C/007/0041
Task ID #4802
Received 2/17/15

WEST RIDGE RESOURCES, INC.
P.O. Box 910, East Carbon, Utah 84520 794 North "C" Canyon Rd, East Carbon, Utah 84520
Telephone (435) 888-4000 Fax (435) 888-4002

March 2, 2015

Utah Division of Oil, Gas & Mining
Utah Coal Program
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, UT 84114-5801

Attn: Daron Haddock
Permit Supervisor

Re: West Ridge Mine C/007/041
2014 Annual Report

Dear Mr. Haddock,

Attached you will find the 2014 Annual Report for the West Ridge Mine.

If you have any questions, or need any additional information regarding this submittal, please contact me directly at 435-888-4000.

Sincerely,

David Hibbs
UtahAmerican Energy, Inc.
President/Chief Engineer

2014

Annual Report

General Information

Print Form | Submit by Email | Reset Form

Annual Report

This Annual Report shows information the Division has for your mine. Submit the completed document and any additional information identified in the Appendices to the Division by the date specified in the cover letter. During a complete inspection an inspector will check and verify the information.

GENERAL INFORMATION

Company Name	West Ridge Resources	Mine Name	West Ridge Mine
Permit Number	C/007/0041	Permit expiration Date	
Operator Name		Phone Number	
Mailing Address		Email	
City			
State		Zip Code	

		DOGM File Location or Annual Report Location
Excess Spoil Piles	☐ Required ☒ Not Required	
Refuse Piles	☐ Required ☐ Not Required	
Impoundments	☒ Required ☐ Not Required	Sediment Pond Annual Certification Included
Other:		

OPERATOR COMMENTS

REVIEWER COMMENTS ☐ Met Requirements ☐ Did Not meet Requirements

COMMITMENTS AND CONDITIONS

The Permittee is responsible for ensuring annual technical commitments in the Mining and Reclamation Plan and conditions accepted with the permit are completed throughout the year. The Division has identified these commitments below and has provided space for you to report what you have done during the past year for each commitment. If additional written response is required, it should be filed as an attachment to this report.

Title: EXPERIMENTAL FIELD TRIALS
Objective: Monitoring to support proposed experimental practice. Provide a comparison of growth on field trials with Douglas/Fir reference area.
Frequency: Annual evaluation in June
Status: Ongoing
Reports: Provide in annual report
Citation: MRP, Volume 1, Appendix 2-6 and Volume A, Map 2-4

Operator Comments

The required Vegetation Monitoring at the Experimental Test Plot prepared by Mt. Nebo Scientific, is included.

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

Title: SOIL SAMPLING OF FILL AT T1, T2 AND T3
Objective: To protect buried substitute topsoil in the fill. Collect a composite sample from several locations near each site to obtain a more average value.
Frequency: Annual evaluation during field season.
Status: Ongoing beginning in 2010.
Reports: Annual report
Citation: MRP, Volume 1, Appendix 2-6 addendum and Volume A, Map 2-4

Operator Comments

ıe Soil Sampling of Fill at T1, T2, and T3 prepared by Mt Nebo Scientific is included.

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

Title: SUBSIDENCE MONITORING
Objective: To monitor subsidence from longwall mining practices. Subsidence monitoring of panels until the effects of mining have stabilized and vertical movement is less than six inches per year.
Frequency: annual
Status: Ongoing
Reports: annual report
Citation: MRP, Volume 2, Chapter 5, page 5-23b to 5-23e

Operator Comments

Subsidence Monitoring information is included.

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

FUTURE COMMITMENTS AND CONDITIONS

The following commitments are not required for the current annual report year, but will be required by the permittee in the future as indicated by the "status" field. These commitments are included for information only, and do not currently require action. If you feel that the commitment is no longer relevant or needs to be revised, please contact the Division.

Title: RECLAMATION MONITORING
Objective: Visually assess the revegetation success.
Frequency: Quarterly for the first three years and annually in June of each year thereafter
Status: Implement at reclamation
Reports: Annual Report
Citation: MRP, Volume 1, Chapter 3, page 3-16, paragraph 2

Title: MEXICAN SPOTTED OWL SURVEY
Objective: Conduct appropriate surveys for Mexican spotted owls on the lease tract areas with 40 percent or greater slopes, cliff habitat areas, riparian habitats, and mixed conifer forest habitats, prior to any future surface disturbing activity and/or any mining activity with the potential to interrupt surface spring flows. Inventory work must be conducted by parties approved and permitted for such survey work by the Fish and Wildlife Service and qualified in accordance with R645-301-132. Surveys must follow current protocol established by Fish and wildlife service.
Frequency: As needed
Status: ongoing
Reports: Annual
Citation: Permit condition attachment A, special condition #3.

Title: SOIL SAMPLING OF FINAL GRADED FILL AT CATCHMENTS A, C AND E
Objective: At final reclamation, the reclaimed surface soils of the catchments will be tested for pH, EC and SAR to allow for the evaluation of the salinity and the need for a revision or addition to the final seed mix to enhance germination and establishment.
Frequency: Once after final grading
Status: Future commitment
Reports: Provide information to the Division
Citation: MRP, Volume 2, Appendix 5-15, Attachment 9, page 14

OPERATOR COMMENTS (OPTIONAL)

REVIEWER COMMENTS

REPORTING OF OTHER TECHNICAL DATA

Please list other technical data or information that was not included in the form above, but is required under the approved plan, which must be periodically submitted to the Division.

Please list attachments:

Reviewer Comments

MAPS

Copies of mine maps, current and up-to-date, are to be provided to the Division as an attachment to this report in accordance with the requirements of R645-301-525.240. The map copies shall be made in accordance with 30 CFR 75.1200 as required by MSHA. Mine maps are not considered confidential.

Map Name	Map Number	Included		Confidential	
		Yes	No	Yes	No
Annual subsidence map		☐	☐	☐	☒
Mine Map		☐	☐	☐	☒
		☐	☐	☐	☐
		☐	☐	☐	☐
		☐	☐	☐	☐

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

2014

Annual Report

Sediment Information

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT		Page 1 of

Permit Number	ACT/007/041	**Report Date**	November 19, 2014
Mine Name	West Ridge Mine		
Company Name	UtahAmerican Energy, Inc		
Impoundment Identification	**Impoundment Name**	None	
	Impoundment Number	None	
	UPDES Permit Number	UTG040023	
	MSHA ID Number	42-02233	

IMPOUNDMENT INSPECTION

Inspection Date	November 19, 2014
Inspected By	Karin Odendahl
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	4th Quarter & Annual

1. **Describe any appearance of any instability, structural weakness, or any other hazardous condition.**

No appearance of instability, structural weakness, or any other hazardous condition was observed at the time of inspection.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. **Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.**

Sediment Elevations:

Cell A (Upper)		Cell B (Lower)	
60%	6942.8'	60%	6928.8'
100%	6945.4'	100%	6930.0'

Current Sediment Levels:

Cell A (Upper)	Cell B (Lower)
6943.8'	6928.4'

3. **Principle and emergency spillway elevations.**

Cell A (Upper)		Cell B (Lower)	
Principle	6952.5'	Principle	6937.0'
Emergency	-------	Emergency	6938.0'

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Approximately 3 feet of water in Cell A (Upper). Starting to freeze over.

Approximately 1 foot of water in the bottom corner of Cell B (Lower). Starting to freeze over.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

No changes in geometry have occurred.
No observable conditions were apparent that could affect the stability or function of the structures.

The water elevation is far below the spillway in Cell A (Upper) and in Cell B (Lower). I do not foresee any discharge within the near future.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ **Date:** 11-19-14

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT		Page 3 of

CERTIFIED REPORT

IMPOUNDMENT EVALUATION (If NO, explain under Comments)	YES	NO
1. Is impoundment designed and constructed in accordance with the approved plan?	XXXXX	
2. Is impoundment free of instability, structural weakness, or any other hazardous condition?	XXXXX	
3. Has the impoundment met all applicable performance standards and effluent limitations from the previous date of inspection?	XXXXX	

COMMENTS AND OTHER INFORMATION

NONE

Certification Statement:

[Professional Engineer Stamp]
REGISTERED PROFESSIONAL ENGINEER
152606
R. JAY MARSHALL
11/19/14
STATE OF UTAH

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself or under my direction and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability in accordance with the Utah R645 Coal Mining Rules.

By: Robert Jay Marshall Engineer
(Full Name and Title)

Signature: R. Jay Marshall Date: 11/19/14

P.E. Number & State: 152606 Utah

2014

Annual Report

Vegetation Monitoring

Information

Vegetation Monitoring at the Experimental Test Plot

2014

at the

West Ridge Mine,
Carbon County, Utah

Prepared by

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

Patrick D. Collins, Ph.D.

for

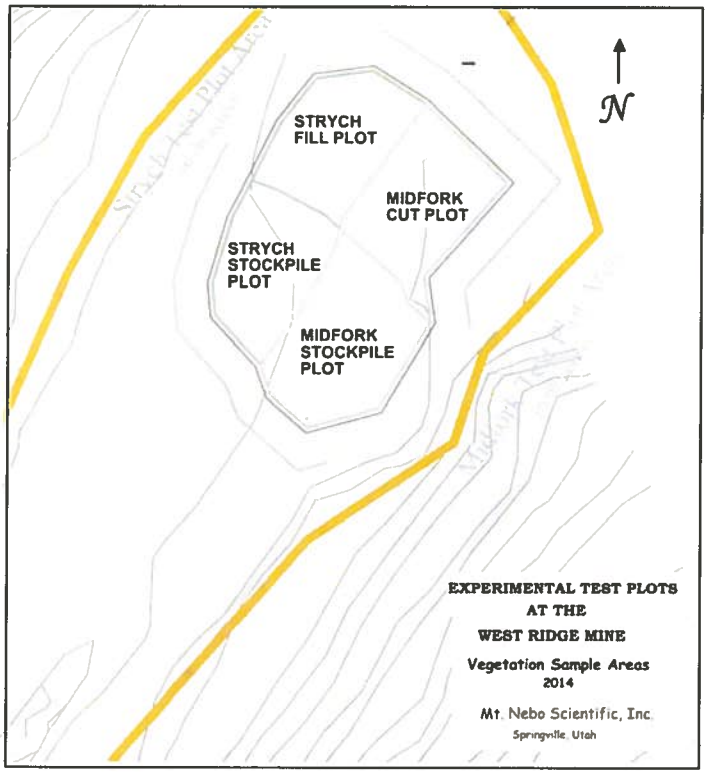
ANDALEX RESOURCES, INC.
West Ridge Mine
P.O. Box 910
East Carbon, Utah 84520

February 2015

TABLE OF CONTENTS

INTRODUCTION

As described in the West Ridge Mine's, Mining & Reclamation Plan (MRP), *Experimental Practice Test Plots* were constructed at the site in 1999 (see the Plot Layout below). These plots were created to simulate final reclamation of those soils that have been left in-place (as opposed to the more common practice to remove and stockpile them). They were covered by a geotextile layer (as a means for preservation of the in-place topsoil), identified with marker strips (to facilitate locating them at the time of reclamation), covered with fill (to simulate the material used to cover the mine pad areas during operations), then covered with other topsoil material, and finally seeded with the *interim* seed mixture for erosion control.



In 2005, or six years following the initial test plot construction, the above procedures were reversed in an attempt to imitate final reclamation and revegetation of the mine site. Or, the fill and topsoil were removed until the marker strips were exposed. These materials were then returned to their place of origin. The geotextile material was then removed exposing the topsoil and subsoil that was left "in-place", followed by re-seeding the area with the seed mixture formulated for *final* revegetation.

This document was prepared to report the current (2014) status and condition of specific parameters for the vegetation of the Experimental Test Plots at the West Ridge Mine.

