine Fan 15																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	12	12	50								FT		7200	CF	2160
		Structure's Vol. Demolished																0.33	88	CY	
		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	City Service Price	4	/CY													88	CY	352
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			2512
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	12	50	1								FT		22	CY	216
		Concrete's Vol. Demolished																1.3	29	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													29	CY	44
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													29	CY	110
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													29	CY	239
		Subtotal																			609
		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																			3121

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Ductwork Airlock 16																			
		Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	70	20	12								FT		16800	CF	4704
		Structure's Vol. Demolished																0.33	205	CY	
		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	City Service Price	4	/CY													205	CY	820
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			5524
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	70	20	1								FT		52	CY	511
		Concrete's Vol. Demolished																1.3	68	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													68	CY	102
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													68	CY	258
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													68	CY	561
		Subtotal																			1432
		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																			6956

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Motor Room 17																			
		Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	16	16	10								FT		2560	CF	717
		Structure's Vol. Demolished																0.33	31	CY	
		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	City Service Price	4	/CY													31	CY	124
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			841
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	16	16	1								FT		9	CY	88
		Concrete's Vol. Demolished																1.3	12	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													12	CY	18
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													12	CY	45
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													12	CY	99
		Subtotal																			250
		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																			1091

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		MCC 18																			
		Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	12	20	9								FT		2160	CF	605
		Structure's Vol. Demolished																0.33	26	CY	
		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	City Service Price	4	/CY													26	CY	104
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			709
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	12	20	1								FT		9	CY	88
		Concrete's Vol. Demolished																1.3	12	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													12	CY	18
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													12	CY	45
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													12	CY	99
		Subtotal																			250
		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																			959

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Portals 19																			
		Structure's Demolition Cost	Seal Portals	AML1	5200	EA.										4	EA		4	EA	20800
		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																			20800
		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																			20800

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Rock Dust Tanks 20																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF			40	12						2	FT		9048		2714
		Structure's Vol. Demolished																0.33	111	CY	
		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	City Service Price	4	/CY													111	CY	444
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			3158
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	40	1							2	FT		59	CY	579
		Concrete's Vol. Demolished																1.3	77	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													77	CY	116
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													77	CY	292
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													77	CY	635
		Subtotal																			1622
		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																			4780

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Oil Grease Storage 21																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	10	30	10								FT		3000	CF	900
		Structure's Vol. Demolished																0.33	37	CY	
		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	City Service Price	4	/CY													37	CY	148
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1048
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	10	30	0.5								FT		6	CY	59
		Concrete's Vol. Demolished																1.3	8	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													8	CY	12
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													8	CY	30
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													8	CY	66
		Subtotal																			167
		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																			1215

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Dumpster Bay 22																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	30	40	6								FT		7200	CF	2160
		Structure's Vol. Demolished																0.33	88	CY	
		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	City Service Price	4	/CY													88	CY	352
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			2512
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	30	40	0.67								FT		30	CY	295
		Concrete's Vol. Demolished																1.3	39	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													39	CY	59
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													39	CY	148
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													39	CY	322
		Subtotal																			824
		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																			3336

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Monitoring Well 23																			
		Structure's Demolition Cost	Plug Well	AML3	5000	EA.										1	EA		1	EA	5000
		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																			5000
		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																			5000

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Hilfiker Wall 24																			
		Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	150	30	12								FT		54000	CF	15120
		Structure's Vol. Demolished																0.33	660	CY	
		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	City Service Price	4	/CY													660	CY	2640
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			17760
		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																			17760

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Guard Rail 25																			
		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	9.82	/CY	3400	3	0.67								FT		253	CY	2484
		Concrete's Vol. Demolished																1.3	329	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													329	CY	494
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													329	CY	1247
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													329	CY	2714
		Subtotal																			6939
		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																			6939

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Bypass Culvert 26																			
		48" culvert removal	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	4314	4	8								ft		5113	CY	9510
		48" culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	4314	4	8								ft		5113	CY	8743
		36" culvert removal	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	962	3	6								ft		641	CY	1192
		36" culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	962	3	6								ft		641	CY	1096
		24" culvert removal	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	594	2	4								ft		176	CY	327
		24" culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	594	2	4								ft		176	CY	301
		Subtotal																			21169
		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																			21169

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Culverts 27																			
		24" culvert removal	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	160	2	4								ft		47	CY	87
		24" culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	160	2	4								ft		47	CY	80
		18" culvert removal	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	460	1.5	3								ft		77	CY	143
		18" culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	460	1.5	3								ft		77	CY	132
		Subtotal																			442
		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																			442

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Water Tanks 28																			
		Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF			30	12						3	FT		10179		2850
		Structure's Vol. Demolished																0.33	124	CY	
		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																			2850
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	16	40	1							2	FT		47	CY	462
		Concrete's Vol. Demolished																1.3	61	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													61	CY	92
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													61	CY	231
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													61	CY	503
		Subtotal																			1288
		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																			4138

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Reclaim Vaults 29																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	15	20	13							3	FT		11700	CF	3510
		Structure's Vol. Demolished																0.33	143	CY	
		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	City Service Price	4	/CY													143	CY	572
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			4082
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	15	30	1.5							3	FT		75	CY	737
		Concrete's Vol. Demolished																1.3	98	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													98	CY	147
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													98	CY	371
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													98	CY	809
		Subtotal																			2064
		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																			6146

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Reclaim Tunnel Semisphere 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																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	210	0.5		13							FT		79	CY	776
		Concrete's Vol. Demolished																1.3	103	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													103	CY	155
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													103	CY	390
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													103	CY	850
		Subtotal																			2171
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	210	12	0.67								FT		63	CY	619
		Concrete's Vol. Demolished																1.3	82	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													82	CY	123
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													82	CY	311
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													82	CY	677
		Subtotal																			1730
		Concrete Demolition																			
		Demolition Cost																			
		Concrete's Vol. Demolished																			
		Loading Cost																			
		Transportation Cost																			
		Disposal Costs																			
		Subtotal																			
		Total																			3901

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Escape Tunnel Vent 31																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF			250	3.5							FT		2405	CF	722
		Structure's Vol. Demolished																0.33	29	CY	
		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	City Service Price	4	/CY													29	CY	116
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			838
		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																			838

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Truck Loadout 32																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	20	20	30								FT		12000	CF	3600
		Structure's Vol. Demolished																0.33	147	CY	
		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	City Service Price	4	/CY													147	CY	588
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			4188
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	20	1								FT		15	CY	147
		Concrete's Vol. Demolished																1.3	20	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													20	CY	30
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													20	CY	76
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													20	CY	165
		Subtotal																			418
		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																			4606

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Substation Electrical 33																			
		Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	50	100	20								FT		100000	CF	30000
		Structure's Vol. Demolished																0.33	1222	CY	
		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	City Service Price	4	/CY													1222	CY	4888
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			34888
		Equipment 's Disposal Cost																			
		Dismantling Cost																			
		Equipment 's Vol. Demolished																			
		Loading Costs																			
		Transport Costs																			
		Disposal Costs																			
		Subtotal																			
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	40	80	1								FT		119	CY	1169
		Concrete's Vol. Demolished																1.3	155	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													155	CY	233
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													155	CY	587
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													155	CY	1279
		Subtotal																			3268
		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																			38156

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Powerline 69KV 34																			
		Structure's Demolition Cost	Wire Removal	26 05 05 10 1900	23.5	CLF	1200										LF		12	CLF	282
		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																			282
		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																			282

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Powerline Yard Distribution 35																			
		Structure's Demolition Cost	Wire Removal	26 05 05 10 1900	23.5	CLF	1400										LF		14	CLF	329
		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																			329
		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																			329

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Pavement Rail Loadout 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	9.82	/CY	100	120	0.33								FT		147	CY	1444
		Concrete's Vol. Demolished																1.3	191	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													191	CY	287
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													191	CY	724
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													191	CY	1576
		Subtotal																			4031
		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																			4031

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		Pumphouse 37																			
		Structure's Demolition Cost	Mixed Materials Bid. Large	02 41 16 13 0100	0.3	/CF	20	20	8								FT		3200	CF	960
		Structure's Vol. Demolished																0.33	39	CY	
		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	City Service Price	4	/CY													39	CY	156
		Steel's Weight																			
		Truck's Capacity																			
		Haulage																			
		Transportation Cost Steel Truck																			
		Transportation Cost Steel Truck Drive																			
		Disposal Cost Steel																			
		Subtotal																			1116
		Equipment 's Disposal Cost	Chain link remove 8'-10'	02 41 13 60 1700	3.57	/LF	250										FT		250	FT	893
		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																			
		Asphalt																			
		Asphalt Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						31.48					CY		31	CY	304
		Concrete's Vol. Demolished																1.3	40	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													40	CY	60
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													40	CY	152
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													40	CY	330
		Subtotal																			846
		Concrete Demolition																			
		Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	20	0.5								FT		7	CY	69
		Concrete's Vol. Demolished																1.3	9	CY	
		Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													9	CY	14
		Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													9	CY	34
		Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													9	CY	74
		Subtotal																			191
		Total																			2599.5

Ref.	Task	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	2233	Riprap 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																			
		Riprap									10						sq ft				
		Place Riprap	Machine placed rip-rap slope protection	31 37 13 10 0010	52.5	CY	500										ft		185	CY	9713
		Subtotal																			9713
		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																			9713

Task ID	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
		Gob Gas Vent Hole																			
		Structure's Demolition Cost	Mechanical equipment heavy	15055 300 3600	805	/ton							4			8	tons		32	tons	25760
		Structure's Vol. Demolished	Plug Well	AML3	5000	EA.										3	EA		3	EA	15000
		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																			40760
		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																			40760

