C/007/039 Incoming
#3660
OK

Canyon Fuel Company, LLC
Dugout Canyon Mine
P.O. Box 1029
Wellington, Utah 84542

COPY

October 13, 2010

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

RE: 2010 Midterm Permit Review Deficiencies, Task ID #3592
Dugout Canyon Mine, Canyon Fuel Company, LLC, C/007/039, Carbon County, Utah

Dear Sirs:

Attached please find five copies of revisions to the M&RP, General Chapter 1, Degassification Amendment and Refuse Pile Amendment associated with the Midterm Review.

R645-301-632 – Text has been added to section identifying where to find subsidence maps and information.

R645-301-121.100 – Test has been revised in the Refuse Pile Amendment in Sections 234.100, 234.300, 242.100 and 243. Plate RA 2-2 has been updated. Table 2-2 in the M&RP has been updated to include the north and south stockpiles volumes at the fan site in Pace Canyon. The statement "topsoil at the Pace Canyon was temporarily stockpiled above the portal and along the channel diversion area for immediate replacement" is referring to reclamation activities. The salvaged soils at the Pace Canyon site were sampled and analyzed and were incorporated on August 23, 2005 according to the UDOGM stamped on the pages in our copy of the permit. The soil analysis for G-29, G-30 and G-31 are included in this amendment as Attachment 2-1 to the Methane Degassification Volume. As built topsoil volume calculations for the G-25 and G-26 have been included in Attachment 2-2.

R645-301-830.140 – The reclamation bonding costs have been increased for the next five years. The total page of the bonding calculations has been included in this amendment.

R645-301-112-303 – The revised AVS information has been updated and is provided for inclusion into the General Chapter 1, Appendix 1-1.

A copy of this submittal has been delivered to the Price field office.

Thank you for your assistance and if you have any questions please call me at (435) 636-2869.

Sincerely yours,

Vicky S. Miller

Vicky S. Miller

cc: Dave Spillman

File in:
☐ Confidential
☐ Shelf
☒ Expandable
Date Folder 10/14/2010 C0070039
See: Incoming for additional information

RECEIVED
OCT 14 2010
DIV. OF OIL, GAS & MINING

SUFCO Mine ☐ Skyline Mines ☐ Dugout / Soldier Canyon Mines

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

COPY

Permittee: Canyon Fuel Company, LLC
Mine: Dugout Canyon Mine **Permit Number:** C/007/039
Title: 2010 Midterm Permit Review Deficiencies, Task ID # 3592

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	☐ Replace	☐ Remove	General Chapter One
☐ Add	☒ Replace	☐ Remove	Appendix 1-1
☐ Add	☐ Replace	☐ Remove	M&RP
☐ Add	☒ Replace	☐ Remove	Chapter 2, Pages 2-34 and 2-35 - Table 2-2
☐ Add	☒ Replace	☐ Remove	Chapter 5, Appendix 5-6, Page 1
☐ Add	☒ Replace	☐ Remove	Chapter 6, Page 6-18
☐ Add	☐ Replace	☐ Remove	Refuse Pile Amendment
☐ Add	☒ Replace	☐ Remove	Chapter 2 , Pages 2-12 thru 2-18
☐ Add	☒ Replace	☐ Remove	Plate RA 2-2
☐ Add	☐ Replace	☐ Remove	Degassification Amendment
☐ Add	☒ Replace	☐ Remove	Chapter 2 , Table 2-1
☒ Add	☐ Replace	☐ Remove	Attachment 2-1 - add to the back of the existing information
☒ Add	☐ Replace	☐ Remove	Attachment 2-2 - add to the back of the existing information
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.

10/13/10 - Changes to four different sets of binders have been provided. Please be aware that the pages need to be placed in the correct binders when clean copies are provided.

Received by Oil, Gas & Mining

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DIV. OF OIL, GAS & MINING

APPLICATION FOR COAL PERMIT PROCESSING

COPY

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

Permittee: Canyon Fuel Company, LLC
Mine: Dugout Canyon Mine **Permit Number:** C/007/039
Title: 2010 Midterm Permit Review Deficiencies, Task ID # 3592
Description, Include reason for application and timing required to implement:

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

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

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

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

David Spillman — Print Name

David Spillman, Engineering Manager — Sign Name, Position, Date

Subscribed and sworn to before me this 13 day of OCTOBER, 2010

Vicky Sue Miller — Notary Public

My commission Expires: 1-02, 2012

Attest: State of UTAH } ss:
County of CARBON

VICKY SUE MILLER
NOTARY PUBLIC-STATE OF UTAH
1776 KENILWORTH RD.
HELPER, UTAH 84526
COMM. EXP. 01-02-2012

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining
		RECEIVED OCT 14 2010 DIV. OF OIL, GAS & MINING

Form DOGM- C1 (Revised March 12, 2002)

GENERAL
CHAPTER 1

GENERAL CHAPTER 1
APPENDIX 1-1

ARCH COAL INC
2010 OWNERSHIP AND CONTROL UPDATES

October 2010

ARCH COAL INC. (144492)
OWNERSHIP AND CONTROL INFORMATION

Name	Position	Begin Date
LEER, STEVEN F	CEO	7/1/97
LEER, STEVEN F	DIR	7/1/97
LEER, STEVEN F	CB	4/28/06
LANG, PAUL	SVP	12/7/06
DREXLER, JOHN T	CFO, SVP	5/1/08
BESTEN JR, CLARENCE HENRY	SVP	12/01/02
PEUGH, DAVID B	VP	7/1/97
LOCKHART, THOMAS A	DIR	2/21/03
BOYD, JAMES ROBERT	DIR	7/1/97
JONES, ROBERT G	SVP	8/1/2008
JONES, ROBERT G	GC, SEC	10/16/00
STEELE, CHARLES DAVID	VP (TAX)	4/24/03
EAVES, JOHN W	COO	12/11/02
EAVES, JOHN W	DIR	2/23/06
EAVES, JOHN W	PRS	4/28/06
BUMBICO, ANTHONY S	VP	4/27/06
HUNT, DOUGLAS H	DIR	7/1/97
FLORCZAK, JAMES E	TRS	8/17/98
PERRY, MICHAEL A	DIR	9/28/98
SANDS, THEODORE D	DIR	2/25/99
LORSON, JOHN W	VP, CAO	4/30/08
POTTER, ROBERT G	DIR	4/26/01
SLONE, DECK S	VP	4/26/01
FELDMAN, SHEILA B	VP	2/3/03
GODLEY, PATRICIA FRY	DIR	7/22/04
WARNECKE, DAVID N	VP	8/8/05
TAYLOR, WESLEY M	DIR	7/28/05
JENNINGS, BRIAN J	DIR	7/27/06
HARTLEY, DAVID E	VP,CIO	8/1/09
WARNER, CASEY	DIR	4/23/09
PLOETZ, JON S	ASC, AGC	2/18/10
JONES, J. THOMAS	DIR	7/21/10
WOLD, PETER I.	DIR	7/21/10