As a means to retain the following useful information here, in a letter to West Ridge Resources from Priscilla Burton (2009)[1], the following additional comments regarding the history of the Experimental Test Plots were stated:

- The work began with removing stinging nettle seed heads from a patch of nettle that completely covered the Midfork Stockpile Area.
- Certified noxious weed-free alfalfa hay was gouged into the regraded site (copy of certification was attached to the Inspection Report #717).
- There was no application of straw and wood fiber mulch tackifier.
- There was no soil amendment added based upon visual observation of vegetative cover, but soil samples were taken to document the soil chemistry.
- Soils were sampled from the test plots after they were regraded. The Brigham Young University Soil and Plant Analysis Lab analysis is dated October 4, 2005. (***NOTE:*** *The 2005 laboratory report has been provided in the appendix of this report*).
- The seeding was done on October 31, 2005.
- According to information received by the Division on September 10, 2005, the seed mix outlined in Table 3-2B (*in MRP, Appendix 2-6*) was modified due to availability: Sandberg bluegrass replaced muttongrass (*Poa fendleriana*) and neither canyon sweetvetch nor rocky mountain maple were commercially available and were not included in the seed mix.
- Containerized plants shown on Table 3-2B (*in MRP, Appendix 2-6*) were not available and not planted.
- A vegetative analysis was conducted in August 2008 and results are presented in an addendum to Appendix 2-6 (*in MRP*) .
- Burton (2009) speculates that the predominance of stinging nettle in the Midfork Cut plot may have resulted from the Midfork Stockpile area (the source of the Midfork Cut topsoil) that was covered with stinging nettle and the root propagules and seed were more than likely carried over with the soil.
- The Strych Stockpile Area is the only plot that represents the experimental practice of burial and storage in place. A comparison of the Strych Stockpile area and the Strych Fill area is the test of the conventional technique versus the experimental technique in the same soil type.

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[1] Burton, P. 2009. Test plot evaluation and soil monitoring reports, C/007/00041, West Ridge Mine, Task ID #3111. *In:* Letter from D. Haddock. April 16, 2009, State of Utah, Division of Oil, Gas & Mining, Salt Lake City, UT.

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 August 14, 2014. The reference area proposed to ultimately be compared with this plot for revegetation success standards, was sampled during the growing season of 1998. These data were also presented herein for general comparisons with the results of quantitative sampling conducted in 2014 on the test plots.

Sampling Design and Transect/Quadrat Placement

Quadrat sample locations were chosen using random numbers 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. Plant nomenclature follows *A Utah Flora* (Welsh et al., 2008)[2]

[2] Welsh, S.L., N.D. Atwood, S. Goodrich and L.C. Higgins. 2008. A Utah flora. Print Services, Brigham Young University, Provo, UT. 1019 pp.

Woody Species Density

Density of woody plant species was not assessed because very few or no trees or shrubs were present on the plots.

Photographs

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

Raw Data

The raw data have been summarized on a spreadsheet and is available upon request by the operator or DOGM.

RESULTS

Midfork Cut

The Midfork Cut plot (Photo 1) was largely dominated by thickspike wheatgrass (*E. lanceolatus*), stinging nettle (*Urtica dioica*), Kentucky bluegrass (*Poa pratensis*) and western wheatgrass (*Elymus smithii*). For a list of all plant species by cover and frequency found in the test plot, refer to Table 1.

Table 1: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

MIDFORK CUT

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Achillea millefolium	1.00	3.00	10.00
Geranium richardsonii	1.00	3.00	10.00
Linum lewisii	5.00	5.00	50.00
Urtica dioica	15.00	7.89	90.00
GRASSES			
Elymus lanceolatus	16.00	8.60	100.00
Elymus smithii	8.50	6.34	70.00
Elymus spicatus	4.44	4.97	50.00
Poa pratensis	14.50	8.79	90.00

Table 2: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

MIDFORK CUT

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	66.50	3.91
Litter	19.50	6.50
Bareground	5.90	2.07
Rock	8.10	6.28
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	34.03	8.23
Grasses	65.97	8.23

Total living cover of the plot was estimated at 66.50% (Table 2-A). The living cover was comprised of 65.97% grasses, 34.03% forbs with no shrubs present in the sample quadrats (Table 2-B).

Midfork Stockpile

The dominant plant species represented in the Midfork Stockpile (Photo 2) were thickspike wheatgrass, Lewis flax (*Linum lewisii*), bluebunch wheatgrass (*Elymus spicatus*) and western wheatgrass (Table 3).

Table 3: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

MIDFORK STOCKPILE

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Hedysarum boreale	1.00	2.00	20.00
Linum lewisii	14.00	10.68	70.00
Urtica dioica	3.50	4.50	40.00
GRASSES			
Elymus lanceolatus	15.50	13.68	60.00
Elymus smithii	12.00	8.43	80.00
Elymus spicatus	13.50	11.19	70.00
Poa pratensis	7.50	12.09	40.00

The total living cover for the Midfork Stockpile plot was estimated at 67.00% (Table 4-A). The composition of the living cover was comprised of 30.50% forbs, 69.50% grasses and no shrubs (Table 4-B.) .

Table 4: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

MIDFORK STOCKPILE

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	67.00	11.66
Litter	20.20	8.33
Bareground	6.60	4.10
Rock	6.20	7.08
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	30.50	19.63
Grasses	69.50	19.63

Strych Stockpile

The Strych Stockpile plot (Photo 3) was dominated by Lewis flax, thickspike wheatgass, bluebunch wheatgrass and western wheatgrass (Table 5).

Table 5: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

STRYCH STOCKPILE

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Hedysarum boreale	2.00	4.00	20.00
Linum lewisii	20.00	10.25	80.00
Urtica dioica	4.50	6.87	30.00
GRASSES			
Elymus lanceolatus	15.50	10.06	80.00
Elymus smithii	9.00	5.83	80.00
Elymus spicatus	12.00	7.14	90.00
Poa pratensis	2.50	5.12	20.00

The total living cover of the plot was estimated at 65.50% (Table 6-A); this cover consisted of 59.27% grasses and 40.73% forbs with no woody species present (Table 6-B).

Table 6: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

STRYCH STOCKPILE

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	65.50	3.50
Litter	14.50	9.34
Bareground	9.30	4.94
Rock	10.70	6.96
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	40.73	16.98
Grasses	59.27	16.98

Strych Fill

The Strych Fill plot's (Photo 4) dominant plant species were Kentucky bluegrass, Lewis flax, thickspike wheatgrass, bluebunch wheatgrass and stinging nettle. All species encountered in the plots are shown on Table 7.

Total living cover of the Strych Fill plot was estimated at 62.50% (Table 8-A). The living understory cover composition was comprised of 65.45% grasses and 34.55% forbs (Table 8-B).

Table 7: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

STRYCH FILL	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Linum lewisii	13.00	7.81	90.00
Urtica dioica	8.50	8.67	60.00
GRASSES			
Elymus lanceolatus	11.00	9.17	80.00
Elymus smithii	5.50	6.50	50.00
Elymus spicatus	9.00	8.60	60.00
Poa pratensis	15.50	11.72	70.00

Table 8: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

STRYCH FILL		
A. TOTAL COVER	**Mean Percent**	**Standard Deviation**
Total Living Cover	62.50	7.16
Litter	19.00	8.00
Bareground	7.90	7.53
Rock	10.60	6.73
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	34.55	10.02
Grasses	65.45	10.02

Douglas Fir/Maple Reference Area

The existing Douglas Fir/Maple Reference Area (Photo 5) was chosen to ultimately be compared to the test plots and other sites at the time of final reclamation. Each year this dataset is included with the Experimental Test Plot monitoring data for a general comparison only. When the final revegetation is compared to the reference area, the sampling will be accomplished during the same growing season.

Understory in the Douglas Fir/Maple Reference Area was dominated by bigtooth maple (*Acer grandidentatum*), mountain lover (*Pachistima myrsinites*), and Oregon grape (*Mahonia repens*). Overstory dominants were bigtooth maple and Douglas fir (*Pseudotsuga menziesii*). A list of all species present in the sample quadrats for the reference area is shown in Table 9.

The total living cover of the reference area was estimated at 63.63% of which overstory and understory cover was nearly equally represented at 31.38% and 32.25%, respectively (Table 10-A). Woody species comprised 61.57% of the total living understory cover, followed by forbs at 25.33% and grasses at 13.10% (Table 10-B).

Table 9. West Ridge Mine: Reference Area. Total Cover, Standard Deviation and Frequency by Species (1998).

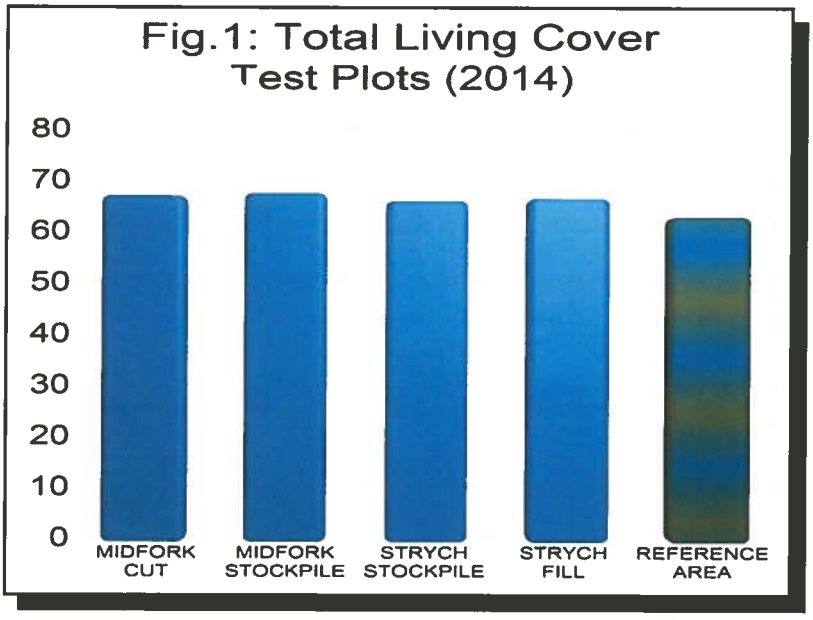
DOUGLAS FIR/ MAPLE COMMUNITY REFERENCE AREA (NEW)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY COVER			
Acer grandidentatum	15.88	21.30	50.00
Juniperus scopulorum	1.38	6.22	5.00
Pseudotsuga menziesii	14.13	20.67	45.00
UNDERSTORY COVER			
TREES & SHRUBS			
Acer grandidentatum	6.18	11.30	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
Descurainia 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
Taraxacum 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 10. 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	13.10	19.14	40

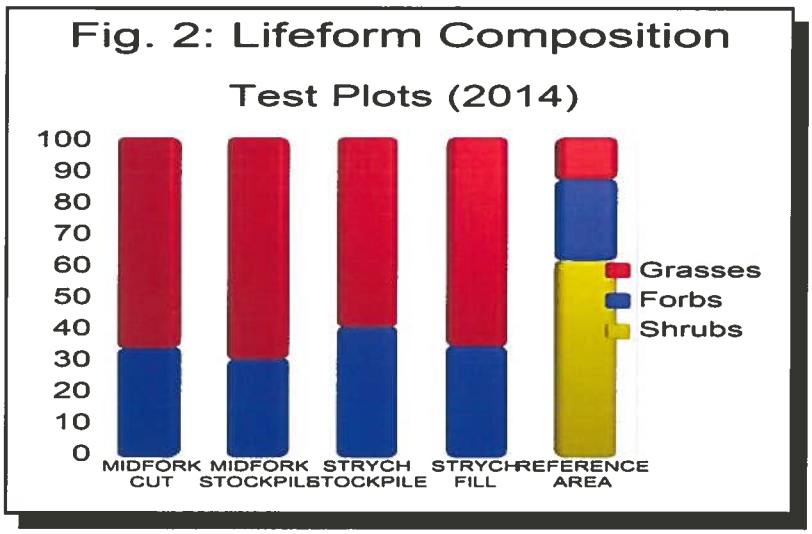
DISCUSSION

Results for the 2014 sample period were similar to the previous years. Like previous years, stinging nettle was prevalent in the Midfork Cut and Strych Fill plots. Although not necessarily an undesirable species, it is interesting to note where the plant was dominant. Comments about this have been provided by (Burton 2009)[1] described in the



INTRODUCTION of this document. Also similar to previous year, Lewis flax was the most important forb species in the plots. All grasses appear to be doing well with different species sometimes dominating the plots.