	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
Remove Cap Layer															22888
Remove Excess Pad Fill															422621
Remove Remaining Backfill															28503
Backfill Highwall															4071
Topsoil															19062
Expose Topsoil															94761
Establish Rubbleland Surface															19230
Pump House															559
Gob Hole															2143
Support Personnel and Equipment															161402
															775240

	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
Remove Cap Layer															
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR	4466	CY	727	CY/HR	6.1	HR	1463
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	28	3232.88	$/HR					6.1	HR	19721
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	$/HR					6.1	HR	1704
									5024	TON					0
Subtotal															22888

	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
Remove Excess Pad Fill															
Left Fork															
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	11	1270.06	$/HR	13614	CY	380	CY/HR	35.8	HR	45468
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR					35.8	HR	8586
Right Fork															
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	11	1270.06	$/HR	3916	CY	380	CY/HR	10.3	HR	13082
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR					10.3	HR	2470
Main Canyon															
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	11	1270.06	$/HR	88829	CY	380	CY/HR	233.8	HR	296940
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR					233.8	HR	56075
Subtotal															422621

	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
Remove Remaining Backfill															
Left Fork 21+50 to 23+00															
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR	2857	CY	440	CY/HR	6.5	HR	1559
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR	16604	CY	391.5	CY/HR	42.4	HR	10169
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	2	230.92	$/HR					42.4	HR	9791
Right Fork Upper Canyon @35+00															
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	$/HR	16604	CY	663	CY/HR	25	HR	6984
Assume material will be sent to backfill highwall															
and that the cost to ship off site is more than															
the cost to backfill highwall.															
Subtotal															28503

	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
Backfill Highwall															
CAT 325CL (10-24)(2nd2006)	10235	46.75	0.1	57.85	173.24	1	173.24	$/HR	1481	CY	63	CY/HR	23.5	HR	4071
Subtotal															4071

	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
Topsoil															
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR	6506	CY	220	CY/HR	29.6	HR	7099
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	2	230.92	$/HR					29.6	HR	6835
CAT 325CL (10-24)(2nd2006)	10235	46.75	0.1	57.85	173.24	1	173.24	$/HR					29.6	HR	5128
Subtotal															19062

	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
Expose Topsoil															
CLAB					44.75	20	895	$/HR	3226	CY	40	CY/HR	80.7	HR	72227
D3C LGP EROPS (9-54) (2nd 2006)	4025	20.9	0.1	57.85	106	1	106	$/HR					80.7	HR	8554
CAT 325CL (10-24)(2nd2006)	10235	46.75	0.1	57.85	173.24	1	173.24	$/HR					80.7	HR	13980
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	2							80.7	HR	0
Subtotal															94761

	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
Establish Rubbleland Surface															
CAT 325CL (10-24)(2nd2006)	10235	46.75	0.1	57.85	173.24	1	173.24	$/HR					111	HR	19230
Subtotal															19230

	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
Pump House															
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	$/HR					2	HR	559
Subtotal															559

	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
Gob Hole															
Grading															
Backfill and rough grade															
D7N DS Series II (9-51) (2nd 2007)	11530	55.05	0.1	60.1	192.72	1	192.72	$/HR	842	CY	250	CY/HR	3.4	HR	655
Topsoil															
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR	515	CY	220	CY/HR	2.3	HR	552
6X4 70,000lbs 12-18 CY (20-15) (2nd2006)	3795	41.9	0.1	45.65	115.46	2	230.92	$/HR					2.3	HR	531
D7N DS Series II (9-51) (2nd 2007)	11530	55.05	0.1	60.1	192.72	1	192.72	$/HR	515	CY	250	CY/HR	2.1	HR	405
Subtotal															2143

	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
Support Personnel and Equipment															
Foreman Average, Outside					62.25	1	62.25	$/HR					605.5	HR	37692
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	$/HR					605.5	HR	12776
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	$/HR					605.5	HR	83838
CLAB					44.75	1	44.75	$/HR					605.5	HR	27096
Subtotal															161402

	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
ECDC							35	/TON							
Subtotal															

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
	Main Site																			188315
	Pumphouse																			5633
	Gob Hole Vent																			2461
	Pocking	Excavation Bulk Bank 2 CY (322BL)	31 23 16 42 0260	1.54	/CY						340					CY		340	CY	
	Total																			196409

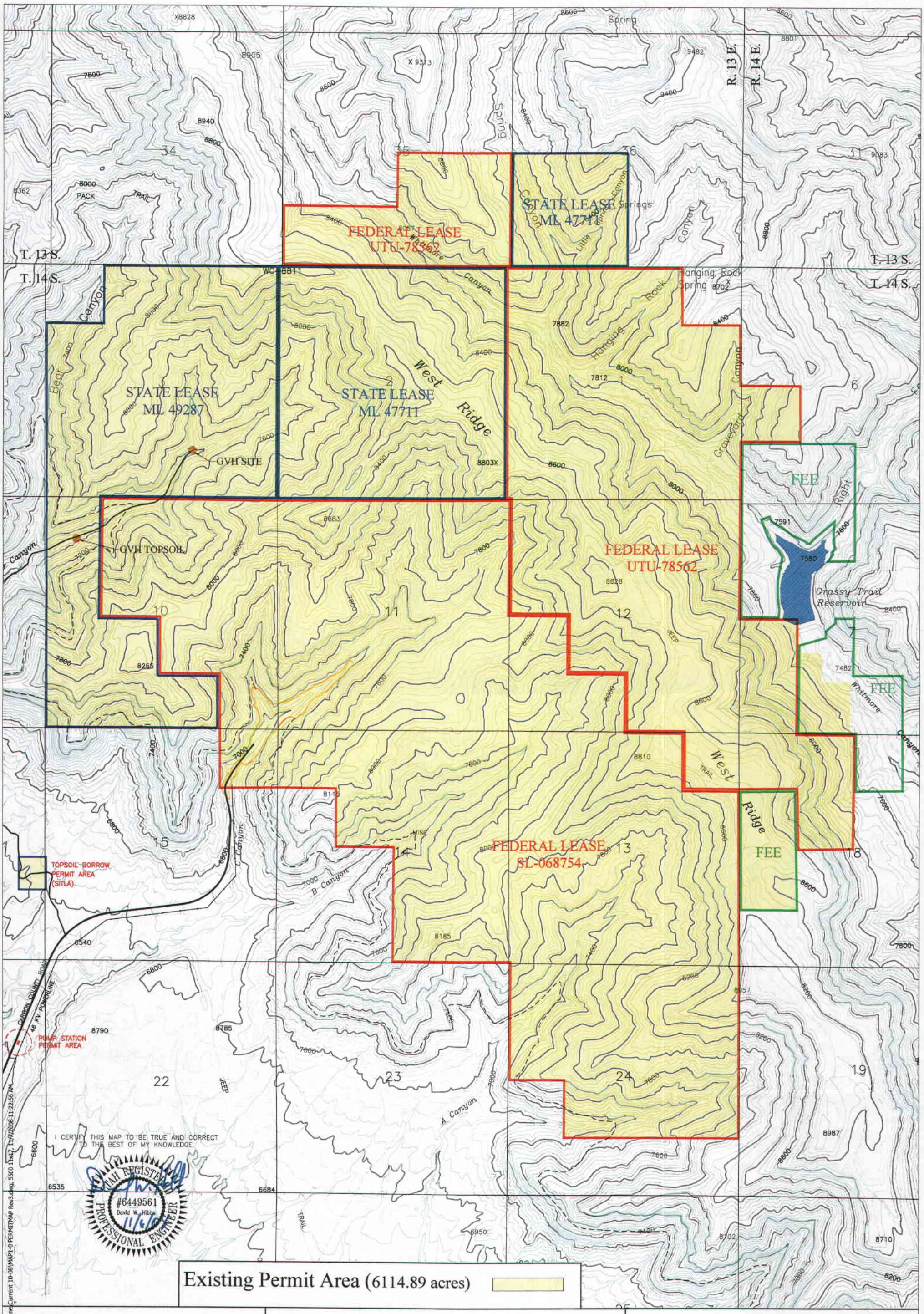
Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Main Site																			
	Pinyon Juniper Community																			
	Mulch Material	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					13						AC		566	MSF	11909
	Mulch Labor and Equipement	Hay 1" material only 32 91 13 16 0350	Reveg001	44.5	/MSF					13						AC		566	MSF	25187
	Seeding Material	West Ridge Pinyon/Juniper	WestRidge07411	484.05	/AC					13						AC		13	AC	6293
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					13						AC		566	MSF	11909
	Pocking	Excavation Bulk Bank 2 CY (322BL)	31 23 16 42 0260	1.54	/CY						340					CY		340	CY	524
	Douglas Fir Maple Community																			
	Mulch Material	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					10						AC		436	MSF	9173
	Mulch Labor and Equipement	Hay 1" material only 32 91 13 16 0350	Reveg001	44.5	/MSF					10						AC		436	MSF	19402
	Seeding Material	West Ridge Douglas Fir Maple	WestRidge07412	747.45	/AC					10						AC		10	AC	7475
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					10						AC		436	MSF	9173
	Transplants														300	/AC				
		Serviceberry	WestRidge07416	3.95	/EA					10						AC		3000	EA	11850
		Mountain Mahogany	WestRidge07417	3.95	/EA					10						AC		3000	EA	11850
	Douglas Fir Rocky Mountain Juniper																			
	Mulch Material	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					5						AC		218	MSF	4587
	Mulch Labor and Equipement	Hay 1" material only 32 91 13 16 0350	Reveg001	44.5	/MSF					5						AC		218	MSF	9701
	Seeding Material	West Ridge Douglas Fir Mt Juniper	WestRidge07413	524.15	/AC					5						AC		5	AC	2621
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					5						AC		218	MSF	4587
	Sagebrush Grass Community																			
	Mulch Material	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					1						AC		44	MSF	926
	Mulch Labor and Equipement	Hay 1" material only 32 91 13 16 0350	Reveg001	44.5	/MSF					1						AC		44	MSF	1958
	Seeding Material	West Ridge Douglas Fir Mt Juniper	WestRidge07414	601.3	/AC					1						AC		1	AC	601
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					1						AC		44	MSF	926
	Subtotal																			150652
	Mine Site																			
	Reseeding 25%																			37663
	Subtotal																			37663
	Total																			188315