Name	Position	Begin Date	End Date
CHANGES 2006 - 2010			
HORGAN, JANET L	ASS	10/16/00	10/14/05
HORGAN, JANET L	AGC	10/16/00	12/14/05
BOYD, JAMES ROBERT	CB	7/1/97	4/28/06
EAVES, JOHN W	EVP	12/11/02	4/28/06
LEER, STEVEN F	PRS	7/1/97	4/28/06
MESSEY, ROBERT J	CFO, SVP	12/1/00	4/30/08
KELLEY, ALLEN	COF	3/15/05	11/17/08
ABBENE, MICHAEL T	VP, CIO	7/1/05	7/31/09
BILLHARTZ, GREGORY A	ASC	12/8/05	10/6/09
LORSON, JOHN W	COP	4/9/99	4/30/08
BESTEN JR, CLARENCE HENRY	VP	7/1/97	12/01/09
BURKE, FRANK M	DIR	9/7/00	Deceased 7/24/10

LEGEND

AGC - ASSISTANT GENERAL COUNSEL
AST - ASSISTANT TREASURER
CB - CHAIRMAN OF THE BOARD
CFO - CHIEF FINANCIAL OFFICER
COO - CHIEF OPERATING OFFICER
CIO - CHIEF INFORMATION OFFICER
EVP - EXECUTIVE VICE PRESIDENT
GM - GENERAL MANAGER
GC - GENERAL COUNSEL
SEC - SECRETARY
VP - VICE PRESIDENT
SVP - SENIOR VICE PRESIDENT

ASC - ASSISTANT SECRETARY
CAO – CHIEF ACCOUNTING OFFICER
CEO - CHIEF EXECUTIVE OFFICER
COF - INTERNAL AUDITOR
COP - CONTROLLER
DIR - DIRECTOR
FIN - FINANCE

PRS - PRESIDENT
TRS - TREASURER

October 8, 2010

ASSISTANT SECRETARY'S CERTIFICATE

ARCH COAL, INC.

I, Jon S. Ploetz, Assistant Secretary of ARCH COAL, INC., a Delaware corporation (the "Company"), hereby certify to the following:

1. On July 21, 2010, J. Thomas Jones was elected a Director of the Company; and

2. On July 21, 2010, Peter I. Wold was elected a Director of the Company.

WITNESS my hand and seal of this Company this 21st day of July, 2010.

Jon S. Ploetz

State of Missouri)
) ss
County of St. Louis)

Sworn and Subscribed to before me this 21st day of July, 2010.

Jolene Mermis

My Commission Expires: May 21, 2011

JOLENE JOUETT MERMIS
Notary Public - Notary Seal
State of Missouri
Commissioned for St Louis County
My Commission Expires: May 21, 2011
Commission Number: 07388596

M&RP

CHAPTER 2

SOILS

M&RP

If during construction activities additional topsoil is found, this material will be removed and stockpiled for use during reclamation activities. It is likely that material will be found in some areas marked on Plate 2-2 as OB.

As requested by the Division, a non-biased, third party, professional soil scientist will be on-site when available at the Dugout Canyon Mine facilities during soil salvage to monitor and supervise soil salvage operations for the purpose of maximizing soil salvage volumes and quantities.

At the Pace Canyon fan portal site, the topsoil and underlying unconsolidated materials will be removed and stockpiled together. The entire mixture will be treated as topsoil in compliance with R614-201-234.300. The recovery of topsoil/growth medium will be maximized at the site.

TABLE 2-2

TOPSOIL AND SUBSTITUTE TOPSOIL VOLUMES

AREA	MATERIAL TYPE	Volume Estimated at Salvage
NORTHWEST FACILITIES AREA (AREA 2)	TOPSOIL/OVERBURDEN	1,653 CY
COAL STORAGE AREA (AREA 3)	TOPSOIL/SUBSOIL	4,869 CY
SEDIMENT POND, SLOPE AREA, AREAS BETWEEN ROAD AND CREEK (AREAS 4, 6, 7)	TOPSOIL/SUBSOIL	20,118 CY
WATER TANK AREA (AREA 8)	TOPSOIL/SUBSOIL	247 CY
SLOPE EAST OF COAL STORAGE PILE (AREA 9)	TOPSOIL/SUBSOIL	333 CY
GILSON WATER WELL*	TOPSOIL/SUBSOIL	134 CY
SMALL SUBSTATION	TOPSOIL/SUBSOIL	140 CY
	TOTAL	27,450 CY

Topsoil/Subsoil Stockpile Survey	Cubic Yards
North Pile (1998), Includes Area 5 Soils	11,300
South Pile (1998)	13,939
Gilson Well Pile (2006)	134
Small Substation Pile (2006)	140
Subsoil Pile (2006)	734
TOTAL	26,247
North Pile - Pace Fan	1,941
South [illegible] Pace Fan	1,218
TOTAL	3,159

* Refer to Appendix 2-8 for volume calculations and location of soil.

232.200 Poor Topsoil

Topsoil that is of an insufficient quantity, or of poor quality (for sustaining vegetation) will be removed as a separate layer and segregated. Such operations will be done with approval of the Division, and in compliance with R614-301-233.100 (Section 233.100).

232.300 Thin Topsoil

Topsoil to be removed that is less than 6 inches thick will be removed with the immediately underlying unconsolidated materials. This material mixture will be treated as topsoil.

232.400 Minor Disturbances Not Requiring Topsoil Removal

APPENDIX 5-6

Reclamation Bond Estimate

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$1,182,683.00	
Subtotal Backfilling and Grading	$827,141.00	
Subtotal Revegetation	$500,386.00	
Direct Costs	$2,510,210.00	
Indirect Costs		
Mob/Demob	$251,021.00	10.0%
Contingency	$125,511.00	5.0%
Engineering Redesign	$62,755.00	2.5%
Main Office Expense	$170,694.00	6.8%
Project Mainagement Fee	$62,755.00	2.5%
Subtotal Indirect Costs	$672,736.00	26.8%
Total Cost	$3,182,946.00	
Escalation factor		0.016
Number of years		5
Escalation	$262,915.00	
Reclamation Cost Escalated	$3,445,861.00	
Reclamation Cost (rounded to nearest $1,000) 2015 Dollars	$3,446,000.00	
Bond Amount in 2010 dollars	$3,550,000.00	
Difference Between Cost Estimate and Bond	$104,000.00	
Percent Difference	3.02%	

CHAPTER 6
GEOLOGY

M&RP

REFUSE PILE AMENDMENT

CHAPTER 2

SOILS

Conservation Service published data and technical guides, state agricultural agency, Tennessee Valley Authority, BLM - USFS published data, physical and chemical analyses results, field-site trials, or greenhouse tests.

233.400 Testing of Substitute Topsoil

Only the substitute topsoil used in lieu of, or in conjunction with, on-site overburden and soil will be tested as described in Section 233.300.

234 Topsoil Storage

Soils salvaged from the site will be stockpiled on the site. Refer to Plates RA 5-1 and 7-1 for the stockpile location. The estimated volumes of soil to be stockpiled are presented in RA Table 2-2.