A graphic representation of the *total living cover* can be observed on Fig 1. As can be noted from the figure and also the data summary tables in this report (as well as previous years' monitoring reports), there was not a great deal of difference between the total living cover in the plots that represented soils that remained *in-place* to those that represented soils of the more typical scenario of first *stockpiling* the topsoil and then returning it at the time of revegetation. Most of the total living cover values for the test plots were similar to that of the reference area.



For lifeform composition, the most obvious observation was that there were very few woody species present in the test plots, especially when compared to the Reference Area is (Fig. 2).

COLOR PHOTOGRAPHS OF THE SAMPLE AREAS

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

APPENDIX

Laboratory Analyses
(2005)

10/05/2005 10:18 FAX 4220005 002

BRIGHAM YOUNG UNIVERSITY

Soil and Plant Analysis Laboratory
255 WIDB
Provo, UT 84602
801-422-2147

Plant and Animal Science Department

SOIL TEST REPORT
AND
RECOMMENDATIONS

Name Gary Gray-West Ridge Resources
Street PO Box 790
Lehi UT 84043
City State Zip

Date: 04-Oct-05
Time: 11 12 AM
Telephone:
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
Strych Fill area	Turf	7.31	43.00	35.16	21.84	Loam		4.56

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	7.17	X					apply 2.6 lbs of N/1000 sq ft
Phosphorus ppm P	9.29		X				apply 1.4 lbs of P2O5/1000 sq ft
Potassium ppm K	672.00					X	no fertilizer needed
Salinity-ECe dS/m	1.06		X				no salinity problem
SAR-Sodium Absorption Ratio	0.17	X					no sodium hazard
Calcium-SAR ppm Ca	227.20						
Potassium SAR ppm K	33.60						
Magnesium SAR ppm Mg	25.12						
Sodium SAR ppm Na	10.08						
HCO3 ppm HCO3	592.29						
% moisture sat. % sat	30.60						
Ca Carbonate %CaCO3	19.47						
Total N ppm total N	983.70						
% rock %	20.14						

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Soil and Plant Analysis Laboratory
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Provo, UT 84602
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Plant and Animal Science Department

SOIL TEST REPORT
AND
RECOMMENDATIONS

Name Gary Gray-West Ridge Resources
Street PO Box 790
Lehi UT 84043
City State Zip

Date: 04-Oct-05
Time: 11:12 AM
Telephone:
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
Strych stockpile area	Turf	7.62	42.00	33.16	24.84	Loam		2.69

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	10.50		X				apply 2.1 lbs of N/1000 sq ft
Phosphorus ppm P	5.70	X					apply 2.1 lbs of P2O5/1000 sq ft
Potassium ppm K	448.00					X	no fertilizer needed
Salinity-ECe dS/m	0.77	X					no salinity problem
SAR-Sodium Absorption Ratio	0.34	X					no sodium hazard
Calcium-SAR ppm Ca	136.48						
Potassium SAR ppm K	22.40						
Magnesium SAR ppm Mg	32.32						
Sodium SAR ppm Na	17.28						
HCO3 ppm HCO3	432.63						
% moisture sat. % sat	30.05						
Ca Carbonate %CaCO3	20.25						
Total N ppm total N	502.60						
% rock %	15.14						

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Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
Midfork cut area	Turf	7.27	40.00	36.16	23.84	Loam		5.67

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	16.80		X				apply 2.1 lbs of N/1000 sq ft
Phosphorus ppm P	13.14		X				apply 1.4 lbs of P2O5/1000 sq ft
Potassium ppm K	566.40					X	no fertilizer needed
Salinity-ECe dS/m	0.98	X					no salinity problem
SAR-Sodium Absorption Ratio	0.13	X					no sodium hazard
Calcium-SAR ppm Ca	205.12						
Potassium SAR ppm K	28.32						
Magnesium SAR ppm Mg	24.64						
Sodium SAR ppm Na	7.20						
HCO3 ppm HCO3	669.64						
%moisture sat % sat	52.97						
Ca Carbonate %CaCO3	16.00						
Total N ppm total N	923.60						
% rock %	10.11						

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Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
Midfork stockpile area	Turf	7.39	35	39.16	25.84	Loam		4.59

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	7.46	X					apply 2.8 lbs of N/1000 sq ft
Phosphorus ppm P	13.76		X				apply 1.4 lbs of P2O5/1000 sq ft
Potassium ppm K	592.00					X	no fertilizer needed
Salinity-ECe dS/m	0.90	X					no salinity problem
SAR-Sodium Absorption Ratio	0.19	X					no sodium hazard
Calcium-SAR ppm Ca	188.48						
Potassium SAR ppm K	29.80						
Magnesium SAR ppm Mg	23.84						
Sodium SAR ppm Na	10.56						
HCO3 ppm HCO3	545.84						
%moisture sat. % sat.	48.25						
Ca Carbonate %CaCO3	10.83						
Total N ppm total N	975.80						
% rock %	10.65						

Vegetation Monitoring at the Experimental Test Plot

2014

at the

West Ridge Mine,
Carbon County, Utah

Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
P.O. Box 337
Springville, Utah 84663
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Patrick D. Collins, Ph.D.

for

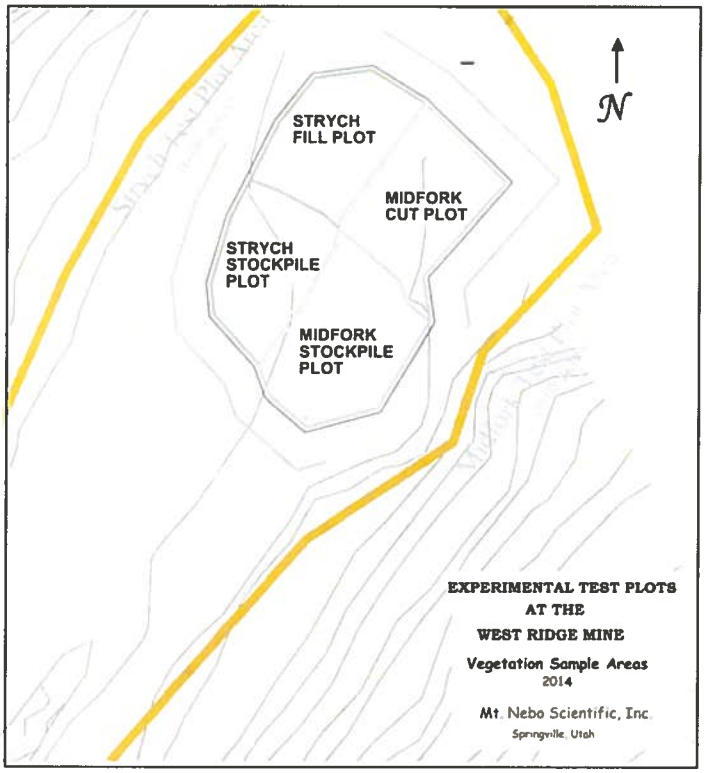
ANDALEX RESOURCES, INC.
West Ridge Mine
P.O. Box 910
East Carbon, Utah 84520

February 2015

TABLE OF CONTENTS

INTRODUCTION

As described in the West Ridge Mine's, Mining & Reclamation Plan (MRP), *Experimental Practice Test Plots* were constructed at the site in 1999 (see the Plot Layout below). These plots were created to simulate final reclamation of those soils that have been left in-place (as opposed to the more common practice to remove and stockpile them). They were covered by a geotextile layer (as a means for preservation of the in-place topsoil), identified with marker strips (to facilitate locating them at the time of reclamation), covered with fill (to simulate the material used to cover the mine pad areas during operations), then covered with other topsoil material, and finally seeded with the *interim* seed mixture for erosion control.



In 2005, or six years following the initial test plot construction, the above procedures were reversed in an attempt to imitate final reclamation and revegetation of the mine site. Or, the fill and topsoil were removed until the marker strips were exposed. These materials were then returned to their place of origin. The geotextile material was then removed exposing the topsoil and subsoil that was left "in-place", followed by re-seeding the area with the seed mixture formulated for *final* revegetation.

This document was prepared to report the current (2014) status and condition of specific parameters for the vegetation of the Experimental Test Plots at the West Ridge Mine.

As a means to retain the following useful information here, in a letter to West Ridge Resources from Priscilla Burton (2009)[1], the following additional comments regarding the history of the Experimental Test Plots were stated:

- The work began with removing stinging nettle seed heads from a patch of nettle that completely covered the Midfork Stockpile Area.
- Certified noxious weed-free alfalfa hay was gouged into the regraded site (copy of certification was attached to the Inspection Report #717).
- There was no application of straw and wood fiber mulch tackifier.
- There was no soil amendment added based upon visual observation of vegetative cover, but soil samples were taken to document the soil chemistry.
- Soils were sampled from the test plots after they were regraded. The Brigham Young University Soil and Plant Analysis Lab analysis is dated October 4, 2005. (***NOTE:*** *The 2005 laboratory report has been provided in the appendix of this report*).
- The seeding was done on October 31, 2005.
- According to information received by the Division on September 10, 2005, the seed mix outlined in Table 3-2B (*in MRP, Appendix* 2-6) was modified due to availability: Sandberg bluegrass replaced muttongrass (*Poa fendleriana*) and neither canyon sweetvetch nor rocky mountain maple were commercially available and were not included in the seed mix.
- Containerized plants shown on Table 3-2B (*in MRP, Appendix* 2-6) were not available and not planted.
- A vegetative analysis was conducted in August 2008 and results are presented in an addendum to Appendix 2-6 (*in MRP*) .
- Burton (2009) speculates that the predominance of stinging nettle in the Midfork Cut plot may have resulted from the Midfork Stockpile area (the source of the Midfork Cut topsoil) that was covered with stinging nettle and the root propagules and seed were more than likely carried over with the soil.
- The Strych Stockpile Area is the only plot that represents the experimental practice of burial and storage in place. A comparison of the Strych Stockpile area and the Strych Fill area is the test of the conventional technique versus the experimental technique in the same soil type.

---

[1] Burton, P. 2009. Test plot evaluation and soil monitoring reports, C/007/00041, West Ridge Mine, Task ID #3111. *In:* Letter from D. Haddock. April 16, 2009, State of Utah, Division of Oil, Gas & Mining, Salt Lake City, UT.

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 August 14, 2014. The reference area proposed to ultimately be compared with this plot for revegetation success standards, was sampled during the growing season of 1998. These data were also presented herein for general comparisons with the results of quantitative sampling conducted in 2014 on the test plots.

Sampling Design and Transect/Quadrat Placement

Quadrat sample locations were chosen using random numbers 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. Plant nomenclature follows *A Utah Flora* (Welsh et al., 2008)[2]

---

[2] Welsh, S.L., N.D. Atwood, S. Goodrich and L.C. Higgins. 2008. A Utah flora. Print Services, Brigham Young University, Provo, UT. 1019 pp.

Woody Species Density

Density of woody plant species was not assessed because very few or no trees or shrubs were present on the plots.

Photographs

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

Raw Data

The raw data have been summarized on a spreadsheet and is available upon request by the operator or DOGM.

RESULTS

Midfork Cut

The Midfork Cut plot (Photo 1) was largely dominated by thickspike wheatgrass (*E. lanceolatus*), stinging nettle (*Urtica dioica*), Kentucky bluegrass (*Poa pratensis*) and western wheatgrass (*Elymus smithii*). For a list of all plant species by cover and frequency found in the test plot, refer to Table 1.

Table 1: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

MIDFORK CUT

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Achillea millefolium	1.00	3.00	10.00
Geranium richardsonii	1.00	3.00	10.00
Linum lewisii	5.00	5.00	50.00
Urtica dioica	15.00	7.89	90.00
GRASSES			
Elymus lanceolatus	16.00	8.60	100.00
Elymus smithii	8.50	6.34	70.00
Elymus spicatus	4.44	4.97	50.00
Poa pratensis	14.50	8.79	90.00

Table 2: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

MIDFORK CUT

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	66.50	3.91
Litter	19.50	6.50
Bareground	5.90	2.07
Rock	8.10	6.28
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	34.03	8.23
Grasses	65.97	8.23

Total living cover of the plot was estimated at 66.50% (Table 2-A). The living cover was comprised of 65.97% grasses, 34.03% forbs with no shrubs present in the sample quadrats (Table 2-B).