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
	Pumphouse																			
	Mulch Material	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					0.9						AC		39	MSF	821
	Mulch Labor and Equipement	Hay 1" material only 32 91 13 16 0350	Reveg001	44.5	/MSF					0.9						AC		39	MSF	1736
	Seeding Material	West Ridge Pinyon/Juniper	WestRidge07411	484.05	/AC					0.9						AC		0.9	AC	436
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					0.9						AC		39	MSF	821
	Place Silt Fence	Silt fence	31 25 13 10 1100	1.12	LF	150										FT		150	FT	168
	Pocking	Excavation Bulk Bank 2 CY (322BL)	31 23 16 42 0260	1.54	/CY						340					CY		340	CY	524
	Subtotal																			4506
	Mine Site																			
	Reseeding 25%																			1127
	Subtotal																			1127
	Total																			5633

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
	Gob Hole Vent																			
	Mulch Material	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					0.34						AC		15	MSF	316
	Mulch Labor and Equipement	Hay 1" material only 32 91 13 16 0350	Reveg001	44.5	/MSF					0.34						AC		15	MSF	668
	Seeding Material	West Ridge Pinyon/Juniper	WestRidge07411	484.05	/AC					0.34						AC		0.3	AC	145
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	21.04	/MSF					0.34						AC		15	MSF	316
	Pocking	Excavation Bulk Bank 2 CY (322BL)	31 23 16 42 0260	1.54	/CY						340					CY		340	CY	524
	Subtotal																			1969
	Mine Site																			
	Reseeding 25%																			492
	Subtotal																			492
	Total																			2461

MAP 1-0

PERMIT MAP



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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER 11/6/08

WEST RIDGE MINE
Map 1-0
Permit Map

DATE: 10-13-08 REV: 3 ACAD REF: MAP1-0 PERMITMAP REV3

LEGEND:
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop

RECEIVED
NOV 10 2008
DIV. OF OIL, GAS & MINING

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

J:\Shared\Current Drawings\MRP Maps\West Ridge Mine\Current 10-08\MAP1-0 PERMITMAP Rev3.dwg, 5500 11x17, 11/7/2008 11:22:56 AM

MAP 1-1

LOCATION MAP

STATE LEASE ML 47711

FEDERAL LEASE UTU-78562

STATE LEASE ML 49287

GVH SITE

STATE LEASE ML 47711

GVH TOPSOIL

FEDERAL LEASE UTU-78562

FEE

WEST RIDGE MINE SURFACE FACILITY AREA

SUBSTITUTE TOPSOIL AREA

FEDERAL LEASE SL-068754

FEE

FEE

PUMP STATION PERMIT AREA

CARBON COUNTY ROAD POWER LINE

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

WEST RIDGE MINE

Map 1-1

Location Map

DATE: 10-13-08 REV: 10 ACAD REF: MAP1-1 LOCATION Rev10

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop
- Power Line

WEST RIDGE RESOURCES, INC.

SCALE: 1"=3000'

MAP 2-1

REGIONAL SOIL MAP

WEST RIDGE MINE
Map 2-1
Regional Soil Map

Soil information from: Soil Survey of Carbon Area, Utah, NRCS

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

SOIL MAP UNITS

5 Beje complex	75 Perma family, 15 to 40 percent slopes
7 Beje-Trag complex	76 Perma family-Danno complex
21 Croydon loam, 8 to 30 percent slopes	84 Podo-Rock outcrop complex
24 Danno Variant very stony loam, 30 to 80 percent slopes	95 Rock outcrop
27 Doney-Tore families complex	96 Rock outcrop-Rubbleland-Travessilla complex
33 Gerst-Badland-Rubbleland complex, 15 to 50 percent slopes	101 Senchert loam, 3 to 15 percent slopes
36 Gerst-Strych-Badland complex, 3 to 50 percent slopes	103 Senchert-Tore family complex
37 Gerst-Strych-Badland complex, 50 to 70 percent slopes	104 Senchert family, 3 to 15 percent slopes
48 Haverdad loam, 1 to 8 percent slopes	107 Shuper-Winetti complex
52 Hernandez family, 3 to 8 percent slopes	113 Strych very stony loam, 3 to 15 percent slopes
62 Midfork family-Commodore complex	125 Uinta-Tore families complex
71 Pathead extremely bouldery fine sandy loam, 40 to 70 percent slopes	

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Soil Mapping Boundary
- Soil Map Number (113)

N

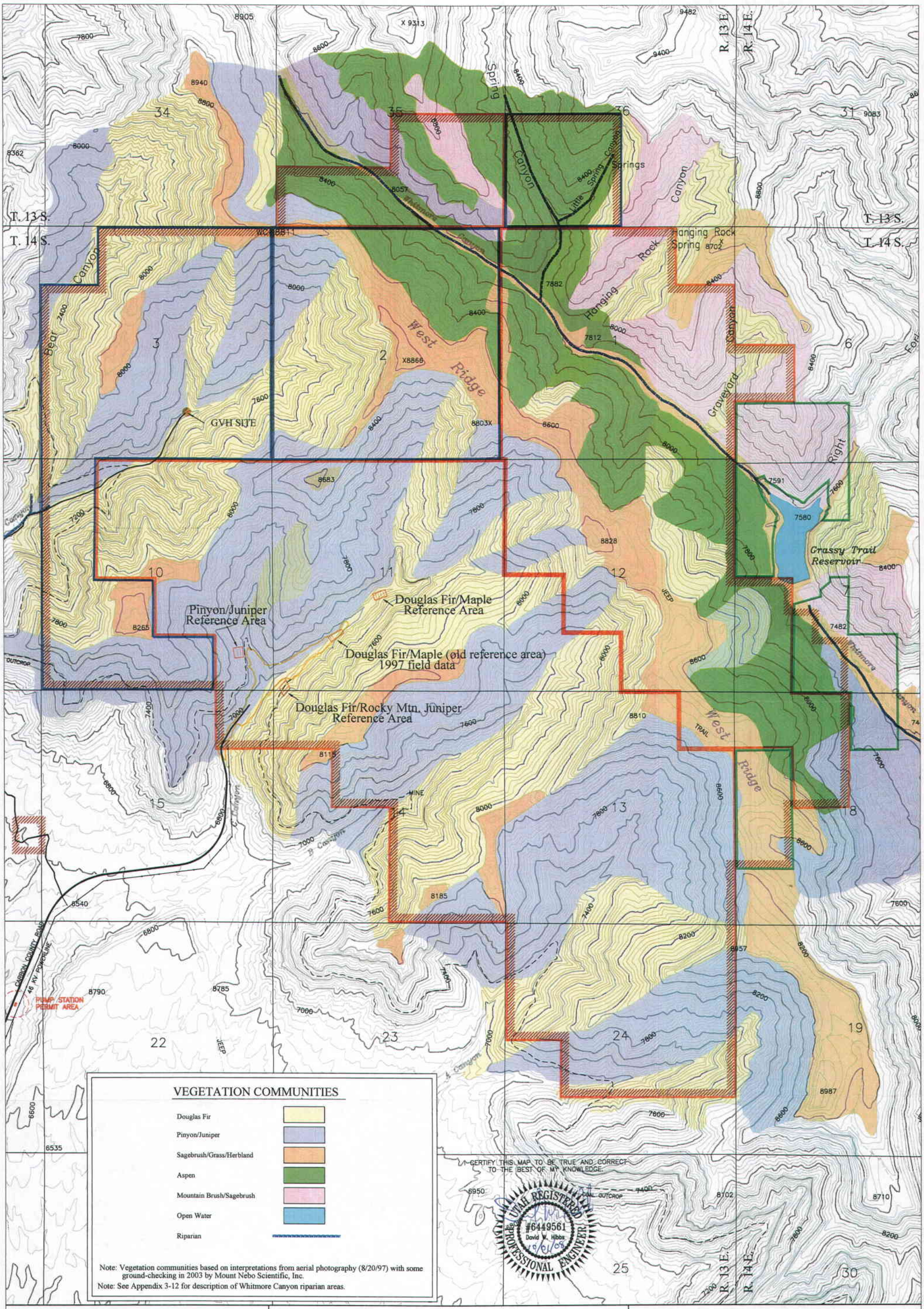
WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