234.100 Topsoil Stockpiling

Soil removed will be stockpiled for later use in reclamation operations when it is impractical to promptly redistribute the materials on regraded areas. Refer to Plates RA 5-1 and 7-1 for the location of the soil storage area. Because the soil salvage quantities are estimated, the actual contours and corresponding cross-sections are approximate. The final soil stockpiles will be reflected in the as-built drawings for the site. RA Plate 2-2 ~~will~~ reflects as-built drawings of the stockpiles soils ~~should they be moved to facilitate the expansion of the waste rock site~~. ~~Once the expansion is completed the as-built drawings of the topsoil stockpiles will be submitted within six months.~~

It is anticipated that the piles will be constructed in horizontal lifts of 1.5 to 2.0 feet. Tracked equipment will be used to reduce compaction. The stockpiles will be graded to a maximum slope of 2:1 and seeded to promote surface stabilization. The interim reclamation seed mix described in Chapter 3, Section 341.200 will be used for this purpose.

The stockpiles will be kept isolated from the main area of the refuse site to protect the material from contaminants and unnecessary compaction that would interfere with vegetation. A sign will be installed on the stockpiles to identify one as a topsoil storage area and the second as the subsoil storage area. The stockpiles will be protected from wind and water erosion by being revegetated with a quick growing vegetative cover (interim seed mix) and by installing berms around the stockpiles to help trap sediment coming off the stockpiles. ~~The stockpiled soils will be moved if necessary to facilitate the expansion of the waste rock site and for contemporaneous reclamation. Following the expansion, these stockpiled soils will not be moved or disturbed until required for redistribution during contemporaneous reclamation.~~ The boulders designated in area "K" (RA Plate 2-1) will be stockpiled separately from the soils salvaged from the refuse site. The boulders will either be placed along the perimeter of the substitute topsoil pile, access road, on top of the subsoil pile or will be transported to the rock stockpile at the Dugout/Soldier Canyon Mine topsoil stockpile adjacent to the Soldier Canyon Road.

234.200 Stockpiled Topsoil

Stable Stockpile Site. Stockpiled materials will be placed on a stable site as described in Section 234.100.

Protection from Contaminants and Compaction. Stockpiled soil will be protected from contaminants and unnecessary compaction. To protect the soil from contaminants and unnecessary compaction that could interfere with vegetation, the stockpiles will be isolated from the main refuse pile area (Section 234.100). A sign designating "topsoil" will be installed on the stockpile.

The stockpile will be constructed in such a manner as to allow equipment access around the base of the stockpiles for repair of the surfaces and diversion structures as needed.

Furthermore, berms will be constructed around the stockpiles to further separate the soils from the materials stored on the site. The berm will be constructed as specified in Chapter 7.

Wind and Water Erosion Protection. The stockpiles will be protected from wind and water erosion by prompt establishment and maintenance of a vegetative cover. Berms will be constructed around the stockpiles to help trap sediment runoff from the stockpiles. Refer to Section 242 .100 for additional protection information.

Topsoil Redistribution. A limited quantity of stockpiled soil may be distributed on the refuse pile to determine the quantity of soil cover necessary to meet revegetation reclamation requirements. The remainder of the stockpiled soil will not be moved until redistributed during reclamation operations unless approved by the Division.

234.300 Topsoil Stockpile Relocation

Stockpiled soil in jeopardy of being detrimentally affected in terms of its quantity and quality by refuse pile operations may be temporarily redistributed upon approval by the Division and modification of this M&RP. ~~The stockpiled soils will be moved to facilitate the expansion of the waste rock site. Following the expansion, these stockpiled soils will not be moved or disturbed until required for redistribution during contemporaneous and final reclamation.~~

Host Site. Soil relocation may occur provided that such action does not permanently adversely affect soil of the host site.

Topsoil Suitability. Stockpiled soil relocation may occur provided the material is retained in a condition more suitable for redistribution than if stockpiled.

240 RECLAMATION PLAN

241 General Requirements

Reclamation of the site (soil redistribution, amendments, and stabilization) is discussed in Sections 242, 243, and 244, respectively.

242 Soil Redistribution

242.100 Soil Redistribution Practices

The stored soil will be redistributed after recontouring of the site has occurred during reclamation activities. The refuse pile will be covered with 1 foot of equally blended coal waste and subsoil, approximately 2.6 feet of subsoil and approximately 0.4 feet of topsoil, to obtain a total depth of cover on the pile of 4 feet. The volume of material needed to cover the refuse pile is 82,976 CY.

There are currently topsoil and subsoil stockpiles located in the northeast portion of the site. Aero-Graphics, Inc. surveys estimated the volume in each stockpile ~~as well as the volume of soil in the containment berms~~ as:

Topsoil Stockpiles volume = ~~7,298~~ 8,384 CY
Subsoil Stockpile volume = ~~6,508~~ 9,211CY
~~Berm volume = 2,686 CY~~

~~An additional 6,317 CY of subsoil has been stripped from the site since construction of the original stockpiles.~~ Total cover material currently available in the stockpiles is estimated to be ~~22,809~~ 17,595 CY

~~When the topsoil and subsoil stockpiles are moved to facilitate the expansion of the refuse pile additional subsoil may be excavated from the northwest portion of the site. The volume of material is estimated to be 5,400 CY.~~

During reclamation the berms and embankments that create the perimeter ditches and sediment pond will be pulled back to blend the undisturbed areas into the reclaimed refuse pile. This process will generate approximately 2,947 CY of additional cover material. The total available cover material at the refuse site is ~~31,156~~ 20,542 CY

To reduce the volume of imported cover material the bottom foot of cover material will be a blend of coal waste and subsoil. Equal portions of coal waste and subsoil will be used to create this blended cover material. Thus, the volume of available cover material may be increased by 10,372 CY ~~(560,088 ft2 x 0.5 ft / 27 ft3/CY)~~ to a total of ~~41,528~~ 30,914 CY.

Volume of cover material to be imported = 82,976 – ~~41,528~~ 30,914 = ~~41,448~~ 52,062 CY

Summary of Volumes

Volume of material needed to obtain 4 feet of cover = 82,976 CY
Total cover material available at the site = ~~31,156~~ 20,542 CY
Vol. of coal waste blended with sub-soil to produce the first foot of cover = 10,372 CY
Vol. of subsoil blended with coal waste to produce the first foot of cover = 10,372 CY
Volume of subsoil and topsoil needed to cover the pile = 72,604 CY
Volume of cover material to be imported from borrow site = ~~41,448~~ 52,062 CY

Soils will be handled when they are in a loose or friable condition. ~~The moisture content will be visually monitored and water will be added as needed to enhance the soil's condition for handling.~~

Contemporaneous Reclamation: In the future, the applicant may decide to demonstrate that two feet of cover material over the refuse pile is sufficient to meet reclamation standards for bond release. Additional information and clarification of the project will be provided at that time. An area on the refuse pile will receive reclamation treatments contemporaneously to justify the decrease of required cover soils from four feet to two feet for final reclamation.