Midfork Stockpile

The dominant plant species represented in the Midfork Stockpile (Photo 2) were thickspike wheatgrass, Lewis flax (*Linum lewisii*), bluebunch wheatgrass (*Elymus spicatus*) and western wheatgrass (Table 3).

Table 3: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

MIDFORK STOCKPILE

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Hedysarum boreale	1.00	2.00	20.00
Linum lewisii	14.00	10.68	70.00
Urtica dioica	3.50	4.50	40.00
GRASSES			
Elymus lanceolatus	15.50	13.68	60.00
Elymus smithii	12.00	8.43	80.00
Elymus spicatus	13.50	11.19	70.00
Poa pratensis	7.50	12.09	40.00

The total living cover for the Midfork Stockpile plot was estimated at 67.00% (Table 4-A). The composition of the living cover was comprised of 30.50% forbs, 69.50% grasses and no shrubs (Table 4-B.) .

Table 4: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

MIDFORK STOCKPILE

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	67.00	11.66
Litter	20.20	8.33
Bareground	6.60	4.10
Rock	6.20	7.08
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	30.50	19.63
Grasses	69.50	19.63

Strych Stockpile

The Strych Stockpile plot (Photo 3) was dominated by Lewis flax, thickspike wheatgass, bluebunch wheatgrass and western wheatgrass (Table 5).

Table 5: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

STRYCH STOCKPILE

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Hedysarum boreale	2.00	4.00	20.00
Linum lewisii	20.00	10.25	80.00
Urtica dioica	4.50	6.87	30.00
GRASSES			
Elymus lanceolatus	15.50	10.06	80.00
Elymus smithii	9.00	5.83	80.00
Elymus spicatus	12.00	7.14	90.00
Poa pratensis	2.50	5.12	20.00

The total living cover of the plot was estimated at 65.50% (Table 6-A); this cover consisted of 59.27% grasses and 40.73% forbs with no woody species present (Table 6-B).

Table 6: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

STRYCH STOCKPILE

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	65.50	3.50
Litter	14.50	9.34
Bareground	9.30	4.94
Rock	10.70	6.96
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	40.73	16.98
Grasses	59.27	16.98

Strych Fill

The Strych Fill plot's (Photo 4) dominant plant species were Kentucky bluegrass, Lewis flax, thickspike wheatgrass, bluebunch wheatgrass and stinging nettle. All species encountered in the plots are shown on Table 7.

Total living cover of the Strych Fill plot was estimated at 62.50% (Table 8-A). The living understory cover composition was comprised of 65.45% grasses and 34.55% forbs (Table 8-B).

Table 7: West Ridge Mine Experimental Test Plots. Living Cover and Frequency by Plant Species (2014).

STRYCH FILL

	Mean Percent	Standard Deviation	Percent Frequency
FORBS			
Linum lewisii	13.00	7.81	90.00
Urtica dioica	8.50	8.67	60.00
GRASSES			
Elymus lanceolatus	11.00	9.17	80.00
Elymus smithii	5.50	6.50	50.00
Elymus spicatus	9.00	8.60	60.00
Poa pratensis	15.50	11.72	70.00

Table 8: West Ridge Mine Experimental Test Plots. Total Cover and Composition (2014).

STRYCH FILL

A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	62.50	7.16
Litter	19.00	8.00
Bareground	7.90	7.53
Rock	10.60	6.73
B. % COMPOSITION		
Shrubs	0.00	0.00
Forbs	34.55	10.02
Grasses	65.45	10.02

Douglas Fir/Maple Reference Area

The existing Douglas Fir/Maple Reference Area (Photo 5) was chosen to ultimately be compared to the test plots and other sites at the time of final reclamation. Each year this dataset is included with the Experimental Test Plot monitoring data for a general comparison only. When the final revegetation is compared to the reference area, the sampling will be accomplished during the same growing season.

Understory in the Douglas Fir/Maple Reference Area was dominated by bigtooth maple (*Acer grandidentatum*), mountain lover (*Pachistima myrsinites*), and Oregon grape (*Mahonia repens*). Overstory dominants were bigtooth maple and Douglas fir (*Pseudotsuga menziesii*). A list of all species present in the sample quadrats for the reference area is shown in Table 9.

The total living cover of the reference area was estimated at 63.63% of which overstory and understory cover was nearly equally represented at 31.38% and 32.25%, respectively (Table 10-A). Woody species comprised 61.57% of the total living understory cover, followed by forbs at 25.33% and grasses at 13.10% (Table 10-B).

Table 9. West Ridge Mine: Reference Area. Total Cover, Standard Deviation and Frequency by Species (1998).

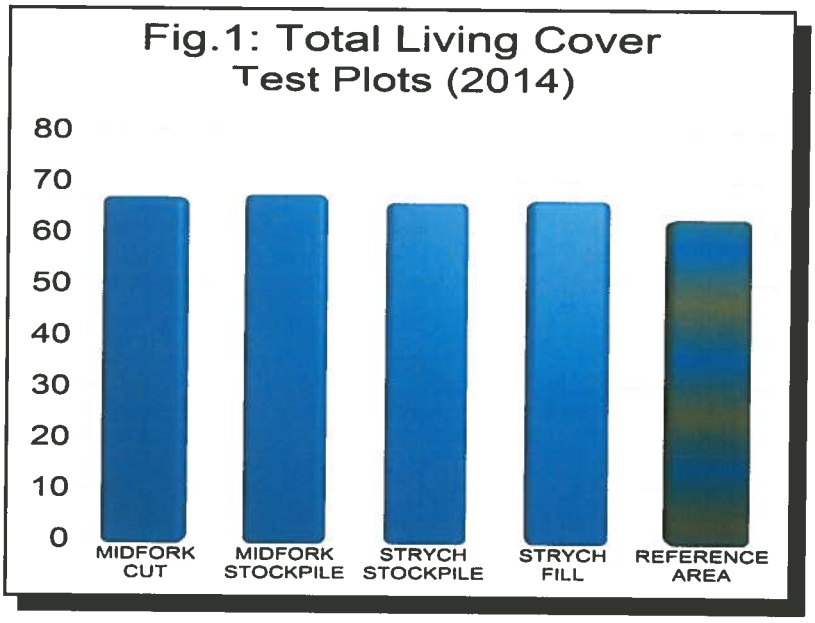
DOUGLAS FIR/ MAPLE COMMUNITY REFERENCE AREA (NEW)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY COVER			
Acer grandidentatum	15.88	21.30	50.00
Juniperus scopulorum	1.38	6.22	5.00
Pseudotsuga menziesii	14.13	20.67	45.00
UNDERSTORY COVER			
TREES & SHRUBS			
Acer grandidentatum	6.18	11.30	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
Descurainia 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
Taraxacum 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 10. 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	13.10	19.14	40

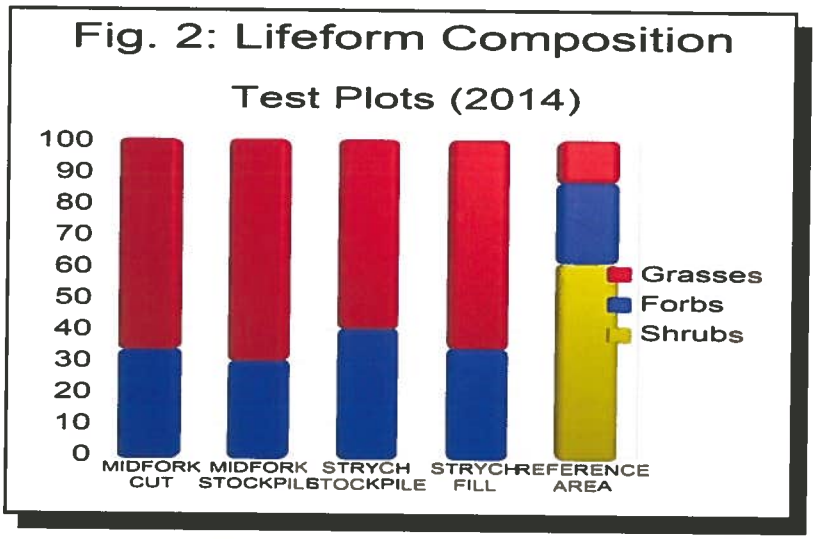
DISCUSSION

Results for the 2014 sample period were similar to the previous years. Like previous years, stinging nettle was prevalent in the Midfork Cut and Strych Fill plots. Although not necessarily an undesirable species, it is interesting to note where the plant was dominant. Comments about this have been provided by (Burton 2009)[1] described in the



INTRODUCTION of this document. Also similar to previous year, Lewis flax was the most important forb species in the plots. All grasses appear to be doing well with different species sometimes dominating the plots.

A graphic representation of the *total living cover* can be observed on Fig 1. As can be noted from the figure and also the data summary tables in this report (as well as previous years' monitoring reports), there was not a great deal of difference between the total living cover in the plots that represented soils that remained *in-place* to those that represented soils of the more typical scenario of first *stockpiling* the topsoil and then returning it at the time of revegetation. Most of the total living cover values for the test plots were similar to that of the reference area.



For lifeform composition, the most obvious observation was that there were very few woody species present in the test plots, especially when compared to the Reference Area is (Fig. 2).

COLOR PHOTOGRAPHS OF THE SAMPLE AREAS

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

APPENDIX

Laboratory Analyses
(2005)

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Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
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Potassium ppm K	672.00					X	no fertilizer needed
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SAR-Sodium Absorption Ratio	0.17	X					no sodium hazard
Calcium-SAR ppm Ca	227.20						
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% moisture sat % sat	30.60						
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Strych stockpile area	Turf	7.62	42.00	33.16	24.84	Loam		2.69

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	10.50		X				apply 2.1 lbs of N/1000 sq ft
Phosphorus ppm P	5.70	X					apply 2.1 lbs of P2O5/1000 sq ft
Potassium ppm K	448.00					X	no fertilizer needed
Salinity-ECe dS/m	0.77	X					no salinity problem
SAR-Sodium Absorption Ratio	0.34	X					no sodium hazard
Calcium-SAR ppm Ca	136.48						
Potassium SAR ppm K	22.40						
Magnesium SAR ppm Mg	32.32						
Sodium SAR ppm Na	17.28						
HCO3 ppm HCO3	432.63						
% moisture sat. % sat	30.05						
Ca Carbonate %CaCO3	20.25						
Total N ppm total N	502.60						
% rock %	15.14						

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Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	16 80		X				apply 2.1 lbs of N/1000 sq ft
Phosphorus ppm P	13 14		X				apply 1.4 lbs of P2O5/1000 sq ft
Potassium ppm K	566.40					X	no fertilizer needed
Salinity-ECe dS/m	0.98	X					no salinity problem
SAR-Sodium Absorption Ratio	0 13	X					no sodium hazard
Calcium-SAR ppm Ca	205 12						
Potassium SAR ppm K	28.32						
Magnesium SAR ppm Mg	24 64						
Sodium SAR ppm Na	7.20						
HCO3 ppm HCO3	669.64						
%moisture sat % sat	52.97						
Ca Carbonate %CaCO3	16.00						
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801-422-2147

Plant and Animal Science Department

SOIL TEST REPORT
AND
RECOMMENDATIONS

Name Gary Gray-West Ridge Resources
Street PO Box 790
Lehi UT 84043
City State Zip

Date: 04-Oct-05
Time: 11:12 AM
Telephone:
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
Midfork stockpile area	Turf	7.39	35	39.16	25.84	Loam		4.59

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Nitrate-Nitrogen ppm N	7.46	X					apply 2.8 lbs of N/1000 sq ft
Phosphorus ppm P	13.76		X				apply 1.4 lbs of P2O5/1000 sq ft
Potassium ppm K	592.00					X	no fertilizer needed
Salinity-ECe dS/m	0.90	X					no salinity problem
SAR-Sodium Absorption Ratio	0.19	X					no sodium hazard
Calcium-SAR ppm Ca	188.48						
Potassium SAR ppm K	29.80						
Magnesium SAR ppm Mg	23.84						
Sodium SAR ppm Na	10.56						
HCO3 ppm HCO3	545.94						
%moisture sat. % sat.	48.25						
Ca Carbonate %CaCO3	10.83						
Total N ppm total N	975.80						
% rock %	10.65						

2014

Annual Report

Soil Monitoring

Information

Soil Monitoring
at the
West Ridge Mine, Utah
2014

Prepared
for
Andalex Resources, Inc.