DATE: 10-13-08 REV: 9 ACAD REF: MAP2-1 REGSOIL REV9

MAP 3-1

GENERAL VEGETATION COMMUNITIES



WEST RIDGE MINE
Map 3-1
General Vegetation Communities

DATE: 10-01-08 REV: 13 ACAD REF: MAP3-1 GENVEG REV13

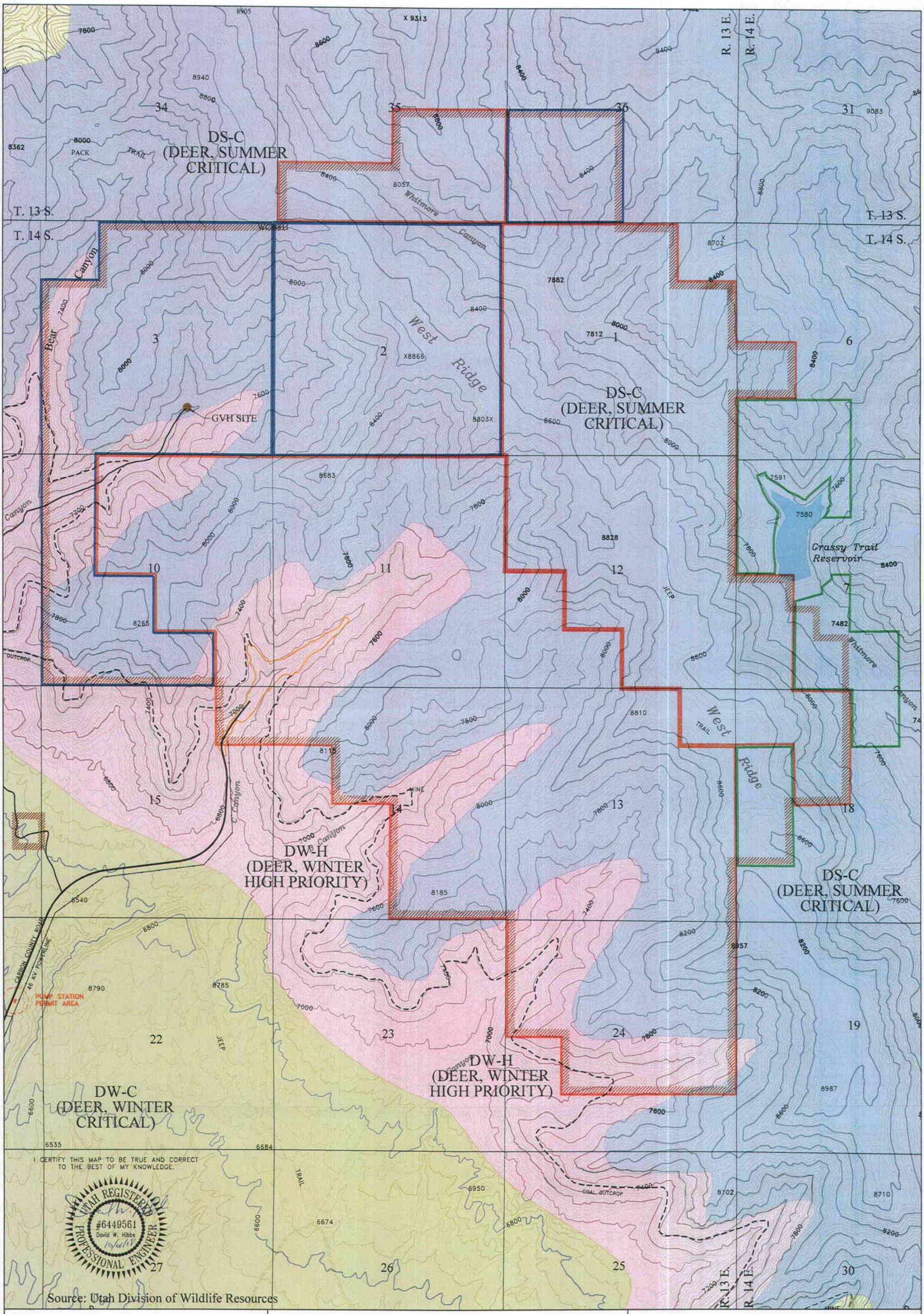
LEGEND:
- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 3-4B

WILDLIFE MAP
DEER RANGE



WEST RIDGE MINE

Map 3-4B

Wildlife Map - Deer Range

DATE: 10-01-08 REV: 10 ACAD REF: MAP3-4B DEER REV10

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- DW-C
- DW-H
- DS-C

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 3-4C

WILDLIFE MAP
ELK RANGE

EY-H
(ELK, YEAR LONG
HIGH VALUE)

EW-H
(ELK, WINTER
HIGH VALUE)

EW-S
(ELK, WINTER
SUBSTANTIAL)

T. 13 S.
T. 14 S.
R. 13 E.
R. 14 E.

PACK TRAIL
Whitmore Canyon
Bear Canyon
West Ridge
GVH SITE
JEEP TRAIL
Crassy Trail Reservoir
CARBON COUNTY ROAD
46 KV POWERLINE
PUMP STATION PERMIT AREA
OUTCROP
COAL OUTCROP
MINE
A Canyon
B Canyon
C Canyon

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

UTAH REGISTERED #6449561 David W. Hibbs 10/01/08 PROFESSIONAL ENGINEER

Source: Utah Division of Wildlife Resources

WEST RIDGE MINE

Map 3-4C

Wildlife Map - Elk Range

DATE: 10-01-08 REV: 10 ACAD REF: MAP 3-4C ELK REV10

Permit Boundary
Federal Lease
State Lease
Penta Creek Fee
Surface Facility Area
GVH Site
EW-S
EY-H
EW-H

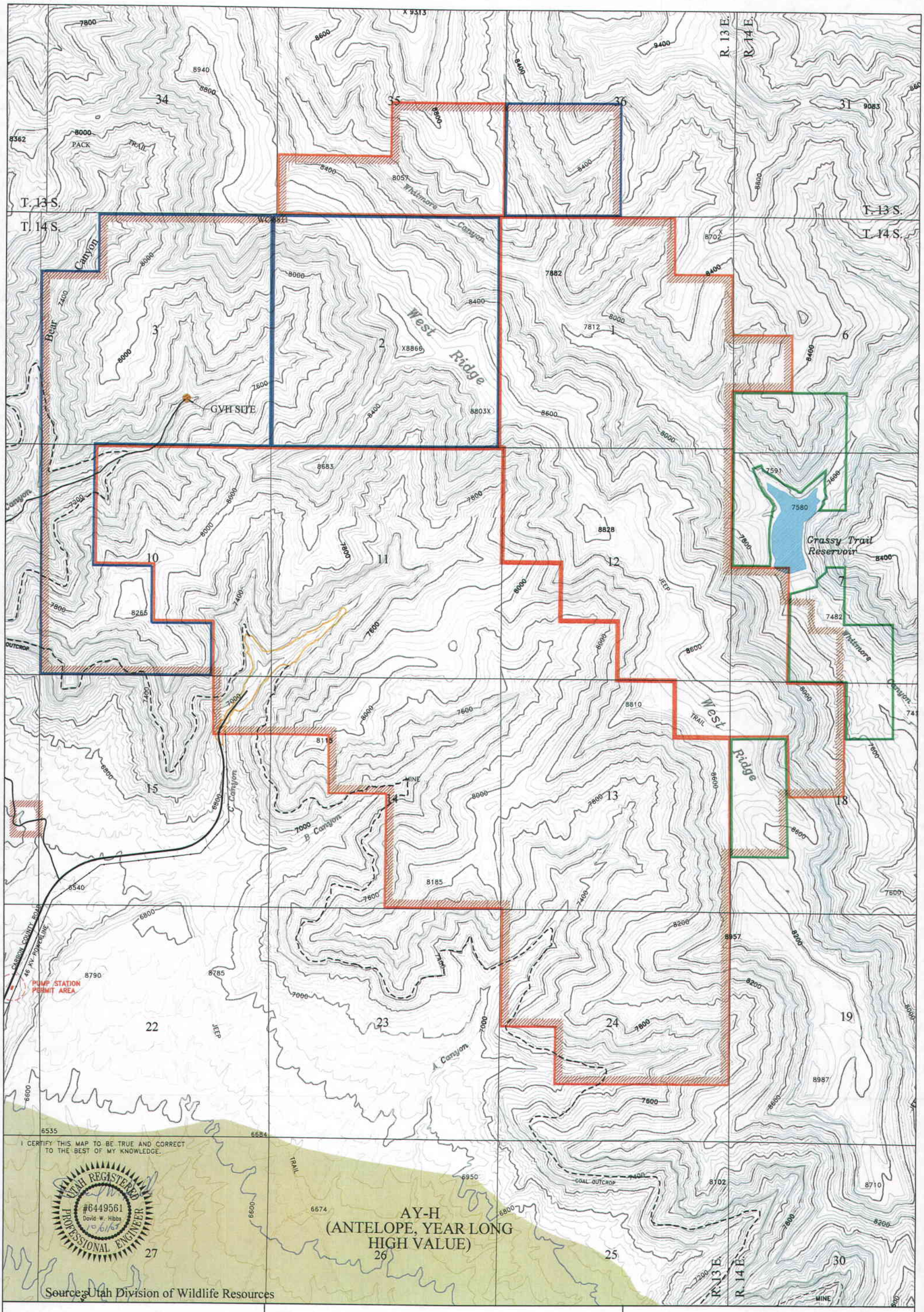
N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 3-4D