Soil Thickness: The topsoil will be distributed to the disturbed areas illustrated on Figure RA 5-1.

Currently, it is planned that the refuse pile portion of the site be covered with approximately 48 inches of soil. Based on the proposed pile configuration this will require about 82,976 CY of soil. The remainder of the site area, not used for refuse storage will be covered with approximately 6 inches of substitute topsoil. Calculations of the soil cover volumes are presented in Attachment 2-2. Soils in the area designated as H and J (approximately 11.2 acres) are not currently planned for salvage, except in the area of the pond spillway (RA Plate 2-1).

Compaction. To prevent compaction of topsoil, soil-moving equipment will refrain from unnecessary operation over spread soil. Front-end-loaders and other wheel-mounted equipment may be used to transport and dump soil. However, to minimize compaction, only track-mounted equipment (e.g. bulldozers, trackhoes) will be used to spread the soil. The soil will be loosened prior to seeding as described in Section 341.200.

Erosion. Care will be exercised to ensure the stability of soil on graded slopes to guard against erosion during and after soil application. Erosion control measures will include but not be limited to extreme surface roughening (also known as pocking and gouging).

242.200 Regrading

Since the site has been disturbed by previous activities and will be used to permanently store coal mine waste, the area will not be returned to the original geometric configuration. Prior to soil redistribution, the disturbed area will be graded to meet the proposed final reclamation topography (RA Plate 5-3).

The surface of the refuse pile will be left in a roughened state and in addition will be ripped prior to the application of soil. After the 1st lift of subsoil is placed, the surface of the refuse pile will be ripped again to a depth of approximately 12 inches in an effort to promote root penetration and to

mix the top layer of the refuse with the subsoil. Refer to Section 341.200 for further discussion of roughening methods.

The second type of surface consists of roads, perimeter ditches, etc. which may be compacted through their use. The surface will be ripped to a depth of approximately 1.5 to 2 feet with a ripper-equipped tractor or other appropriate equipment where possible to reduce surface compaction, to assure soil adherence, and promote root penetration. Following the ripping of the soils and the application of stockpiled soils, extreme roughening techniques will be applied. A backhoe or trackhoe will be used to create microbasins with a minimum depth of 18" and the width of the bucket. Soil removed to form the microbasins will be dropped approximately 2 to 3 feet above the microbasin onto the soil surface.

242.300 Topsoil Redistribution on Impoundments and Roads

The sedimentation pond and embankment will be breached and reclaimed with the other surface disturbed areas. Similarly, reclamation of abandoned roads will also follow the same technique as for other disturbed areas.

243 Soil Nutrients and Amendments

Soil nutrients and amendments may be applied to the redistributed soil as necessary, to establish the vegetative cover. The type and rate of application will be determined just prior to contemporaneous and final reclamation activities based on analyses of samples collected from the stockpiled soil materials. The soils will, at a minimum, be tested for pH, EC, total carbon, SAR, phosphorus, nitrate-nitrogen, and water holding capacity.

In the event that the topsoil/subsoil piles are moved adjacent to the Dugout Canyon Road in conjunction with the pile expansion, organic matter will be incorporated into topsoil/subsoil piles when the soils are relocated. Vegetation growing on the piles was incorporated into the topsoil/subsoil piles as they were relocated. The future type and rate of application for organic matter will be determined by the applicant and UDOGM reclamation specialists prior to moving the soils during reclamation activities.

DEGASSIFICATION AMENDMENT

CHAPTER 2

SOILS

TABLE 2-1

Topsoil Volumes*

Well No.	Cubic Yards of Material
G-1	415
G-2	3,104
G-3	1,182
G-4	1,100
G-5	1,909
G-6	792
G-7	1251
G-8	543
G-9	1,574
G-10	2,344
G-11	254
G-12	563
G-13	2,162
G-14	1,544
G-15	1,475
G-16	1,092
G-17	797
G-18	2,195
G-19	2,037
G-22 & Access Road	2,103
G-25	~~1,406~~ 1,081
G-26	~~1,080~~ 927
G-29	1,363
G-30	1,235
G-31	4,624

ATTACHMENT 2-1

SOIL INVENTORY AND ASSESSMENT

add to the back of existing information

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S1006234001

Project: Dugout Canyon Mine
Date Received: 6/14/2010

Date Reported: 7/22/2010
Work Order: S1006234

Lab ID	Sample ID	Depths Inches	pH s.u.	Saturation %	Electrical Conductivity dS/m	Field Capacity %	Wilt Point %
S1006234-001	G-30-02	0-3	6.7	45.9	0.52	33.8	15.2
S1006234-002	G-30-02	3-8	6.8	51.1	0.31	29.4	16.8
S1006234-003	G-30-02	8-30	8.2	40.7	0.23	24.7	12.7
S1006234-004	G-30-02	30-60	8.2	41.3	0.38	26.1	14.4
S1006234-005	G-30-01	0-3	7.7	51.0	0.47	36.2	17.9
S1006234-006	G-30-01	3-8	7.3	48.5	0.46	32.1	16.7
S1006234-007	G-30-01	8-12	7.9	45.0	0.28	26.5	16.0
S1006234-008	DUG-5-2 /G-29	0-2	7.6	52.6	0.56	29.7	20.1
S1006234-009	DUG-5-2 /G-29	2-9	7.7	53.1	0.54	31.5	19.7
S1006234-010	DUG-5-2 /G-29	9-16	8.0	39.9	0.45	25.5	14.0
S1006234-011	DUG-5-2 /G-29	16-30	8.1	41.0	0.43	25.0	16.5
S1006234-012	DUG-5-2 /G-29	30-45	8.1	40.8	0.26	25.9	15.0

These results apply only to the samples tested.

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

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

Inter-Mountain Laboratories, Inc.
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Soil Analysis Report

Canyon Fuel Company
Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S1006234001

Project: Dugout Canyon Mine
Date Received: 6/14/2010

Date Reported: 7/22/2010
Work Order: S1006234

Lab ID	Sample ID	Depths Inches	PE Calcium meq/L	PE Magnesium meq/L	PE Potassium meq/L	PE Sodium meq/L	SAR	Sand %	Silt %	Clay %	Texture
S1006234-001	G-30-02	0-3	2.49	1.19	0.22	0.64	0.47	34.0	30.0	36.0	Clay Loam
S1006234-002	G-30-02	3-8	1.95	0.53	0.03	0.12	0.11	23.0	32.0	45.0	Clay
S1006234-003	G-30-02	8-30	1.50	0.30	0.02	0.13	0.14	30.0	35.0	35.0	Clay Loam
S1006234-004	G-30-02	30-60	1.56	0.56	0.01	0.76	0.74	25.0	40.0	35.0	Clay Loam
S1006234-005	G-30-01	0-3	3.24	0.70	0.14	0.14	0.10	36.0	31.0	33.0	Clay Loam
S1006234-006	G-30-01	3-8	3.25	0.74	0.10	0.11	0.08	35.0	33.0	32.0	Clay Loam
S1006234-007	G-30-01	8-12	1.80	0.41	0.03	0.27	0.25	11.0	51.0	38.0	Silty Clay Loam
S1006234-008	DUG-5-2 / G-29	0-2	4.27	0.54	0.31	0.26	0.16	31.0	42.0	27.0	Clay Loam
S1006234-009	DUG-5-2 / G-29	2-9	4.28	0.64	0.28	0.24	0.15	23.0	48.0	29.0	Clay Loam
S1006234-010	DUG-5-2 / G-29	9-16	2.49	0.50	0.18	0.66	0.54	31.0	38.0	31.0	Clay Loam
S1006234-011	DUG-5-2 / G-29	16-30	1.89	0.58	0.14	0.79	0.71	33.0	35.0	32.0	Clay Loam
S1006234-012	DUG-5-2 / G-29	30-45	1.47	0.35	0.06	0.15	0.16	26.0	44.0	30.0	Clay Loam

These results apply only to the samples tested.