Prepared by

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

Patrick D. Collins, Ph.D.

for

ANDALEX RESOURCES, INC.
West Ridge Mine
P.O. Box 910
East Carbon, Utah 84520

February 2015

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INTRODUCTION

As described in previous annual monitoring reports for the West Ridge Mine, an *'experimental practice'* for the protection of soil resources was designed and implemented at the site. The experimental practice was designed to test the effectiveness of burying soils in-place rather than salvaging (removing) them and returning them at the time of final reclamation. The in-situ topsoil was covered with a geotextile material and layer markers followed by fill material to create working areas for surface operations of the mine.

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Soil samples of the mine **pad areas** were taken by Patrick Collins (*Mt. Nebo Scientific, Inc.*) at the West Ridge Mine site in specified locations on September 11, 2001, November 25, 2008, July 2, 2009, July 22, 2010, September 1, 2011, August 30, 2012, August 23, 2013 and August 14, 2014. The *approximate* (see below) same locations were sampled all years and are shown on the attached map (Figure 1). Below are brief descriptions of these locations:

T1 *Located in the right fork, it was originally described to be 64 ft northwest of the jersey barrier in the center of the canyon. Because this location was so close to construction and where equipment was placed at the time, the sample was taken about 25 ft north of that location in 2008 and 2009. In 2010 there was a new building at the previous sample area, so the soil sample pit was re-located close-by, but 10 ft west of the northwest corner of the new building (2010 GPS name and UTM coordinates: WR T1, NAD 27, 12 S 548475 E, 4385176 N). In 2011-14, the sample was taken in the same place as described for 2010.*

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Soil sampling in the **Experimental Test Plots** was also conducted by Gary Gray, *P.E. (Andalex Resources)* in the fall of 2005 (more information about that is given later in the report).

Soil sample pits were hand-dug with a pick and shovel. A composite sample was taken at depths between 6 and 12 inches at each of the locations described above. Small amounts of soil material were taken at each depth and mixed in the field. Soils were analyzed by the Brigham Young University, Environmental Analytical Laboratory, Provo, Utah. Parameters and laboratory methods used are shown below.

pH	*ASA Mono. No. 9, Part 2, (2 ed), 1982. Method 10-3.2, page 171. Perform pH on saturated paste.*
ECe	*Electrical conductivity reported as mmhos/cm 25°C. ASA Mono. No. 9, Part 2, (2 ed), 1982. Method 10-3.3, page 172-173.*
SAR	*Sodium Adsorption Ratio. Calculated from soluble Ca, Mg and Na.*
$CaCO_3$	*Method S-13.20. Acetic acid dissolution method. Western States Laboratory Proficiency Testing Program. Soil and Plant Analytical Methods. 1998.*

RESULTS

The laboratory results for 2001, 2008, 2009, 2010, 2011, 2012 2013 and 2014 for the soils in the pad areas are shown on Table 1. The entire 2014 lab report has been included in the Appendix of this report; original lab reports for the other years were included in the respective sample reports for those years.

In 2008, some sample values exceeded acceptable levels according to DOGM soil guidelines; the parameters that exceeded the standards were EC and SAR in sample T3. The high concentration of salts (EC and SAR) was likely the result of road salt that is often placed in the travel areas at the mine to treat snow and ice. The road salts can also accumulate in the snow and on the coal trucks while using the haul road to and from the mine. This snow and salt no doubt can drop off the trucks while idling at the loadout site. By 2009, however, the salts appear to have leached below the sampling depths. In 2010, the SAR in T3 was high again and would be considered "poor" by Division standards, but again it was not in the "unacceptable" range. The mean values for the sample years rendered all parameter values within the acceptable limits according to Division Guidelines. Additionally, "acidification" of the soils will probably not be a problem due to the neutralizing or "buffering" effect caused by the high percentage of calcium carbonates (% $CaCO_3$) present in all samples. By 2011, the values for nearly all parameters were in the "good" range by Division standards (the one exception was the pH value in T1 where 8.4 put it in the "fair" range. In 2012, however, the sodium values (SAR) were again elevated in the T3 sample. This is an area that is constantly undergoing changes due to the onsite operations. Unless there was a laboratory problem, the explanation for the higher SAR and EC may be the same as described above in 2008.

In 2013 the pH values were in the "good" range for T2 and T3, but the "poor" range for T1. The mean of the three samples that year was 8.10, or would be considered "good". The EC values were "good" for T1 and T2 and "fair" for T3. All SAR values would be placed in the

"good" category. $CaCO_3$ values for T2 and T3 were "good", whereas T1 was "fair".

In 2014, the only notable value (rated at *poor*) was the EC in T3, the site that always has the most onsite activity associated with it and, as explained above, is often reflected in the yearly monitoring data.

As a side note, Priscilla Burton (DOGM) made the following request for the 2012 annual soil monitoring report.

> *"As I was reviewing the West Ridge annual report, I wondered if you could provide information on the variability of each parameter at each location T1, T2, T3 over time in the next (2012) annual report. i.e. calculate the mean and standard deviation for each row in Table 1 of the soils report. Thereby providing the range, mean and std dev. of values for pH, EC, SAR and ÊCO2 for each general location T1, T2, & T3."*

This was done in 2012-14 and the calculations are shown on Table 1.

Table 1: Laboratory Results for Soil Sampling in Mine Pad Areas at West Ridge Mine (2001, 2008, 2009, 2010, 2011, 2012, 2013 and 2014.

A. pH

Sample No.	2001	2008	2009	2010	2011	2012	2013	2014	Mean	SDev.***
T1	8.04	7.75	7.81	8.15	8.40	7.35	8.7**	7.50	7.96	0.42
T2	7.52	7.23	7.91	7.63	7.55	7.42	7.9	7.30	7.56	0.23
T3	7.83	8.42	8.21	7.82	7.35	7.59	7.7	7.40	7.79	0.35
Mean	7.80	7.80	7.98	7.87	7.77	7.45	8.10	7.40	7.77	0.22
SDev.	0.26	0.60	0.21	0.21	0.46	0.12	0.53	0.10	0.33	0.19

B. EC (Salinity or ECe dS/m)

T1	6.20	4.80	14.20	1.55	3.65	2.75	2.90	2.90	5.15	3.95
T2	2.70	4.80	0.62	1.90	3.20	3.00	2.30	3.10	2.65	1.19
T3	4.20	17.50*	3.50	4.80	2.70	5.40	6.00	11.30**	6.30	4.69
Mean	4.37	9.03	6.11	2.75	3.18	3.72	3.73	5.77	4.70	2.03
SDev.	1.76	7.33	7.16	1.46	0.39	1.46	1.99	4.79	3.14	2.64

C. SAR (Sodium Adsorption Ration; see Appendix A for lab data and units to calculate the SAR's)

T1	2.19	5.83	2.53	3.65	1.22	0.83	0.60	0.90	2.41	1.71
T2	0.74	4.14	0.14	0.74	0.77	1.91	0.30	1.00	1.25	1.29
T3	1.94	31.31*	7.07	12.26	0.96	21.91*	0.20	0.20	10.81	11.01
Mean	1.62	13.76	3.25	5.55	0.98	8.22	0.37	0.70	4.82	4.46
SDev.	0.78	15.22	3.52	4.89	0.18	11.87	0.21	0.44	5.40	5.57

D. $CaCO_3$ (% Calcium Carbonate)

T1	19.21	11.85	16.60	7.96	10.82	12.09	24.40	24.80	14.70	5.26
T2	5.10	11.25	10.77	6.18	12.38	4.80	6.00	12.90	8.07	3.01
T3	15.00	12.02	12.25	17.67	12.64	11.18	12.30	19.00	13.29	2.09
Mean	13.10	11.71	13.21	10.60	11.95	9.36	14.23	18.90	12.02	1.54
SDev.	7.24	0.40	3.03	5.05	0.80	3.97	9.35	5.95	4.45	3.06

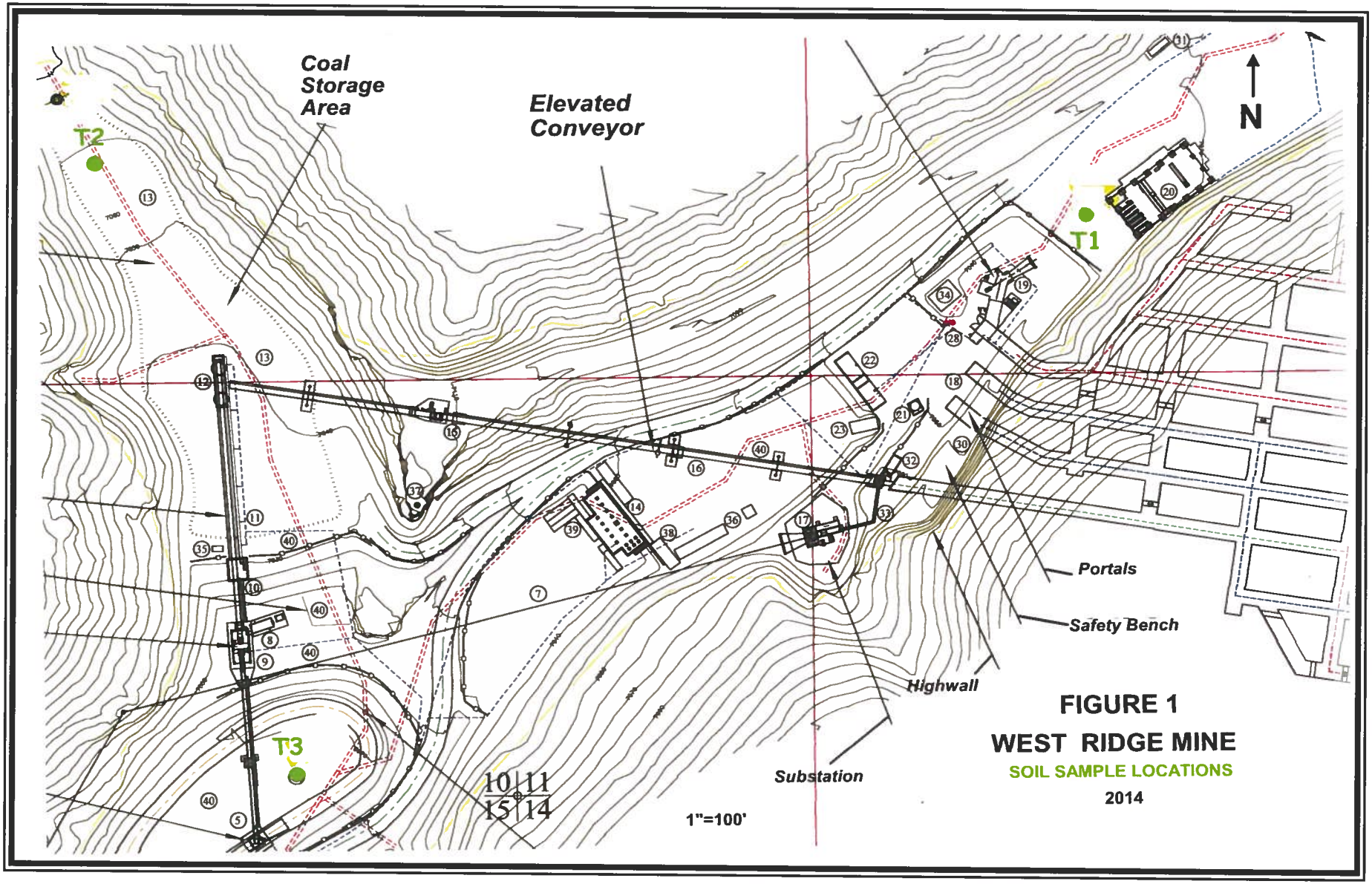
* Value considered "unacceptable" according evaluation in the Division soil guidelines.
** Value considered "poor" according to Division guidelines
*** Slightly different formulae were used for standard deviations between years; they have been adjusted to be consistent in this table.