WILDLIFE MAP
ANTELOPE RANGE



WEST RIDGE MINE

Map 3-4D

Wildlife Map - Antelope Range

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- AY-H

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

DATE: 10-01-08 REV: 10 ACAD REF: MAP3-4D ANTELOPE REV10

MAP 4-1

EXISTING LAND USE

COW CANYON ALLOTMENT

ROCK CANYON ALLOTMENT

SHEEP CANYON ALLOTMENT

NON-ALLOTTED

SHEEP CANYON ALTMT

BEAR CANYON ALLOTMENT

MUD SPRINGS ALLOTMENT

GRASSY TRAIL ALLOTMENT

T. 13 S.

T. 14 S.

R. 13 E.

R. 14 E.

PRIVATE CABIN

GVH SITE

GVH TOPSOIL

PUMP STATION PERMIT AREA

Crassy Trail Reservoir

West Ridge

Hanging Rock Spring

Graveyard Canyon

Bear Canyon

Whitmore Canyon

Little Spring Canyon

Spring Canyon

B Canyon

C Canyon

A Canyon

Right Fork

JEEP TRAIL

PACK TRAIL

MINE

CARBON COUNTY ROAD

46 KV POWERLINE

OUTCROP

COAL OUTCROP

WC 8811

X8866

8803X

SYMBOL LEGEND

Extent of Water Right	•	Fence	
Impoundment	△	Spring	
		Locked Gate	

Refer to Map 7-3 for State Appropriated Water Rights

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER 10/13/08

WEST RIDGE MINE

Map 4-1

Existing Land Use

DATE: 10-13-08 REV: 11 ACAD REF: MAP4-1 LANDUSE REV11

LEGEND:

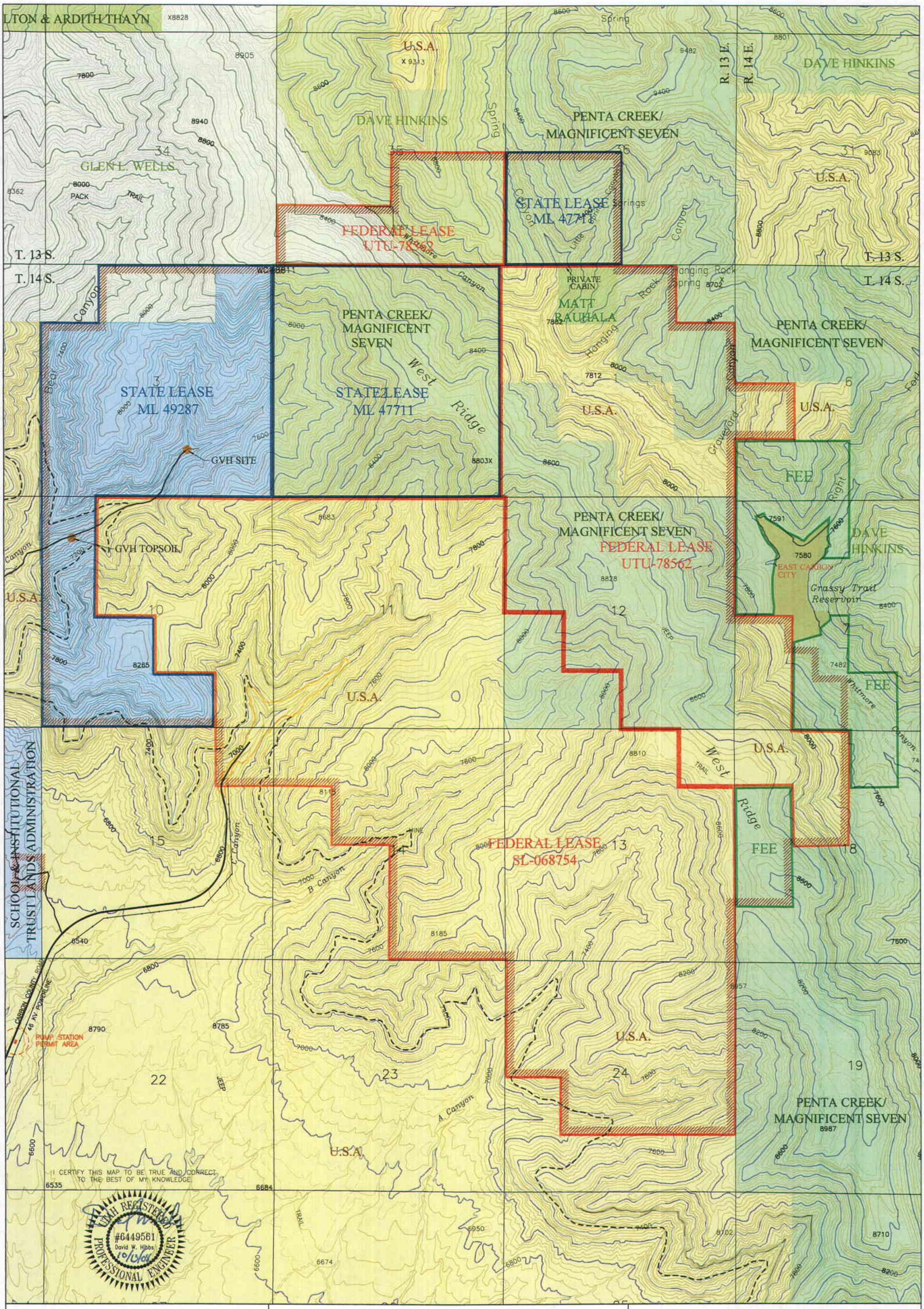
- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Grazing Allotment Boundary

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 5-2

SURFACE OWNERSHIP MAP



WEST RIDGE MINE

Map 5-2

Surface Ownership Map

DATE: 10-13-08 REV: 11 ACAD REF: MAP5-2 SURFOWN REV11

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop
- School Trust Land (SITLA)
- Penta Creek/ Magnificent Seven
- U.S.A. (BLM)
- Dave Hinkins
- Glen L. Wells
- Matt Rauhala
- Milton & Ardith Thayn
- East Carbon City

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 5-3

SUB-SURFACE OWNERSHIP MAP

WEST RIDGE MINE

Map 5-3

Sub-surface Ownership Map

DATE: 10-02-08 REV: 11 ACAD REF: MAP5-3 SUBSURFOWNREV11

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop
- School Trust Lands (SITLA)
- Penta Creek/ Magnificent Seven
- U.S.A. (BLM)
- Dave Hinkins
- East Carbon City

WEST RIDGE RESOURCES, INC.

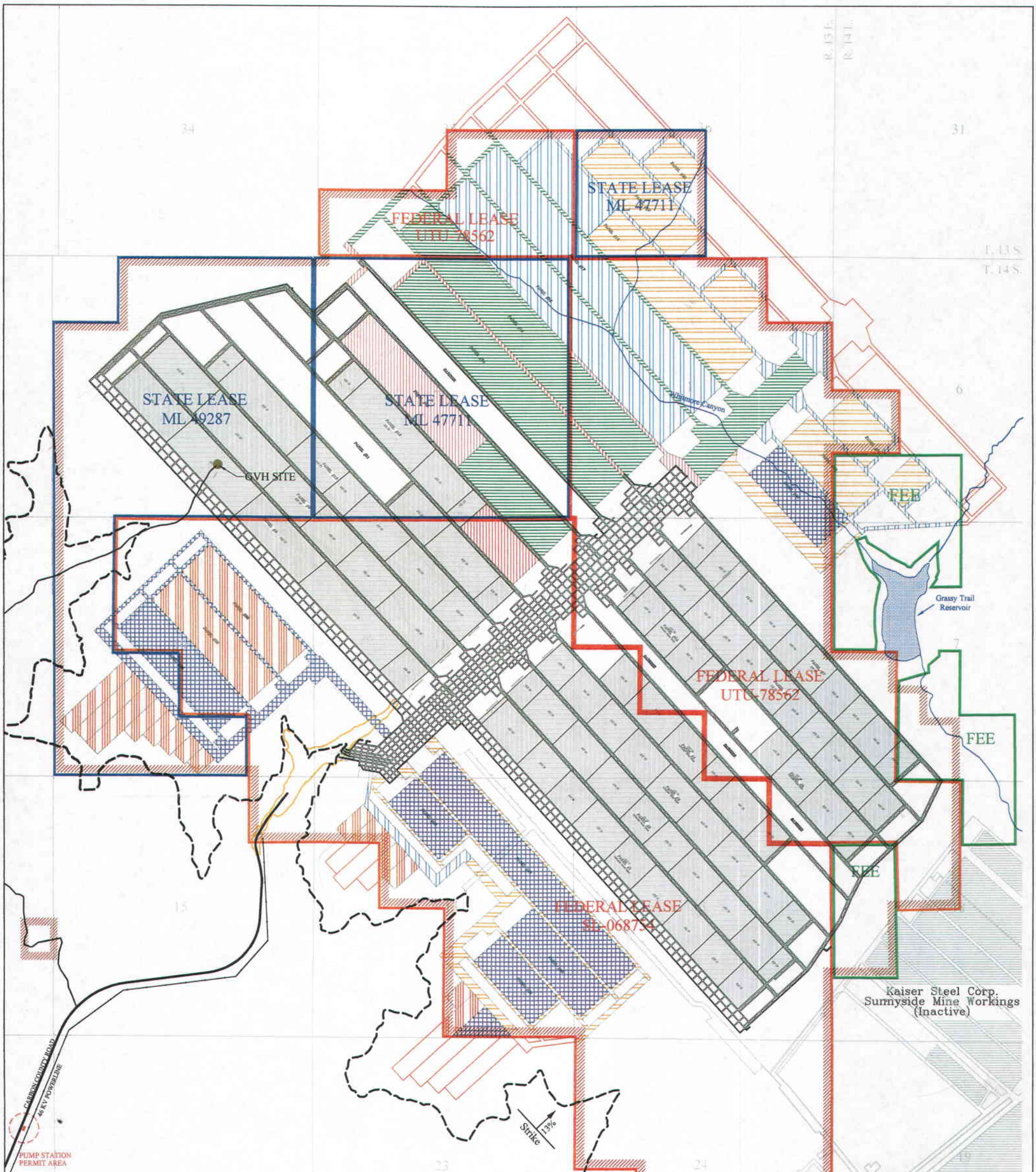
SCALE: 1"=2000'

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER 10/2/08

MAP 5-4A

MINING PROJECTIONS



YEAR KEY:

- 2068
- 2009
- 2010
- 0211
- 2012
- 2013
- Mined Area

NOTE:

Mine projections are subject to change depending on conditions encountered in the underground mine workings.
Actual mine works are shown as of October 1, 2008.
Mine projections depicted in the fringe areas beyond the existing permit area are speculative and based on future reserve acquisitions.
No mining will be conducted in these areas unless those reserves are acquired in the future and permitted according to federal, state, and local permitting requirements.
West Ridge Resources acknowledges that permission to mine within the permit boundary does not imply permission to mine beyond the permit boundary.