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

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

Inter-Mountain Laboratories, Inc.
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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S1006234001

Project: Dugout Canyon Mine
Date Received: 6/14/2010

Date Reported: 7/22/2010
Work Order: S1006234

Lab ID	Sample ID	Depths Inches	CO3 %	Nitrogen Nitrate ppm	Available Phosphorus ppm	Available Potassium ppm	Selenium ppm	Boron ppm	TKN %	Total Carbon %	TOC %
S1006234-001	G-30-02	0-3	1.2	10.5	16.2	336	<0.02	0.57	0.21	2.1	1.9
S1006234-002	G-30-02	3-8	1.5	0.4	0.86	96.2	<0.02	0.33	0.13	0.6	0.4
S1006234-003	G-30-02	8-30	24.4	0.5	0.64	53.2	<0.02	0.22	0.05	3.0	0.2
S1006234-004	G-30-02	30-60	20.2	0.6	0.67	57.0	<0.02	0.19	0.06	2.7	0.3
S1006234-005	G-30-01	0-3	6.5	2.9	17.1	259	<0.02	0.35	0.27	3.1	2.3
S1006234-006	G-30-01	3-8	2.1	1.3	3.62	181	0.02	0.21	0.14	1.7	1.5
S1006234-007	G-30-01	8-12	13.8	1.1	0.78	67.0	<0.02	0.15	0.07	1.9	0.2
S1006234-008	DUG-5-2 / G-29	0-2	22.1	4.0	20.5	263	<0.02	0.34	0.29	5.9	3.4
S1006234-009	DUG-5-2 / G-29	2-9	18.4	4.4	3.86	280	<0.02	0.32	0.27	5.0	2.9
S1006234-010	DUG-5-2 / G-29	9-16	26.4	3.9	1.63	212	<0.02	0.15	0.12	3.8	1.2
S1006234-011	DUG-5-2 / G-29	16-30	26.6	1.8	1.03	192	0.02	0.13	0.11	3.8	0.9
S1006234-012	DUG-5-2 / G-29	30-45	30.3	0.9	0.64	95.2	<0.02	0.12	0.08	4.2	0.5

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

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

Inter-Mountain Laboratories, Inc.
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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S1006234001

Project: Dugout Canyon Mine
Date Received: 6/14/2010

Date Reported: 7/22/2010
Work Order: S1006234

Lab ID	Sample ID	Depths Inches	Available Sodium meq/100g	Exchangeable Sodium meq/100g
S1006234-001	G-30-02	0-3	0.02	<0.01
S1006234-002	G-30-02	3-8	0.03	0.03
S1006234-003	G-30-02	8-30	0.02	0.02
S1006234-004	G-30-02	30-60	0.03	<0.01
S1006234-005	G-30-01	0-3	0.01	<0.01
S1006234-006	G-30-01	3-8	0.02	0.01
S1006234-007	G-30-01	8-12	0.03	0.02
S1006234-008	DUG-5-2 /6-29	0-2	0.02	<0.01
S1006234-009	DUG-5-2 /6-29	2-9	0.02	<0.01
S1006234-010	DUG-5-2 /6-29	9-16	0.02	<0.01
S1006234-011	DUG-5-2 /6-29	16-30	0.01	<0.01
S1006234-012	DUG-5-2 /6-29	30-45	0.02	0.01

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Karen Secor, Soil Lab Supervisor

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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S1006234001

Project: Dugout Canyon Mine
Date Received: 6/14/2010

Date Reported: 7/22/2010
Work Order: S1006234

Lab ID	Sample ID	Depths Inches	Total Sulfur %	T.S. AB t/1000t	Neutral. Potential t/1000t	T.S. ABP t/1000t	Sulfate Sulfur %	Pyritic Sulfur %	Organic Sulfur %	PyriticS AB t/1000t	PyriticS ABP t/1000t
S1006234-001	G-30-02	0-3	0.03	1.03	10.6	9.61	0.02	<0.01	<0.01	<0.01	10.6
S1006234-002	G-30-02	3-8	0.02	0.64	14.2	13.6	<0.01	<0.01	0.01	<0.01	14.2
S1006234-003	G-30-02	8-30	0.01	0.42	236	235	<0.01	<0.01	0.01	<0.01	236
S1006234-004	G-30-02	30-60	0.02	0.47	200	200	<0.01	<0.01	0.01	<0.01	200
S1006234-005	G-30-01	0-3	0.04	1.23	69.6	68.3	0.01	0.01	0.01	0.43	69.2
S1006234-006	G-30-01	3-8	0.04	1.18	20.4	19.3	0.02	<0.01	0.01	<0.01	20.4
S1006234-007	G-30-01	8-12	0.02	0.60	143	142	<0.01	<0.01	<0.01	<0.01	143
S1006234-008	DUG-5-2 /G-29	0-2	0.04	1.24	214	213	0.01	0.02	0.01	0.48	213
S1006234-009	DUG-5-2 /G-29	2-9	0.03	1.08	178	177	<0.01	0.01	0.02	0.43	178
S1006234-010	DUG-5-2 /G-29	9-16	0.03	0.82	222	221	<0.01	<0.01	0.02	<0.01	222
S1006234-011	DUG-5-2 /G-29	16-30	0.03	0.84	239	238	0.01	<0.01	<0.01	<0.01	239
S1006234-012	DUG-5-2 /G-29	30-45	0.02	0.57	300	299	<0.01	<0.01	0.01	<0.01	300

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Reviewed by: Karen A Secor

Karen Secor, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.
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(307) 672-8945

Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0705521001

Project: Dugout Canyon Mine
Date Received: 5/29/2007

Date: 7/9/2007
Work Order: S0705521

Lab ID	Sample ID	Depths Inches	pH s.u.	Saturation %	Electrical Conductivity dS/m	Field Capacity %	Wilt Point %
S0705521-001	G-31 SP1	0-6	7.7	41.7	0.29	16	15
S0705521-002	G-31 SP1	6-24	7.8	39.6	0.26	16	15
S0705521-003	G-31 SP1	24-33	7.9	40.2	0.24	18	15
S0705521-004	97 SP1	0-6	7.0	46.6	0.35	18	15
S0705521-005	97 SP1	6-27	7.8	43.1	0.32	18	16
S0705521-006	62 SP1	0-7	7.6	48.7	0.33	18	18
S0705521-007	62 SP1	7-22	7.9	34.4	0.24	15	13
S0705521-008	62 SP1	22-36	7.8	40.3	0.23	16	17
S0705521-009	G-18 SP1	0-7	7.6	46.3	0.37	18	16
S0705521-010	G-18 SP1	7-21	7.8	46.9	0.34	16	17
S0705521-011	13 SP1	0-10	7.8	42.5	0.34	14	15
S0705521-012	13 SP1	10-26	7.9	40.7	0.30	15	15

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0705521001

Project: Dugout Canyon Mine
Date Received: 5/29/2007

Date: 7/9/2007
Work Order: S0705521

Lab ID	Sample ID	Depths Inches	Calcium meq/L	Magnesium meq/L	Sodium meq/L	Potassium meq/L	SAR	Available Sodium meq/100g	Exchangeable Sodium meq/100g
S0705521-001	G-31 SP1	0-6	3.33	0.30	0.18	0.07	0.13	0.38	0.37
S0705521-002	G-31 SP1	6-24	4.06	0.33	0.27	0.06	0.18	0.28	0.27
S0705521-003	G-31 SP1	24-33	2.42	0.37	0.19	0.06	0.16	0.30	0.30
S0705521-004	97 SP1	0-6	2.44	0.69	0.25	0.09	0.20	0.05	0.04
S0705521-005	97 SP1	6-27	2.30	0.53	0.23	0.05	0.19	0.32	0.31
S0705521-006	62 SP1	0-7	2.27	0.58	0.20	0.20	0.17	0.31	0.31
S0705521-007	62 SP1	7-22	1.48	0.55	0.21	0.17	0.21	0.17	0.16
S0705521-008	62 SP1	22-36	1.53	0.59	0.14	0.15	0.14	0.34	0.33
S0705521-009	G-18 SP1	0-7	2.41	0.55	0.13	0.17	0.11	0.18	0.17
S0705521-010	G-18 SP1	7-21	2.70	0.58	0.22	0.08	0.17	0.36	0.35
S0705521-011	13 SP1	0-10	3.38	0.36	0.08	0.08	0.06	0.27	0.27
S0705521-012	13 SP1	10-26	2.97	0.37	0.12	0.04	0.10	0.23	0.23

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
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Report ID: S0705521001

Project: Dugout Canyon Mine
Date Received: 5/29/2007

Date: 7/9/2007
Work Order: S0705521

Lab ID	Sample ID	Depths Inches	Sand %	Silt %	Clay %	Texture	Coarse Fragment %
S0705521-001	G-31 SP1	0-6	29.0	36.0	35.0	Clay Loam	0.88
S0705521-002	G-31 SP1	6-24	29.0	37.0	34.0	Clay Loam	1.32
S0705521-003	G-31 SP1	24-33	31.0	40.0	29.0	Clay Loam	0.78
S0705521-004	97 SP1	0-6	43.0	27.0	30.0	Clay Loam	0.02
S0705521-005	97 SP1	6-27	38.0	34.0	28.0	Clay Loam	0.91
S0705521-006	62 SP1	0-7	29.0	43.0	28.0	Clay Loam	6.54
S0705521-007	62 SP1	7-22	46.0	34.0	20.0	Loam	0.02
S0705521-008	62 SP1	22-36	24.0	48.0	28.0	Clay Loam	0.11
S0705521-009	G-18 SP1	0-7	35.0	41.0	24.0	Loam	2.45
S0705521-010	G-18 SP1	7-21	24.0	56.0	20.0	Silt Loam	0.65
S0705521-011	13 SP1	0-10	30.0	40.0	30.0	Clay Loam	4.56
S0705521-012	13 SP1	10-26	24.0	48.0	28.0	Clay Loam	0.58

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0705521001

Project: Dugout Canyon Mine
Date Received: 5/29/2007

Date: 7/9/2007
Work Order: S0705521

Lab ID	Sample ID	Depths Inches	Boron ppm	TKN %	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0705521-001	G-31 SP1	0-6	0.29	0.12	3.06	1.46	<0.02
S0705521-002	G-31 SP1	6-24	0.25	0.09	1.03	1.36	<0.02
S0705521-003	G-31 SP1	24-33	0.24	0.08	0.47	0.44	<0.02
S0705521-004	97 SP1	0-6	0.34	0.15	4.54	0.70	<0.02
S0705521-005	97 SP1	6-27	0.46	0.11	1.60	0.18	<0.02
S0705521-006	62 SP1	0-7	0.28	0.10	4.98	12.7	<0.02
S0705521-007	62 SP1	7-22	0.15	0.04	0.59	1.83	<0.02
S0705521-008	62 SP1	22-36	0.20	0.05	0.86	0.76	<0.02
S0705521-009	G-18 SP1	0-7	0.43	0.17	6.51	1.23	<0.02
S0705521-010	G-18 SP1	7-21	0.27	0.10	1.06	0.26	<0.02
S0705521-011	13 SP1	0-10	0.31	0.12	2.85	0.55	<0.02
S0705521-012	13 SP1	10-26	0.28	0.09	1.46	<0.01	<0.02

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Canyon Fuel Company

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P.O. Box 1029
Wellington, UT 84542

Report ID: S0705521001

Project: Dugout Canyon Mine
Date Received: 5/29/2007

Date: 7/9/2007
Work Order: S0705521

Lab ID	Sample ID	Depths Inches	Total Sulfur %	T.S. AB t/1000t	Neut. Pot. t/1000t	T.S. ABP t/1000t	Total Carbon %	TOC %
S0705521-001	G-31 SP1	0-6	0.01	0.45	213	212	3.3	0.7
S0705521-002	G-31 SP1	6-24	0.01	0.35	257	256	3.6	0.5
S0705521-003	G-31 SP1	24-33	0.04	1.23	309	308	4.3	0.6
S0705521-004	97 SP1	0-6	<0.01	<0.01	14.4	14.4	1.1	1.0
S0705521-005	97 SP1	6-27	0.01	0.39	142	141	2.3	0.6
S0705521-006	62 SP1	0-7	0.02	0.77	91.4	90.6	2.1	1.0
S0705521-007	62 SP1	7-22	0.01	0.33	136	136	1.5	<0.1
S0705521-008	62 SP1	22-36	<0.01	<0.01	126	126	1.8	0.2
S0705521-009	G-18 SP1	0-7	0.01	0.41	70.7	70.3	1.7	0.9
S0705521-010	G-18 SP1	7-21	<0.01	<0.01	188	188	2.7	0.4
S0705521-011	13 SP1	0-10	0.03	0.84	213	212	3.2	0.7
S0705521-012	13 SP1	10-26	0.04	1.11	258	257	3.5	0.4

These results apply only to the samples tested.