As a means for comparison, Table 2 shows results of soil sampling in *the Experimental Test Plots* at the West Ridge Mine in 2005. These plots were created to simulate final reclamation of those soils that were left in-place, covered by a geotextile layer, marked with strips, then covered with fill material for the life of the mine. At the time of final reclamation the geotextile fabric, markers and fill will be removed thus exposing the native soils enabling revegetation to proceed. A similar process to test this reclamation design was implemented in the Experimental Test Plot area by placing material over existing soils, then later removing it, followed by revegetation techniques.

Table 2: Laboratory Results for Soil Sampling in Experimental Test Plot at West Ridge Mine (2005).*

	pH	EC	SAR	$CaCO_3$
Subplot Name				
Strych Fill	7.31	1.06	0.17	19.47
Strych Stockpile	7.62	0.77	0.34	20.25
Midfork Cut	7.27	0.98	0.13	16.00
Midfork Stockpile	7.39	0.90	0.19	10.83
Mean	7.40	0.93	0.21	16.64
SDev.	0.16	0.12	0.09	4.29

** Results are a subset showing specific parameters from the complete soil laboratory report prepared by Brigham Young University (October 4, 2005). Sampling was conducted by Gary Gray, P.E. from the West Ridge Mine. A complete copy of the lab report has been provided to DOGM.*


Coal
Storage
Area
Elevated
Conveyor
T2
T1
T3
N
Portals
Safety Bench
Highwall
Substation
10 11
15 14
1"=100'
FIGURE 1
WEST RIDGE MINE
SOIL SAMPLE LOCATIONS
2014

APPENDIX

(Laboratory Report)

BRIGHAM YOUNG UNIVERSITY

Environmental Analytical Laboratory
1026 LSB
Provo, UT 84602
801-422-2147

Plant and Wildlife Sciences Department

Name Mt. Nebo Scientific
Street
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 25-Aug-14
Telephone: 801-489-6937
Fax: 801-489-6779

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
T-1	Turf	7.5						

Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Salinity-ECe dS/m	2.9			X			no salinity problem
SAR-Sodium Absorption Ratio	0.9	X					no sodium hazard
Calcium-SAR ppm Ca	381						
Magnesium SAR ppm Mg	230						
Sodium SAR ppm Na	91						
Ca Carbonate %CaCO3	24.8						

Notes:

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Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
T-2	Turf	7.3						

Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Salinity-ECe dS/m	3.1			X			no salinity problem
SAR-Sodium Absorption Ratio	1.0	X					no sodium hazard
Calcium-SAR ppm Ca	495						
Magnesium SAR ppm Mg	194						
Sodium SAR ppm Na	104						
Ca Carbonate %CaCO3	12.9						

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T-3	Turf	7.4						

Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Salinity-ECe dS/m	11.3					X	salinity a problem for most crops
SAR-Sodium Absorption Ratio	0.2	X					no sodium hazard
Calcium-SAR ppm Ca	748						
Magnesium SAR ppm Mg	587						
Sodium SAR ppm Na	23						
Ca Carbonate %CaCO3	19.0						

Notes:

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Sample No.	2001	2008	2009	2010	2011	2012	2013	2014	Mean	SDev.***
A. pH										
T1	8.04	7.75	7.81	8.15	8.40	7.35	8.7**	7.50	7.96	0.42
T2	7.52	7.23	7.91	7.63	7.55	7.42	7.9	7.30	7.56	0.23
T3	7.83	8.42	8.21	7.82	7.35	7.59	7.7	7.40	7.79	0.35
Mean	7.80	7.80	7.98	7.87	7.77	7.45	8.10	7.40	7.77	0.22
SDev.	0.26	0.60	0.21	0.21	0.46	0.12	0.53	0.10	0.33	0.19
B. EC (Salinity or ECe dS/m)										
T1	6.20	4.80	14.20	1.55	3.65	2.75	2.90	2.90	5.15	3.95
T2	2.70	4.80	0.62	1.90	3.20	3.00	2.30	3.10	2.65	1.19
T3	4.20	17.50*	3.50	4.80	2.70	5.40	6.00	11.30**	6.30	4.69
Mean	4.37	9.03	6.11	2.75	3.18	3.72	3.73	5.77	4.70	2.03
SDev.	1.76	7.33	7.16	1.46	0.39	1.46	1.99	4.79	3.14	2.64
C. SAR (Sodium Adsorption Ration; see Appendix A for lab data and units to calculate the SAR's)										
T1	2.19	5.83	2.53	3.65	1.22	0.83	0.60	0.90	2.41	1.71
T2	0.74	4.14	0.14	0.74	0.77	1.91	0.30	1.00	1.25	1.29
T3	1.94	31.31*	7.07	12.26	0.96	21.91*	0.20	0.20	10.81	11.01
Mean	1.62	13.76	3.25	5.55	0.98	8.22	0.37	0.70	4.82	4.46
SDev.	0.78	15.22	3.52	4.89	0.18	11.87	0.21	0.44	5.40	5.57
D. $CaCO_3$ (% Calcium Carbonate)										
T1	19.21	11.85	16.60	7.96	10.82	12.09	24.40	24.80	14.70	5.26
T2	5.10	11.25	10.77	6.18	12.38	4.80	6.00	12.90	8.07	3.01
T3	15.00	12.02	12.25	17.67	12.64	11.18	12.30	19.00	13.29	2.09
Mean	13.10	11.71	13.21	10.60	11.95	9.36	14.23	18.90	12.02	1.54
SDev.	7.24	0.40	3.03	5.05	0.80	3.97	9.35	5.95	4.45	3.06

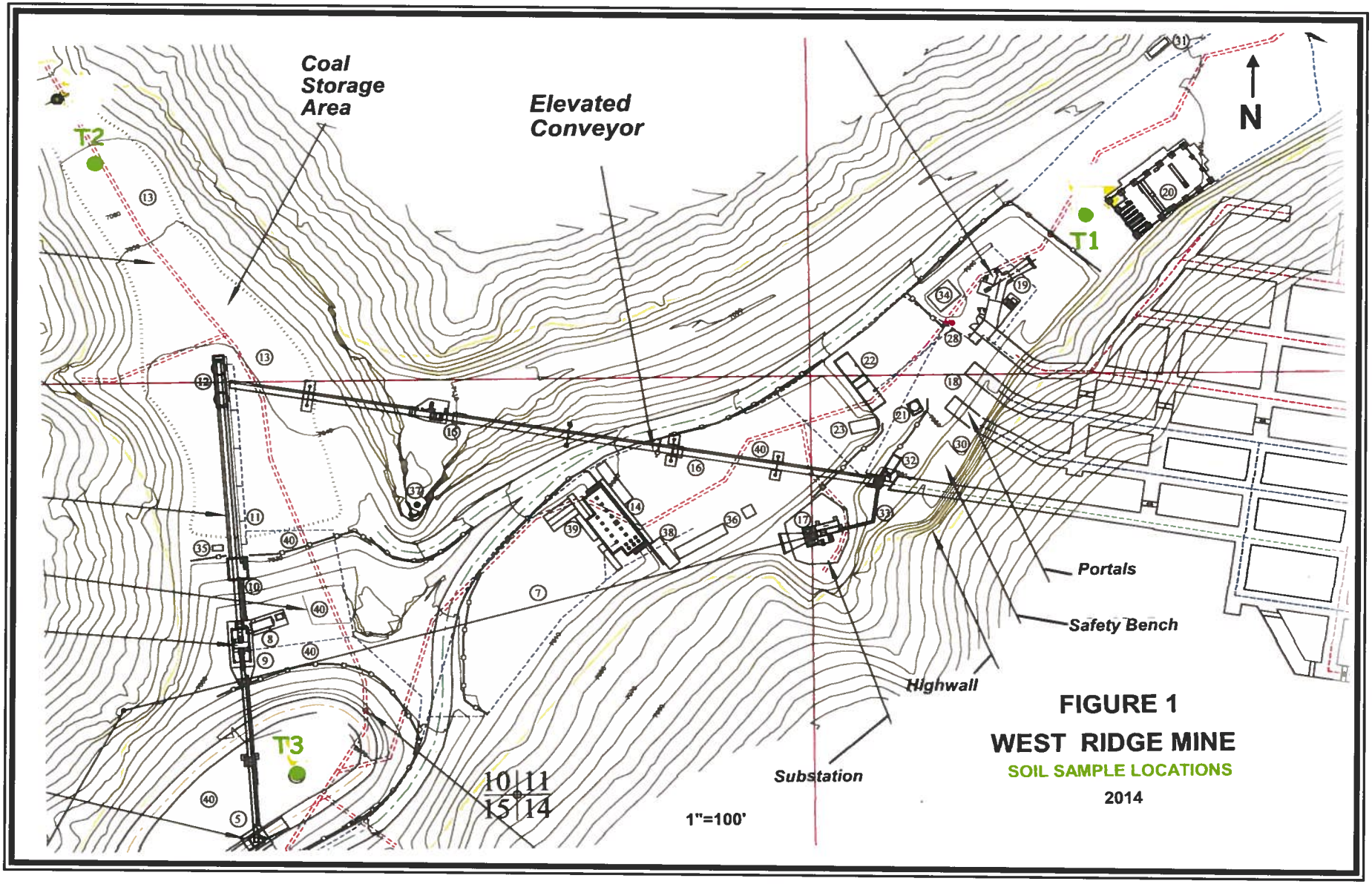
* Value considered "unacceptable" according evaluation in the Division soil guidelines.
** Value considered "poor" according to Division guidelines
*** Slightly different formulae were used for standard deviations between years; they have been adjusted to be consistent in this table.

As a means for comparison, Table 2 shows results of soil sampling in *the Experimental Test Plots* at the West Ridge Mine in 2005. These plots were created to simulate final reclamation of those soils that were left in-place, covered by a geotextile layer, marked with strips, then covered with fill material for the life of the mine. At the time of final reclamation the geotextile fabric, markers and fill will be removed thus exposing the native soils enabling revegetation to proceed. A similar process to test this reclamation design was implemented in the Experimental Test Plot area by placing material over existing soils, then later removing it, followed by revegetation techniques.