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER 10/30/08

WEST RIDGE MINE

Map 5-4A

Mining Projections

DATE: 10-13-08 REV: 11 ACAD REF: WRTIMEA REV11

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop

N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 5-4B

MINING PROJECTIONS
(EXTENDED RESERVES)

Note: Economic minability of this area to be determined upon development of 1st Left entries and other future evaluation of the area.

STATE LEASE ML 47711

FEDERAL LEASE UTU-78562

STATE LEASE ML 49287

STATE LEASE ML 47711

FEDERAL LEASE UTU-78562

FEE

Grassy Trail Reservoir

FEE

FEDERAL LEASE SL-068754

FEE

Kaiser Steel Corp. Sunnyside Mine Workings (Inactive)

Kaiser Steel Corp. Sunnyside Mine Workings (Inactive)

GVH SITE

PUMP STATION PERMIT AREA

CARBON COUNTY ROAD

46 KV POWERLINE

C-Canyon

B-Canyon

A-Canyon

Potential Fracture/Fault Zone

Fault

Strike 13%

5.0'

6.0'

7.0'

8.0'

9.0'

NOTE:

Mine projections and barrier pillar location(s) are subject to change depending on conditions encountered in the underground mine workings.

Actual mine works are shown as of October 1, 2008.

Mine projections depicted in the fringe areas beyond the existing permit area are speculative and based on future reserve acquisitions. No mining will be conducted in these areas unless those reserves are acquired in the future and permitted according to federal, state, and local permitting requirements.

West Ridge Resources acknowledges that permission to mine within the permit boundary does not imply permission to mine beyond the permit boundary.

2008
2009
2010
2011
2012
2013
2014

Mined Area

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

UTAH REGISTERED #6449561 David W. Hibbs 10/13/08 PROFESSIONAL ENGINEER

WEST RIDGE MINE
Map 5-4B
Mining Projections (Extended Reserves)

DATE: 10-13-08 REV: 11 ACAD REF: WRTIMEB REV11

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease (ML 49287)
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop

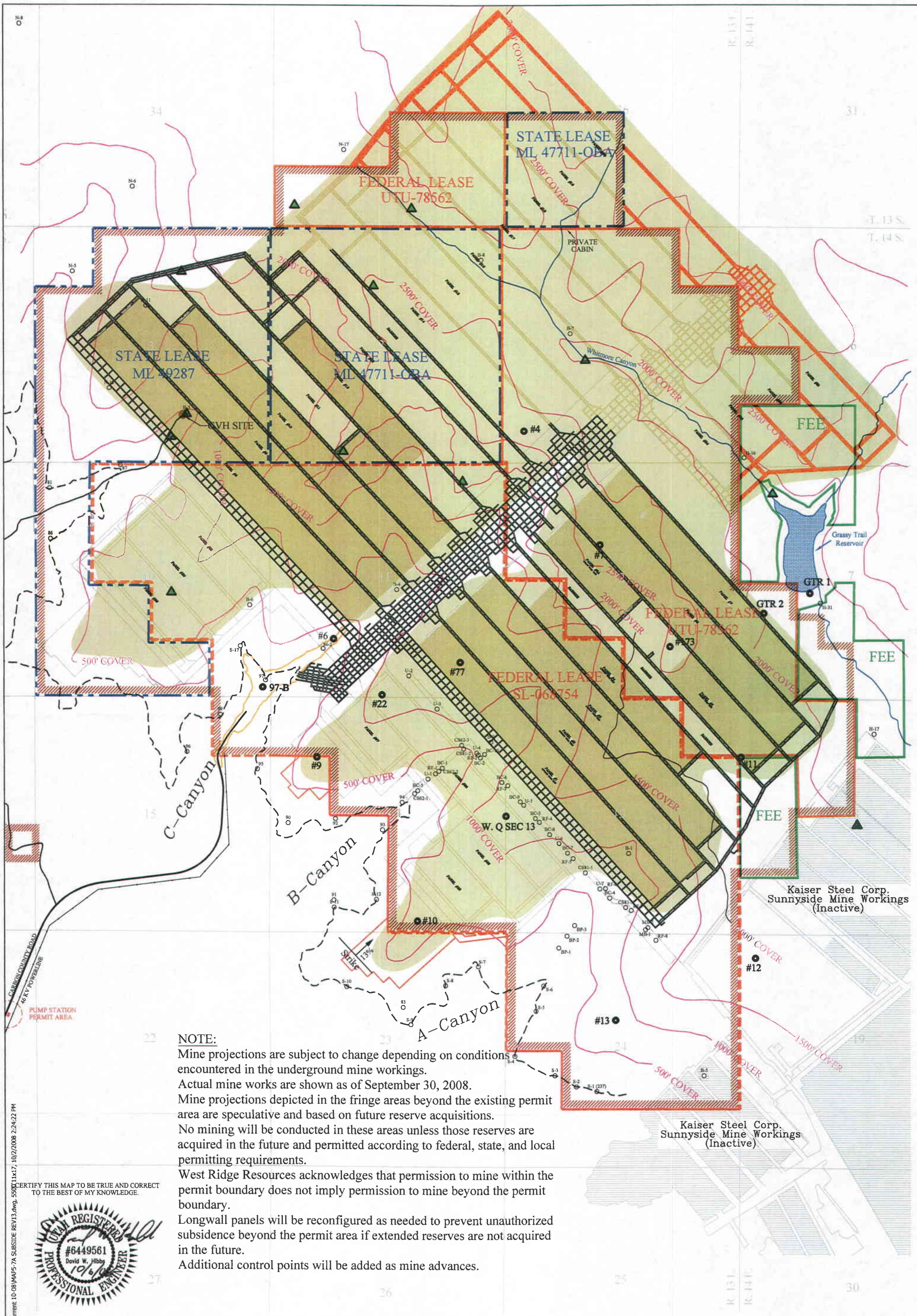
N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 5-7

SUBSIDENCE MAP



NOTE:

Mine projections are subject to change depending on conditions encountered in the underground mine workings.

Actual mine works are shown as of September 30, 2008.

Mine projections depicted in the fringe areas beyond the existing permit area are speculative and based on future reserve acquisitions.

No mining will be conducted in these areas unless those reserves are acquired in the future and permitted according to federal, state, and local permitting requirements.

West Ridge Resources acknowledges that permission to mine within the permit boundary does not imply permission to mine beyond the permit boundary.

Longwall panels will be reconfigured as needed to prevent unauthorized subsidence beyond the permit area if extended reserves are not acquired in the future.

Additional control points will be added as mine advances.

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

UTAH REGISTERED #6449561 David W. Hibbs 10/6/08 PROFESSIONAL ENGINEER

WEST RIDGE MINE

Map 5-7

Subsidence Map

DATE: 10-02-08 REV: 13 ACAD REF: MAP5-7A SUBSIDE REV13

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- Outcrop
- Cover
- Drill Hole
- Possible Subsidence Area
- Existing Photogammetric Control Points
- Future Photogammetric Control Points

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

S:\Shared\Current Drawings\MRP Maps\West Ridge Mine\Current 10-08\MAP5-7A SUBSIDE REV13.dwg, 550(11x17, 10/2/2008 2:24:22 PM

MAP 6-1

REGIONAL GEOLOGY MAP

FEDERAL LEASE
UTU-78562

STATE LEASE
ML 47711

STATE LEASE
ML 49287

STATE LEASE
ML 47711

FEDERAL LEASE
UTU-78562

FEDERAL LEASE
SL-068754

FEE

FEE

GVH SITE

PUMP STATION
PERMIT AREA

T. 13 S.
T. 14 S.

R. 13 E.
R. 14 E.

Grassy Trail
Reservoir

Refer to Map 6-1A for cross-section.

FORMATION LEGEND:

Quaternary
- Qa — Alluvium Undifferentiated
- Qp — Pediment Deposits Undifferentiated

Tertiary
- Tgr — GREEN RIVER FORMATION
- Tc — COLTON FORMATION
- Tkn — NORTH HORN FORMATION

Cretaceous

PRICE RIVER FORMATION
- Kpb — Bluecastle Sandstone
- Kpl — Mudstone Member
- Kc — Castlegate Sandstone

BLACKHAWK FORMATION
- Kbs — Upper Mudstone Mbr. Sunnyside Member
- Kbk — Lower Mudstone Mbr. Kenilworth Member
- Km — Mancos Shale

WEST RIDGE MINE

Map 6-1

Regional Geology Map

DATE: 10-02-08 REV: 9 ACAD REF: MAP6-1 GEOLOGY REV9

LEGEND:
- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Fault

N

WEST RIDGE RESOURCES, INC.