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

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

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0909250001

Project: Dugout Canyon Mine
Date Received: 9/14/2009

Date Reported: 10/8/2009
Work Order: S0909250

Lab ID	Sample ID	pH	Saturation	Electrical Conductivity	Field Capacity	Wilt Point	PE Calcium	PE Magnesium	PE Potassium	PE Sodium	SAR
		s.u.	%	dS/m	%	%	meq/L	meq/L	meq/L	meq/L	
S0909250-001	G-25	7.7	46.3	0.48	45	14	2.66	0.87	0.07	0.76	0.57
S0909250-002	G-26	7.4	43.9	0.45	28	12	3.66	0.73	0.10	0.16	0.11

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0909250001

Project: Dugout Canyon Mine
Date Received: 9/14/2009

Date Reported: 10/8/2009
Work Order: S0909250

Lab ID	Sample ID	Sand %	Silt %	Clay %	Texture	CO3 %	Nitrogen Nitrate ppm	Selenium ppm	Boron ppm	Phosphorus ppm	TKN %
S0909250-001	G-25	26.0	45.0	29.0	Clay Loam	21.4	5.2	<0.02	0.49	6.47	<0.01
S0909250-002	G-26	38.0	41.0	21.0	Loam	11.2	2.1	<0.02	0.35	11.6	<0.01

These results apply only to the samples tested.

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

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

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Soil Analysis Report

Canyon Fuel Company

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0909250001

Project: Dugout Canyon Mine
Date Received: 9/14/2009

Date Reported: 10/8/2009
Work Order: S0909250

Lab ID	Sample ID	Available Potassium ppm	Available Sodium meq/100g	Exchangeable Sodium meq/100g	Total Carbon %	TOC %	Neutral. Potential t/1000t
S0909250-001	G-25	90.7	0.18	0.14	3.1	0.5	214
S0909250-002	G-26	96.0	0.02	0.01	2.5	1.2	112

These results apply only to the samples tested.

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

Reviewed by: Karen A Secor
[illegible]n Secor, Soil Lab Supervisor

ATTACHMENT 2-2

TOPSOIL CALCULATIONS

add to the back of existing information

Volume Report 10/15/2009 14:57
Comparing Grid: C:/Documents and Settings/svasten/Desktop/25a Base.grd
and Grid: C:/Documents and Settings/svasten/Desktop/25a Final.grd
Grid corner locations: 89230.17,89762.89 to 89623.00,90123.58
Grid resolution X: 100, Y: 100 Grid cell size X: 3.93, Y: 3.61
Area in Cut : 0.0 S.F., 0.00 Acres
Area in Fill: 1,793.5 S.F., 0.04 Acres
Total inclusion area: 1,793.5 S.F., 0.04 Acres
Cut to Fill ratio: 0.00
Average Fill Depth: 2.92
Max Fill Depth: 6.64
Cut (C.Y.) / Area (acres): 0.00
Fill (C.Y.) / Area (acres): 4708.62
Cut volume: 0.0 C.F., 0.00 C.Y.
Fill volume: 5,234.3 C.F., 193.86 C.Y.

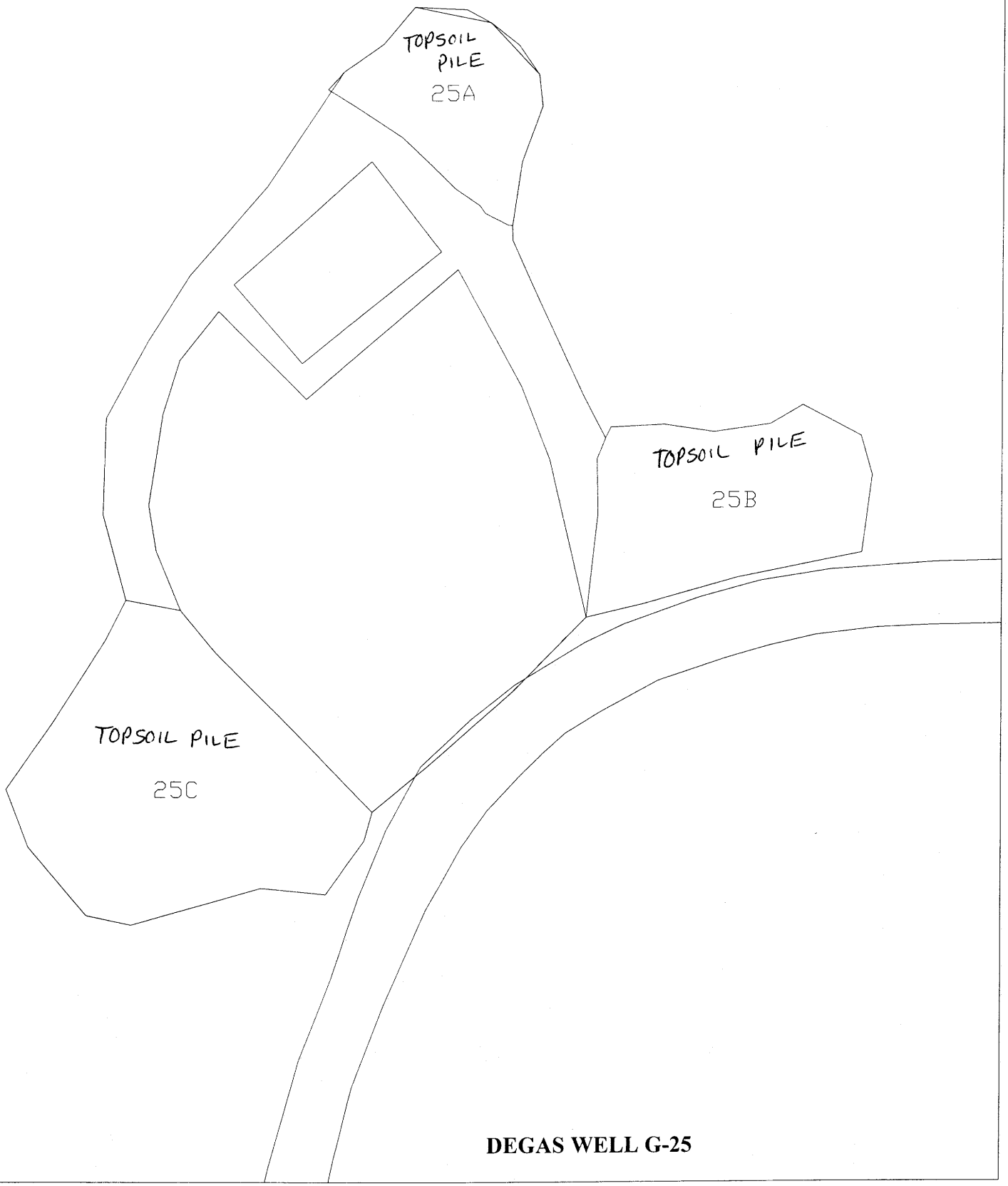
Volume Report 10/15/2009 14:58
Comparing Grid: C:/Documents and Settings/svasten/Desktop/25b Base.grd
and Grid: C:/Documents and Settings/svasten/Desktop/25b Final.grd
Grid corner locations: 89230.17,89762.89 to 89623.00,90123.58
Grid resolution X: 100, Y: 100 Grid cell size X: 3.93, Y: 3.61
Area in Cut : 0.6 S.F., 0.00 Acres
Area in Fill: 2,952.9 S.F., 0.07 Acres
Total inclusion area: 2,953.4 S.F., 0.07 Acres
Cut to Fill ratio: 0.00
Average Cut Depth: 0.02 Average Fill Depth: 2.05
Max Cut Depth: 0.05 Max Fill Depth: 6.16
Cut (C.Y.) / Area (acres): 0.01
Fill (C.Y.) / Area (acres): 3305.22
Cut volume: 0.0 C.F., 0.00 C.Y.
Fill volume: 6,050.7 C.F., 224.10 C.Y.