Table 2: Laboratory Results for Soil Sampling in Experimental Test Plot at West Ridge Mine (2005).*

	pH	EC	SAR	$CaCO_3$
Subplot Name				
Strych Fill	7.31	1.06	0.17	19.47
Strych Stockpile	7.62	0.77	0.34	20.25
Midfork Cut	7.27	0.98	0.13	16.00
Midfork Stockpile	7.39	0.90	0.19	10.83
Mean	7.40	0.93	0.21	16.64
SDev.	0.16	0.12	0.09	4.29

** Results are a subset showing specific parameters from the complete soil laboratory report prepared by Brigham Young University (October 4, 2005). Sampling was conducted by Gary Gray, P.E. from the West Ridge Mine. A complete copy of the lab report has been provided to DOGM.*


Coal Storage Area
Elevated Conveyor
T2
T1
T3
N
Portals
Safety Bench
Highwall
Substation
10 11
15 14
1"=100'
FIGURE 1
WEST RIDGE MINE
SOIL SAMPLE LOCATIONS
2014

APPENDIX

(Laboratory Report)

BRIGHAM YOUNG UNIVERSITY

Environmental Analytical Laboratory
1026 LSB
Provo, UT 84602
801-422-2147

Plant and Wildlife Sciences Department

Name Mt. Nebo Scientific
Street
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 25-Aug-14
Telephone: 801-489-6937
Fax: 801-489-6779

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
T-1	Turf	7.5						

Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Salinity-ECe dS/m	2.9			X			no salinity problem
SAR-Sodium Absorption Ratio	0.9	X					no sodium hazard
Calcium-SAR ppm Ca	381						
Magnesium SAR ppm Mg	230						
Sodium SAR ppm Na	91						
Ca Carbonate %CaCO3	24.8						

Notes:

BRIGHAM YOUNG UNIVERSITY

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SOIL TEST REPORT AND RECOMMENDATIONS

Date: 25-Aug-14
Telephone: 801-489-6937
Fax: 801-489-6779

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
T-2	Turf	7.3						

Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Salinity-ECe dS/m	3.1			X			no salinity problem
SAR-Sodium Absorption Ratio	1.0	X					no sodium hazard
Calcium-SAR ppm Ca	495						
Magnesium SAR ppm Mg	194						
Sodium SAR ppm Na	104						
Ca Carbonate %CaCO3	12.9						

Notes:

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City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 25-Aug-14
Telephone: 801-489-6937
Fax: 801-489-6779

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
T-3	Turf	7.4						

Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Salinity-ECe dS/m	11.3					X	salinity a problem for most crops
SAR-Sodium Absorption Ratio	0.2	X					no sodium hazard
Calcium-SAR ppm Ca	748						
Magnesium SAR ppm Mg	587						
Sodium SAR ppm Na	23						
Ca Carbonate %CaCO3	19.0						

Notes:

2014

Annual Report

Subsidence Information

UtahAmerican Energy
West Ridge Mine
Grassy Trail Reservoir
Differential Level survey data

11/19/2014

STATION	C-1	C-2	C-3	C-4	C-5	C-6	C-7
NORTHING	38,830.55	38,865.88	38,892.13	38,917.88	38,943.74	38,969.37	38,996.01
EASTING	37,333.20	37,471.64	37,570.28	37,668.82	37,767.40	37,866.16	37,964.74
Differential level survey date.							
07/30/2002 Elevation	7593.49	7590.63	7590.29	7590.67	7590.44	7590.08	7590.08
08/29/2003 Elevation	7593.50	7590.65	7590.31	7590.69	7590.46	7590.08	7590.08
10/27/2004 Elevation	7593.50	7590.62	7590.30	7590.68	7590.45	7590.08	7590.08
08/12/2005 Elevation	7593.52	7590.66	7590.32	7590.69	7590.46	7590.09	7590.08
03/21/2006 Elevation	7593.50	7590.70	7590.30	7590.68	7590.45	7590.09	7590.08
04/14/2006 Elevation	7593.53	7590.73	7590.31	7590.67	7590.44	7590.08	7590.08
05/4/2006 Elevation	7593.54	7590.75	7590.31	7590.66	7590.43	7590.08	7590.08
05/30/2006 Elevation	7593.55	7590.78	7590.31	7590.65	7590.43	7590.07	7590.08
08/11/2006 Elevation	7593.49	7590.79	7590.31	7590.64	7590.43	7590.07	7590.08
09/18/2006 Elevation	7593.51	7590.82	7590.33	7590.66	7590.43	7590.08	7590.08
10/09/2007 Elevation	7593.54	7590.83	7590.33	7590.67	7590.44	7590.08	7590.08
04/28/2008 Elevation	7593.59	7590.84	7590.34	7590.69	7590.45	7590.09	7590.08
05/30/2008 Elevation	7593.56	7590.82	7590.32	7590.65	7590.44	7590.09	7590.08
07/13/2008 Elevation	7593.56	7590.84	7590.33	7590.66	7590.44	7590.08	7590.08
08/29/2008 Elevation	7593.57	7590.83	7590.33	7590.67	7590.44	7590.08	7590.08
09/27/2008 Elevation	7593.56	7590.84	7590.34	7590.68	7590.45	7590.09	7590.08
11/24/2008 Elevation	7593.55	7590.82	7590.32	7590.66	7590.44	7590.08	7590.08
02/23/2009 Elevation	7593.57	7590.83	7590.33	7590.67	7590.45	7590.08	7590.08
03/31/2009 Elevation	7593.57	7590.83	7590.32	7590.67	7590.44	7590.08	7590.08
04/27/2009 Elevation	7593.58	7590.83	7590.33	7590.68	7590.45	7590.08	7590.08
05/29/2009 Elevation	7593.59	7590.84	7590.33	7590.67	7590.44	7590.08	7590.08
06/28/2009 Elevation	7593.57	7590.83	7590.33	7590.67	7590.44	7590.08	7590.08
08/6/2009 Elevation	7593.57	7590.84	7590.33	7590.68	7590.45	7590.08	7590.08
09/9/2009 Elevation	7593.58	7590.84	7590.33	7590.68	7590.45	7590.08	7590.08
10/25/2009 Elevation	7593.56	7590.84	7590.33	7590.68	7590.44	7590.08	7590.08
11/20/2009 Elevation	7593.56	7590.83	7590.32	7590.67	7590.44	7590.08	7590.08
03/05/2010 Elevation	7593.58	7590.84	7590.33	7590.67	7590.45	7590.08	7590.08
04/15/2010 Elevation	7593.60	7590.84	7590.34	7590.68	7590.46	7590.08	7590.08
05/17/2010 Elevation	7593.59	7590.84	7590.33	7590.67	7590.45	7590.08	7590.08
06/24/2010 Elevation	7593.58	7590.84	7590.34	7590.68	7590.45	7590.08	7590.08
07/27/2010 Elevation	7593.56	7590.83	7590.32	7590.68	7590.45	7590.08	7590.08
09/02/2010 Elevation	7593.56	7590.84	7590.33	7590.69	7590.46	7590.08	7590.08
10/15/2010 Elevation	7593.56	7590.84	7590.33	7590.69	7590.46	7590.08	7590.08
11/18/2010 Elevation	7593.56	7590.83	7590.33	7590.67	7590.48	7590.08	7590.08
05/05/2011 Elevation	7593.58	7590.84	7590.33	7590.68	7590.45	7590.08	7590.08
06/03/2011 Elevation	7593.59	7590.84	7590.34	7590.68	7590.46	7590.08	7590.08
07/21/2011 Elevation	7593.58	7590.84	7590.33	7590.68	7590.45	7590.08	7590.08
08/29/2011 Elevation	7593.58	7590.83	7590.34	7590.67	7590.46	7590.08	7590.08
10/4/2011 Elevation	7593.57	7590.83	7590.33	7590.67	7590.45	7590.08	7590.08
11/7/2011 Elevation	7593.58	7590.84	7590.34	7590.67	7590.46	7590.08	7590.08
10/05/2012 Elevation	7593.58	7590.83	7590.33	7590.66	7590.44	7590.08	7590.08
10/22/2013 Elevation	7593.58	7590.84	7590.33	7590.66	7590.44	7590.08	7590.08
11/19/2014 Elevation	7593.59	7590.84	7590.33	7590.67	7590.44	7590.08	7590.08

WARE SURVEYING, L.L.C.

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UtahAmerican Energy
West Ridge Mine
Grassy Trail Reservoir
"Straight line" survey data

11/19/2014

Distance from control point to face of Monitoring Well (MW) in feet									
Date of survey	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	West Mon.	Straight Line Movement
12/14/2006	94.21	141.49	245.90	295.13	394.71	493.96	556.71	na	No
1/31/2007	94.21	141.49	245.90	295.13	394.71	493.96	556.71	na	No
3/1/2007	94.21	141.49	245.90	295.13	394.71	493.96	556.71	na	No
3/29/2007	94.21	141.49	245.90	295.13	394.71	493.95	556.70	na	No
5/30/2007	94.20	141.49	245.89	295.12	394.70	493.94	556.70	na	No
6/5/2007	94.20	141.49	245.89	295.12	394.69	493.94	556.68	na	No
7/2/2007	94.20	141.49	245.89	295.12	394.69	493.94	556.69	na	No
10/9/2007	94.21	141.50	245.90	295.13	394.71	493.95	556.70	na	No
11/10/2007	94.22	141.50	245.90	295.13	394.70	493.95	556.70	na	No
12/27/2007	94.21	141.50	245.91	295.13	394.71	493.95	na	710.95	No
4/28/2008	94.20	141.49	245.90	295.12	394.70	493.95	556.69	710.95	No
5/30/2008	94.20	141.49	245.90	295.12	394.70	493.94	556.69	710.94	No
7/13/2008	94.20	141.49	245.90	295.12	394.70	493.95	556.69	710.94	No
8/29/2008	94.21	141.50	245.90	295.14	394.71	493.96	556.70	710.95	No
9/27/2008	94.21	141.50	245.91	295.14	394.71	493.96	556.70	710.95	No
11/24/2008	94.21	141.51	245.91	295.14	394.71	493.96	556.70	710.95	No
1/26/2009	94.20	141.50	245.91	295.13	394.71	493.96	556.70	710.94	No
2/23/2009	94.20	141.49	245.90	295.13	394.70	493.96	556.69	710.94	No
3/31/2009	94.20	141.50	245.90	295.13	394.71	493.96	556.70	710.95	No
4/27/2009	94.21	141.50	245.90	295.13	394.70	493.95	556.70	710.95	No
5/29/2009	94.20	141.49	245.90	295.12	394.70	493.95	556.69	710.95	No
6/28/2009	94.21	141.51	245.91	295.13	394.71	493.96	556.70	710.95	No
8/6/2009	94.21	141.51	245.91	295.14	394.70	493.96	556.70	710.96	No
9/9/2009	94.22	141.51	245.91	295.14	394.71	493.96	556.70	710.96	No
10/25/2009	94.21	141.51	245.91	295.14	394.71	493.96	556.70	710.96	No
11/20/2009	94.21	141.50	245.90	295.13	394.70	493.95	556.69	710.95	No
3/5/2010	94.21	141.50	245.90	295.13	394.70	493.95	556.69	710.95	No
4/15/2010	94.21	141.50	245.90	295.13	394.70	493.94	556.69	710.94	No
5/17/2010	94.21	141.50	245.90	295.13	394.70	493.95	556.69	710.95	No
6/24/2010	94.21	141.50	245.90	295.13	394.70	493.95	556.69	710.95	No
7/22/2010	94.21	141.50	245.90	295.13	394.70	493.95	556.70	710.95	No
9/2/2010	94.21	141.50	245.90	295.13	394.70	493.95	556.69	710.94	No
10/15/2010	94.21	141.50	245.90	295.13	394.70	493.95	556.69	710.94	No
11/18/2010	94.20	141.49	245.89	295.12	394.70	493.95	556.68	710.94	No
5/5/2011	94.21	141.49	245.89	295.12	394.69	493.94	556.68	710.94	No
6/3/2011	94.20	141.49	245.90	295.12	394.69	493.93	556.68	710.93	No
7/21/2011	94.21	141.50	245.90	295.13	394.69	493.94	556.68	710.94	No
8/29/2011	94.20	141.49	245.89	295.12	394.70	493.94	556.69	710.93	No
10/4/2011	94.21	141.49	245.90	295.13	394.70	493.95	556.69	710.93	No
11/7/2011	94.21	141.49	245.90	295.13	394.70	493.94	556.69	710.93	No
12/5/2011	94.21	141.50	245.90	295.13	394.70	493.94	556.69	710.94	No
1/2/2012	94.21	141.50	245.90	295.14	394.70	493.95	556.69	710.94	No
10/5/2012	94.21	141.49	245.89	295.12	394.68	493.93	556.67	710.91	No
10/22/2013	94.21	141.49	245.89	295.13	394.69	493.93	556.67	710.91	No
11/19/2014	94.22	*141.69*	245.90	295.13	394.69	493.93	556.67	710.92	No*
Notes	MW-2 appears to have been bumped, a new distance and straight line mark was recorded								

WARE SURVEYING, L.L.C.