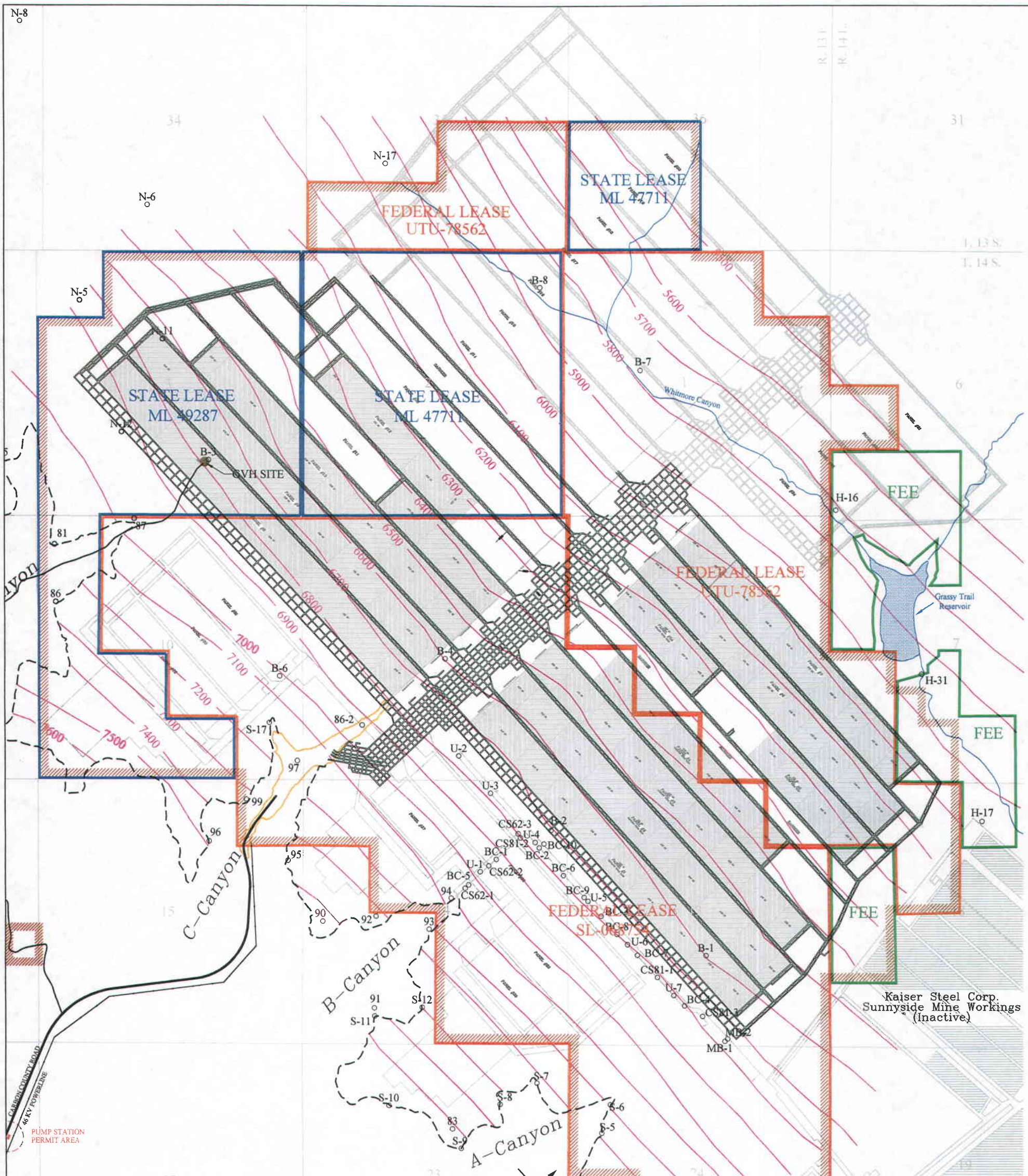
SCALE: 1"=2000'

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

UTAH REGISTERED #6448561 David W. Hibbs PROFESSIONAL ENGINEER MINE

MAP 6-2

COAL SEAM STRUCTURE MAP



NOTE:

Mine projections are subject to change depending on conditions encountered in the underground mine workings.
Actual mine works are shown as of September 30, 2008.
Mine projections depicted in the fringe areas beyond the existing permit area are speculative and based on future reserve acquisitions.
No mining will be conducted in these areas unless those reserves are acquired in the future and permitted according to federal, state, and local permitting requirements.
West Ridge Resources acknowledges that permission to mine within the permit boundary does not imply permission to mine beyond the permit boundary.

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

UTAH REGISTERED #6449561 David W. Hibbs 10/2/08 PROFESSIONAL ENGINEER

WEST RIDGE MINE

Map 6-2

Coal Seam Structure Map

DATE: 10-02-08 REV: 12 ACAD REF: MAP6-2 STRUCTURE REV12

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- Outcrop
- Structure Contour (Base of Lower Sunnyside Seam)
- Drill Hole/Channel Samples S-7

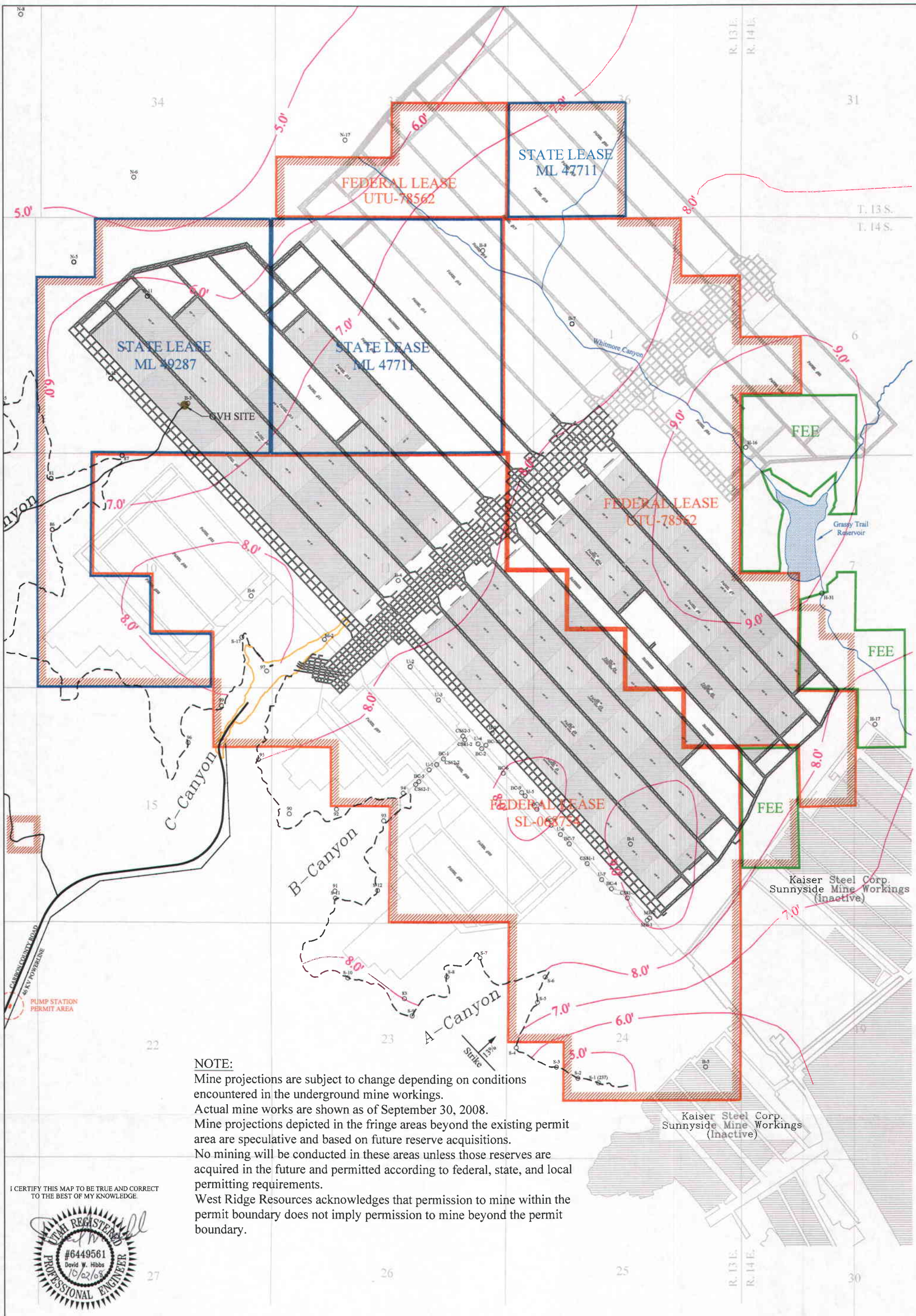
N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 6-3

COAL SEAM ISOPACH MAP



NOTE:

Mine projections are subject to change depending on conditions encountered in the underground mine workings.

Actual mine works are shown as of September 30, 2008.

Mine projections depicted in the fringe areas beyond the existing permit area are speculative and based on future reserve acquisitions.

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

UTAH REGISTERED #6449561 David W. Hibbs 10/02/08 PROFESSIONAL ENGINEER

WEST RIDGE MINE

Map 6-3

Lower Sunnyside Coal Seam Isopach Map

DATE: 10-02-08 REV: 12 ACAD REF: MAP6-3 ISOPACH REV12

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site
- Outcrop
- Coal Isopachs
- Drill Hole/Channel Samples

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 7-3

WATER RIGHTS MAP

T. 13 S.
T. 14 S.
R. 13 E.
R. 14 E.
GVH SITE
PUMP STATION PERMIT AREA
CARBON COUNTY ROAD
46 KV POWERLINE
Spring Canyon
Little Spring Canyon
Springs Canyon
Whitmore Canyon
Hanging Rock Spring
Hanging Rock Canyon
Gravesford Canyon
West Ridge
Grassy Trail Reservoir
Right Fork
B Canyon
C Canyon
A Canyon
Bear Canyon
JEEP TRAIL
MINE
PACK TRAIL

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

Refer to Appendix 7-5 for water rights information.