Volume Report 10/15/2009 14:30
Comparing Grid: C:/Documents and Settings/svasten/Desktop/25c Base.grd
and Grid: C:/Documents and Settings/svasten/Desktop/25c Final.grd
Grid corner locations: 89230.17,89762.89 to 89623.00,90123.58
Grid resolution X: 100, Y: 100 Grid cell size X: 3.93, Y: 3.61
Area in Cut : 1.6 S.F., 0.00 Acres
Area in Fill: 4,988.1 S.F., 0.11 Acres
Total inclusion area: 4,989.7 S.F., 0.11 Acres
Cut to Fill ratio: 0.00
Average Cut Depth: 0.05 Average Fill Depth: 3.59
Max Cut Depth: 0.10 Max Fill Depth: 9.01
Cut (C.Y.) / Area (acres): 0.03
Fill (C.Y.) / Area (acres): 5788.04
Cut volume: 0.1 C.F., 0.00 C.Y.
Fill volume: 17,901.3 C.F., 663.01 C.Y.

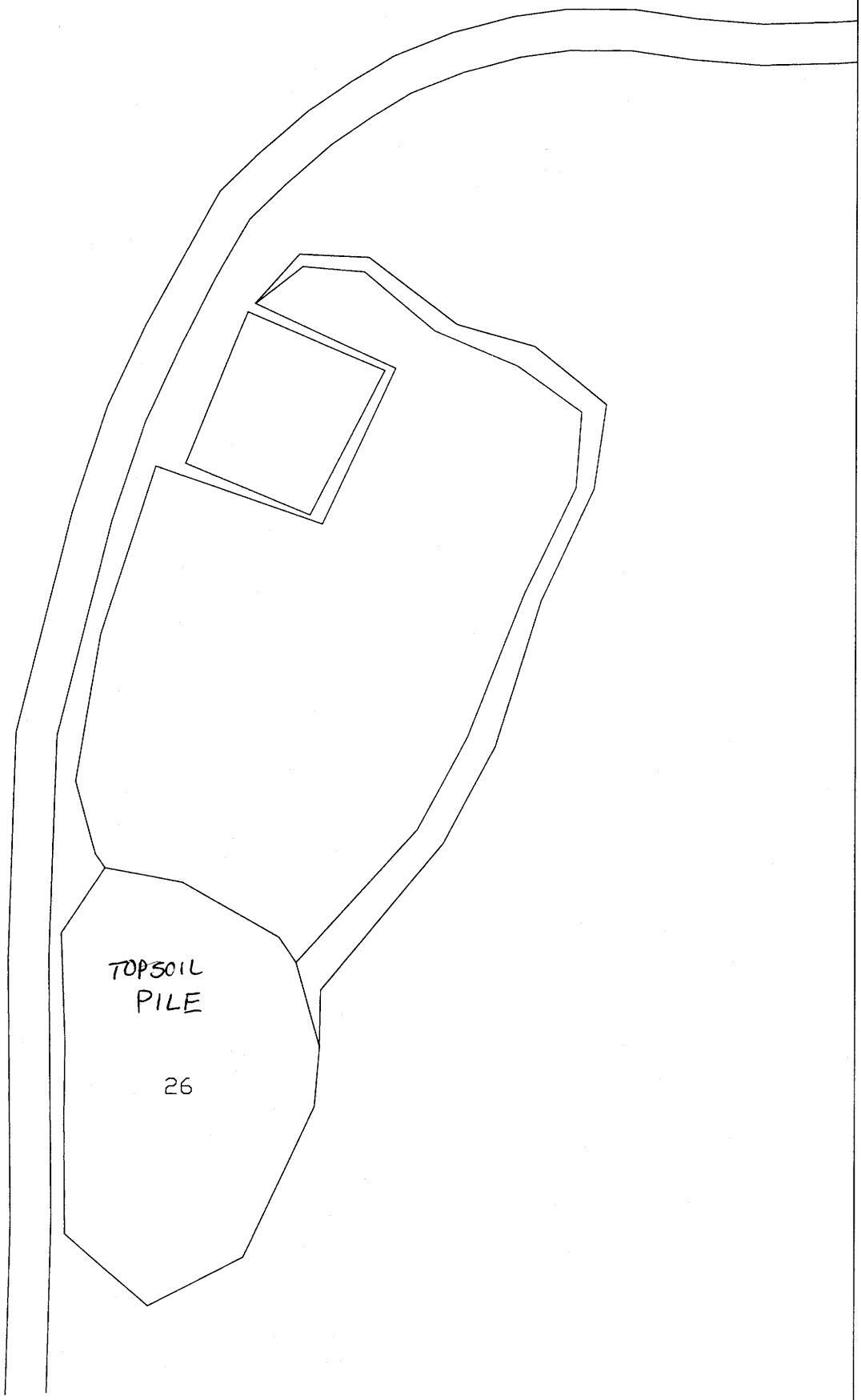
DEGAS WELL G-25 - 1081 CY

Volume Report 10/15/2009 12:36
Comparing Grid: C:/Documents and Settings/svasten/Desktop/26 Base.grd
and Grid: C:/Documents and Settings/svasten/Desktop/26 Final.grd
Grid corner locations: 86870.81,88979.51 to 87143.53,89199.08
Grid resolution X: 100, Y: 100 Grid cell size X: 2.73, Y: 2.20
Area in Cut : 85.7 S.F., 0.00 Acres
Area in Fill: 6,153.5 S.F., 0.14 Acres
Total inclusion area: 6,239.2 S.F., 0.14 Acres
Cut to Fill ratio: 0.00
Average Cut Depth: 0.01 Average Fill Depth: 4.07
Max Cut Depth: 0.08 Max Fill Depth: 11.65
Cut (C.Y.) / Area (acres): 0.24
Fill (C.Y.) / Area (acres): 6468.77
Cut volume: 0.9 C.F., 0.03 C.Y.
Fill volume: 25,016.6 C.F., 926.54 C.Y.

DEGAS WELL G-26 - 927 CY



DEGAS WELL G-25



DEGAS WELL G-26