1344 North 1000 West – Price,
UT 84501
Office: 435-613-1266

UtahAmerican Energy

West Ridge Mine

Grassy Trail Reservoir
GPS Survey Data
Anticipated vertical accuracy ~ 0.08'+/-

11/19/2014

STATION	12	13	14	MID	TOE
NORTHING	38,509.85	38,555.42	38,610.87	38,828.21	38,719.59
EASTING	37,047.46	37,064.56	37,099.85	37,580.00	37,664.94
GPS survey date.					
September 2004	7789.87	7771.43	7739.26		
November 2004	7789.84	7771.39	7739.21		
August 2005	7789.75	7771.30	7739.13		
April 2006	7789.46	7771.02	7738.83		
October 2006	7789.39	7770.95	7738.66		
May 2007	7789.45	7771.00	7738.77		
October 2007	7789.45	7771.01	7738.76		
May 2008	7789.57	7771.10	7738.78	7565.52	7515.69
7/13/2008	7789.54	7771.12	7738.82	7565.54	7515.68
8/29/2008	7789.51	7771.08	7738.75	7565.51	7515.63
9/27/2008	7789.49	7771.05	7738.79	7565.52	7515.66
11/24/2008	7789.52	7771.09	7738.76	7565.54	7515.67
3/31/2009	7789.52	7771.07	7738.74	7565.55	7515.65
4/27/2009	7789.50	7771.05	7738.71	7565.53	7515.64
5/29/2009	7789.39	7771.01	7738.72	7565.48	7515.62
6/28/2009	7789.44	7771.08	7738.71	7565.50	7515.63
8/6/2009	7789.49	7771.12	7738.68	7565.49	7515.64
9/9/2009	7789.50	7771.10	7738.67	7565.51	7515.66
10/25/2009	7789.48	7771.11	7738.70	7565.50	7515.67
11/20/2009	7789.49	7771.10	7738.69	7565.49	7515.65
4/15/2010	7789.35	7770.99	7738.80	7565.49	7515.66
5/26/2010	7789.32	7770.91	7738.84	7565.50	7515.66
6/24/2010	7789.36	7770.96	7738.74	7565.46	7515.64
7/22/2010	7789.33	7770.93	7738.75	7565.48	7515.64
9/2/2010	7789.32	7770.91	7738.75	7565.47	7515.64
10/15/2010	7789.34	7770.93	7738.76	7565.49	7515.66
11/18/2010	7789.33	7770.92	7738.73	7565.49	7515.65
5/5/2011	7789.44	7770.93	7738.70	7565.46	7515.62
6/3/2011	7789.46	7770.99	7738.72	7565.50	7515.61
7/21/2011	7789.40	7770.96	7738.75	7565.47	7515.64
8/29/2011	7789.36	7770.96	7738.74	7565.49	7515.62
10/4/2011	7789.33	7770.95	7738.78	7565.48	7515.65
11/7/2011	7789.38	7770.92	7738.77	7565.48	7515.63
10/5/2012	7789.35	7770.91	7738.78	7565.47	7515.62
10/22/2013	7789.37	7770.95	7738.79	7565.47	7515.65
11/19/2014	7789.36	7770.92	7738.78	7565.49	7515.63

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UtahAmerican Energy, Inc.

West Ridge Mine - Subsidence Survey
Whitmore Canyon - Right & Left Forks

11/19/2014

STATION	NORTHING (FEET)	EASTING (FEET)	2011 ELEVATION (FEET)	2012 ELEVATION (FEET)	2013 ELEVATION (FEET)	2014 ELEVATION (FEET)
RIGHT FORK						
RF 1	45659.81	41232.67	7791.10	7791.00	7791.04	7791.05
RF 2	45562.48	41234.29	7786.54	7786.40	7786.40	7786.43
RF 3	45486.21	41199.27	7785.81	7785.81	7785.82	7785.80
RF 4	45398.66	41143.49	7781.40	7781.44	7781.44	7781.43
RF 5	45315.26	41087.44	7775.96	7775.96	7775.95	7775.95
RF 6	45217.64	41054.02	7772.24	7772.26	7772.24	7772.25
RF 7	45153.51	40945.84	7766.74	7766.84	7766.81	7766.83
RF 8	45061.46	40904.94	7764.42	7764.53	7764.49	7764.50
RF 9	44956.79	40868.03	7761.89	7761.89	7761.91	7761.89
RF 10	44870.99	40801.72	7761.92	7761.91	7761.90	7761.92
RF 11	44782.16	40777.38	7757.92	7757.88	7757.91	7757.90
RF 12	44634.05	40738.25	7740.20	7740.18	7740.21	7740.19
RF 13	44508.68	40706.73	7745.98	7746.01	7746.00	7746.02
RF 14	44433.85	40622.93	7736.59	7736.60	7736.58	7736.59
RF 15	44331.63	40507.23	7726.44	7726.33	7726.36	7726.34
RF 16	44264.81	40442.14	7724.27	7724.21	7724.22	7724.23
RF 17	44216.22	40336.61	7726.75	7726.67	7726.69	7726.71
RF 18	44150.10	40292.26	7719.17	7719.12	7719.14	7719.11
RF 19	44065.21	40210.72	7716.58	7716.56	7716.55	7716.56
RF 20	43939.23	40097.47	7706.35	7706.32	7706.34	7706.35
RF 21	43863.42	40028.09	7704.28	7704.24	7704.25	7704.23
RF 22	43786.13	39946.17	7703.06	7702.99	7702.99	7703.00
RF 23	43723.85	39841.32	7702.95	7702.83	7702.86	7702.86
RF 24	43647.34	39781.38	7702.06	7702.05	7702.04	7702.06
RF 25	43559.69	39727.08	7695.23	7695.23	7695.26	7695.25
RF 26	43488.54	39640.90	7689.57	7689.55	7689.53	7689.53
RF 27	43413.36	39596.08	7686.02	7686.01	7686.02	7686.02
RF 28	43320.94	39521.68	7678.12	7678.09	7678.10	7678.11
RF 29	43252.64	39457.23	7676.82	7676.76	7676.79	7676.78
RF 30	43152.28	39401.82	7674.47	7674.44	7674.48	7674.45
RF 31	43080.85	39360.31	7667.94	7667.93	7667.92	7667.91
RF 32	43008.55	39304.45	7670.26	7670.25	7670.27	7670.26
RF 33	42827.60	39226.44	7670.85	7670.87	7670.84	7670.87
RF 34	42711.18	39250.81	7666.31	7666.38	7666.35	7666.35
RF 35	42596.13	39207.73	7663.53	7663.51	7663.53	7663.50
RF 36	42570.31	39103.58	7662.47	7662.44	7662.44	7662.45
RF 37	42452.88	38978.21	7655.94	7655.94	7655.96	7655.95
RF 38	42380.30	38944.86	7646.66	7646.67	7646.64	7646.65
RF 39	42291.93	38885.24	7646.27	7646.27	7646.24	7646.27
RF 40	42196.21	38841.77	7647.09	7647.11	7647.08	7647.10
RF 41	42092.94	38813.43	7644.11	7644.13	7644.10	7644.11
RF 42	42060.94	38755.40	7646.32	7646.33	7646.30	7646.32
RF 43	41931.63	38693.07	7637.34	7637.37	7637.38	7637.38
RF 44	41802.80	38658.27	7630.26	7630.34	7630.30	7630.33
LEFT FORK						
LF 1	42947.67	35009.14		7699.83	7699.86	7699.85
LF 2	42837.27	35179.58		7689.16	7689.17	7689.16
LF 3	42753.94	35311.07		7691.13	7691.15	7691.15
LF 4	42673.74	35541.60		7690.54	7690.53	7690.52
LF 5	42543.99	35584.78		7682.72	7682.71	7682.73
LF 6	42429.63	35705.26		7674.28	7674.29	7674.27
LF 7	42326.48	35935.09		7665.34	7665.36	7665.37
LF 8	42195.08	36012.95		7655.45	7655.44	7655.44
LF 9	41878.50	36275.53		7643.16	7643.16	7646.17
LF 10	41496.01	36676.23		7621.75	7621.79	7621.77
LF 11	41739.13	36450.07		7632.59	7632.57	7632.60
LF 12	40974.97	36844.87		7606.36	7606.33	7606.35
LF 13	40453.52	37148.89		7619.22	7619.23	7619.21
LF 14	39700.71	37130.63		7611.25	7611.25	7611.27
LF 15	39496.20	37139.12		7611.93	7611.95	7611.95

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Annual Report

Raptor Survey

Included in Confidential File

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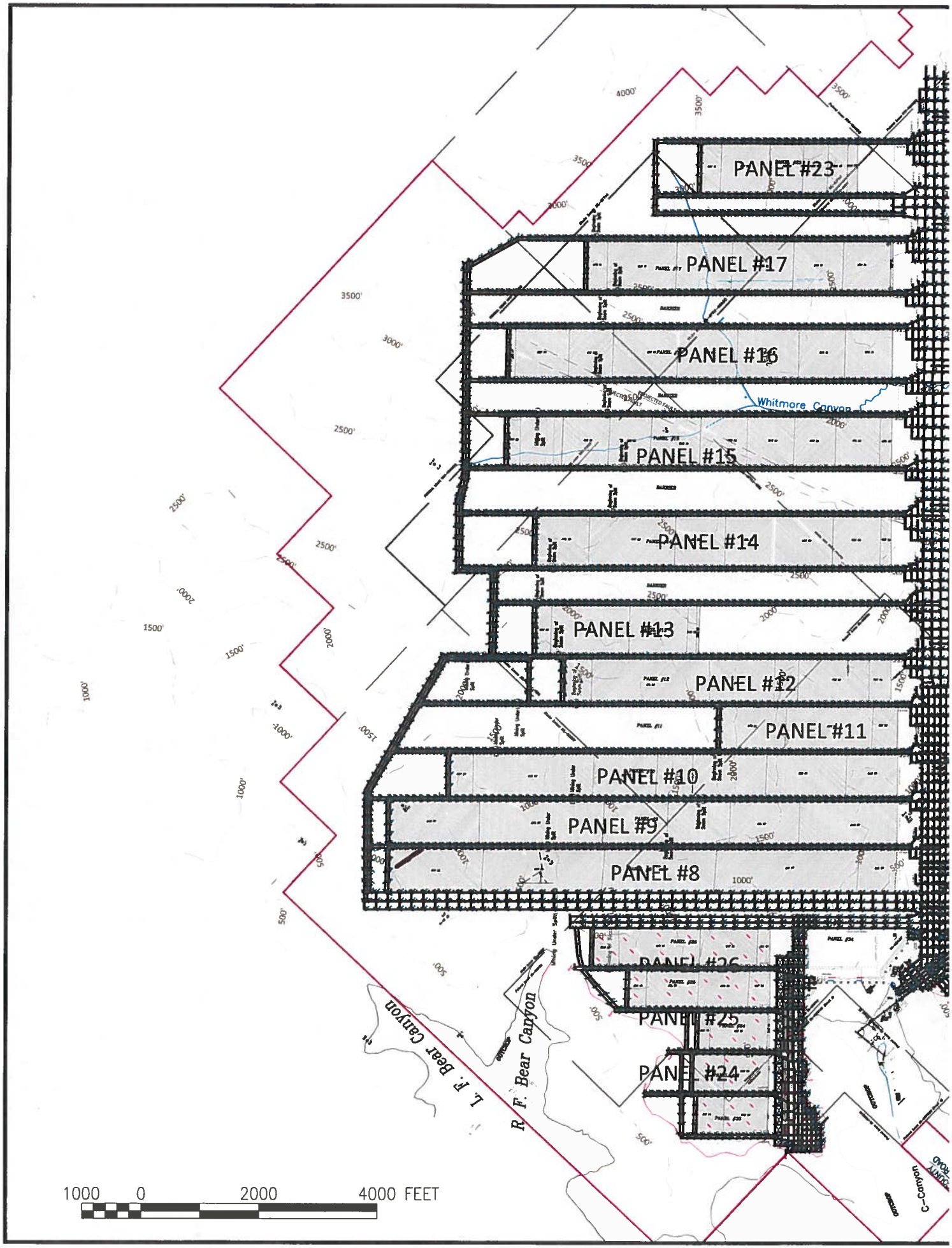
Annual Report

Mine Map


PANEL #23
PANEL #17
PANEL #16
Whitmore Canyon
PANEL #15
PANEL #14
PANEL #13
PANEL #12
PANEL #11
PANEL #10
PANEL #9
PANEL #8
PANEL #26
PANEL #25
PANEL #24
L. F. Bear Canyon
R. F. Bear Canyon
1000 0 2000 4000 FEET