WEST RIDGE MINE

Map 7-3

Water Rights

DATE: 10-02-08 REV: 11 ACAD REF: MAP7-3 WATERIGHTS REV11

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Water Right:
  - Point to Point (91 363)
  - Spring (91 363)
- Ground Water Right (91 363)
- Municipal Water System Intake

N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 7-5

SEEP/SPRING SURVEY MAP

June 1986 Seep and Spring Inventory Area

October 1985 Seep and Spring Inventory Area

June 1986 Seep and Spring Inventory Area

October 1985 Seep and Spring Inventory Area

June 1986 Seep and Spring Inventory Area

T. 13 S.

T. 14 S.

R. 13 E.

R. 14 E.

GVH SITE

PUMP STATION PERMIT AREA

Grassy Trail Reservoir

Whitmore Canyon

West Ridge

Bear Canyon

West Ridge

Hanging Rock Canyon

Graveyard Fork

Right Fork

A Canyon

B Canyon

C Canyon

Little Spring Canyon

Springs Canyon

Spring Canyon

JEEP TRAIL

PACK TRAIL

MINE

OUTCROP

COAL OUTCROP

CARBON COUNTY ROAD

46 KV POWERLINE

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

UTAH REGISTERED #6449561 David W. Hibbs PROFESSIONAL ENGINEER

SEEP AND SPRING LEGEND

- Seep and Spring Inventory Boundary
- F-17 Location of Seep or Spring, October 1985
- S-208 Location of Seep or Spring, June 1986
- Spring Monitoring Station (1985-1989)

WEST RIDGE MINE

Map 7-5

Seep/Spring Survey Map

DATE: 10-02-08 REV: 11 ACAD REF: MAP7-5 SEEP-SPRING REV11

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site

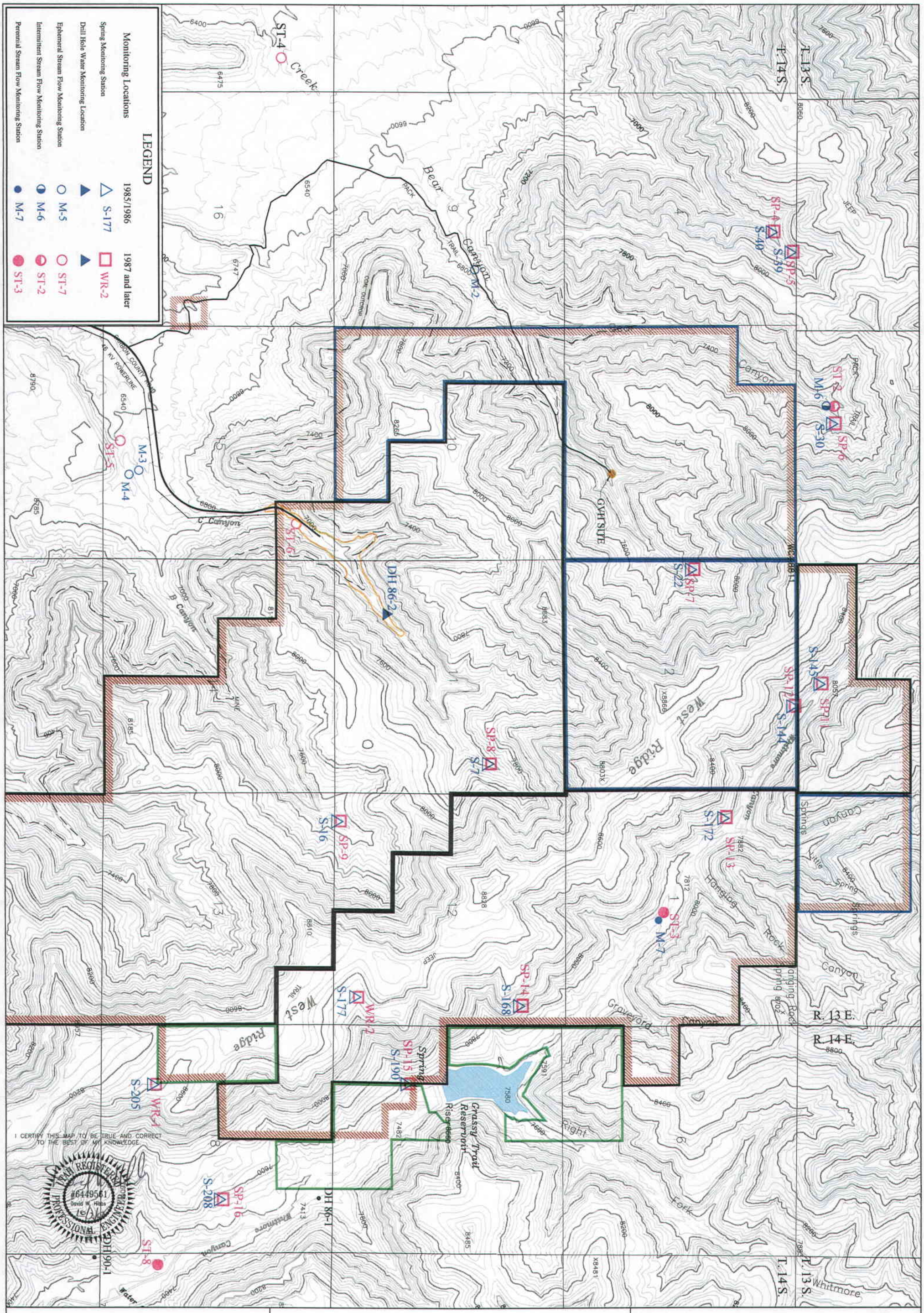
N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

MAP 7-6

HYDROLOGIC MONITORING MAP
(HISTORICAL MONITORING LOCATIONS)


LEGEND
Monitoring Locations
1985/1986
1987 and later
Spring Monitoring Station
S-177
WR-2
Drill Hole Water Monitoring Location
Ephemeral Stream Flow Monitoring Station
M-5
ST-7
Intermittent Stream Flow Monitoring Station
M-6
ST-2
Perennial Stream Flow Monitoring Station
M-7
ST-3
T. 13 S.
T. 14 S.
R. 13 E.
R. 14 E.
Bear 9 Canyon
PACK TRAIL
JEEP TRAIL
Creek
B Canyon
C Canyon
West Ridge
Spring Canyon
Grassy Trail Reservoir
Right Fork
Graveyard Canyon
Rock Canyon
Hanging Rock Canyon
Whitmore Canyon
Little Springs Canyon
Springs
GVH SITE
DH 86-2
DH 86-1
DH 90-1
MINE
48 KV POWERLINE
CARBON COUNTY
ST-4
ST-5
ST-6
ST-8
SP-4
SP-5
SP-6
SP-7
SP-8
SP-9
SP-11
SP-12
SP-13
SP-14
SP-15
SP-16
S-40
S-39
S-30
S-22
S-7
S-16
S-145
S-144
S-172
S-168
S-190
S-205
S-208
M-1
M-2
M-3
M-4
I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE
UTAH REGISTERED PROFESSIONAL ENGINEER
#6449561
David W. Hicks
WEST RIDGE MINE
Map 7-6
Hydrologic Monitoring Map
(Historical Monitoring Locations)
DATE: 10-02-08
REV: 12
ACAD REF: MAP7-6 MONITOR-HIS REV12
LEGEND:
Permit Boundary
Federal Lease
State Lease
Penta Creek Fee
Surface Facility Area
GVH Site
WEST RIDGE
RESOURCES, INC.
SCALE: 1"=2000'

MAP 7-7

HYDROLOGIC MONITORING MAP
OPERATIONAL MONITORING LOCATIONS

LEGEND

Operational Monitoring Locations

Spring Monitoring Station — WR-2

Drill Hole Water Monitoring Location — DH 86-2

Ephemeral Stream Flow Monitoring Station — ST-5

Intermittent Stream Flow Monitoring Station — ST-8

ST-4 (Discontinued-July 2005)

ST-13

ST-11

ST-12

ST-10

ST-9

ST-6

ST-6A

ST-3

ST-5

SP-8

SP-12

SP-13

SP-10-1

SP-10-2

SP-16

WR-1

WR-2

DH 86-2

DH 86-1

DH 90-1

Bear 9 Canyon

C Canyon

B Canyon

West Ridge

Grassy Trail Reservoir

Spring Canyon

Graveyard Fork

Right Fork

Whitmore Canyon

Water Canyon

Hanging Rock Canyon

Canyon Springs

GVH SITE

CARBON COUNTY ROAD

46 kV POWERLINE

JEEP TRAIL

PACK TRAIL

T. 13 S.

T. 14 S.

R. 13 E.

R. 14 E.

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

UTAH REGISTERED PROFESSIONAL ENGINEER #6449561 David W. Hibbs

WEST RIDGE MINE

Map 7-7

Operational Monitoring Locations

LEGEND:

- Permit Boundary
- Federal Lease
- State Lease
- Penta Creek Fee
- Surface Facility Area
- GVH Site

N

WEST RIDGE RESOURCES, INC.

SCALE: 1"=2000'

DATE: 10-02-08 REV: 10 ACAD REF: MAP7-7 MONITOR-OP REV10