**CONSOL Mining Company LLC.**
1000 CONSOL Energy Drive
Canonsburg, PA 15317
(724) 485-4267

C/015/0015
Received 10/8/2014
Task ID #4700

October 07, 2014

Daron Haddock
Utah Division of Oil, Gas and Mining
Coal Program
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

Re: Emery Deep Mine Permit C/015/015
Revegetation and Dust Control Revision Deficiency Response Task ID 4654

Dear Mr. Haddock:

Per you deficiency letter dated September 19, 2014, please consider these responses.

Per the ongoing revegetation reclaimability study at Chapter III Page 4a, CONSOL is submitting deficiency responses regarding test reclamation sites. Included in this section are three representative sites and a revised seed mix.

Consol is also requesting to discontinue the dust monitoring program at the 4th East portal and revising the wind fence maintenance program.

Enclosed please find 3 copies including an executed C1 form, C2 form and revised pages. A cd-rom has been included with the submittal in pdf format.

If you have any questions concerning this request, please contact me at (724) 485-4267.

Sincerely,

Kerry Goodballet P.E.
Director of Permitting – Coal

Enclosure

KLG/jag emvegdust.rev.DOGMdef.tsk4654.docx

# APPLICATION FOR COAL PERMIT PROCESSING

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

**Permittee:** CONSOL Mining Company LLC
**Mine:** Emery Mine **Permit Number:** 015/015
**Title:** Revegetation and Dust Control Revision
**Description,** Include reason for application and timing required to implement:
update revegetation study and revise dust control plan 10/14 deficiency response Task 4654

**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.

KERRY L. GOODBALLET
Print Name

Kerry L. Goodballet, Dir. Permitting Coord, 10-7-14
Sign Name, Position, Date

Subscribed and sworn to before me this 7TH day of October, 20 14

Katherine L. Jursa
Notary Public

My commission Expires: 10-29, 2017
Attest: State of Pennsylvania } ss:
County of Washington

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Katherine L. Jursa, Notary Public
Cecil Twp., Washington County
My Commission Expires Oct. 29, 2017
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

| For Office Use Only: | Assigned Tracking Number: | Received by Oil, Gas & Mining |
|---|---|---|
| | | |

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

**Permittee:** CONSOL Mining Company LLC
**Mine:** Emery Mine **Permit Number:** 015/015
**Title:** Revegetation and Dust Control Revision 10/14 deficiency response Task 5654

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 | Chapter III, Page 4a |
| ☐ Add | ☒ Replace | ☐ Remove | Chapter III ,Page 4b |
| ☒ Add | ☐ Replace | ☐ Remove | Chapter III, Page 4c |
| ☐ Add | ☒ Replace | ☐ Remove | Chapter X-C, Page 5a |
| ☐ Add | ☒ Replace | ☐ Remove | Chapter X-C, Page 5b |
| ☐ Add | ☐ Replace | ☒ Remove | Chapter X-C, Page 5h |
| ☒ Add | ☐ Replace | ☐ Remove | Appendix X.C-3 ( Emery Mine Coal Dust Monitoring Summary) |
| ☐ Add | ☐ Replace | ☐ Remove | |
| ☐ Add | ☐ Replace | ☐ Remove | |
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| ☐ Add | ☐ Replace | ☐ Remove | |

| **Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.** | **Received by Oil, Gas & Mining** |
|---|---|
| | |

The permittee is committed to develop an investigative study into past reclamation practices conducted at the Emery and Hidden Valley mine sites.

The scope of the investigation shall include but not limited to:

1. Evaluate current vegetation and soil chemistry of all topsoil and subsoil stockpiles. Past reclamation sites of disturbed land are to be included within the scope of study. "A Reclamation Monitoring Study for the Emery Mine – Vegetation and Soils" was completed in 2003 and can be found at Ch III Appendix III-1.

2. Based on findings from the study, plans shall be developed to enhance the vegetation of each site. The plan is to be reviewed with Division of Oil Gas and Mining (DOGM) prior to implementation of the plan. Period for implementing enhancement methods should be performed when warm season planting may be conducted.

A field meeting was held on 4/16/14 to reengage the revegetation success and reclaimability study by Mt. Nebo entitled Reclamation Monitoring Study for the Emery Mine – Vegetation and Soils dated December 2003 and contained in permit 015/015 at Chapter III Appendix III-1. The last meeting on this project was held on October 11, 2011 (DOGM inspection report 2895). The results of the study and the 2011 site meeting were to proceed to Phase II. Phase II was to be choosing representative sites with varying soil chemistry to show vegetative success for future reclamation of the mine site. Refer to DOGM inspection report #3810 dated 4/16/14 for details and photographs.

After a review of the chronology of events since 2003, the team chose several sites to visit based on the soil chemistry and vegetation. Three stockpiled soil locations were chosen to demonstrate vegetation/reclamation success on poor, fair and good soil. During the field tour it was decided that several of the previous areas of concern (ponds) could be left with minimal work as post mine wildlife habitat. The three sites that were chosen to demonstrate reclamation success are Sites 3-5 (Pond #6 stockpiles, Map III-2); site 21 (partially removed reverse osmosis pond #4, Plate III-4); and Site 14 (long subsoil pile adjacent to the proposed prep plant site, Chapter III, App III Table I). Vegetative success on these sites will be compared to control sites 12 and 13.
The sites below will be prepared and seeded during the fall 2014 with results reported out through the annual report process.

1.) Implement DOGM's three recommendations on Page 5/5 section 11 (Contemporaneous Reclamation) of inspection report 3810.

a. Sites 3-5: Pond #6 - Good quality soil
   i. Three-sided small metal post barb wire fence to preclude grazing.
   ii. Regrade piles to lesser slope similar to 4th East portal topsoil stockpile
   iii. Combine the smaller subsoil pile with the topsoil pile resulting in two piles of good quality

b. Site 21: Reverse Osmosis Pond #4 - Fair quality soil
   i. Regrade the disturbed SE dam of the pond into the bottom of the pond to a depth of 6 inches
   ii. Collect soil samples from the bottom of the RO pond as well as the regarded berm material

Inserted 10/2002
Revised 2/07
Revised 12/08
Revised 9/14

c. Site 14: Long subsoil pile - Poor quality soil

i. Backfill a small portion of the ditch as a demonstration plot as proving vegetation success on this poor soil would help reduce future reclamation cost drastically.

2.) Once graded the sites will be disced on the contour to incorporate 1 ton/acre straw or hay mulch and then seeded with the following seed mix per Mt. Nebo and DOGM suggestions. All sites will be sampled after grading for ph, EC and SAR from depths of zero to 6 inches and 6 inches to 12 inches.

| **SEED MIX FOR THE EMERY MINE RECLAMATION TEST AREAS** | | | |
|---|---|---|---|
| **SALT DESERT AREAS** | | | |
| 20 June 2014 | | | |
| | | | |
| SHRUBS | | Rate (PLS/Ac) | Seeds/Ft$^2$ |
| *Atriplex canescens* | Fourwing saltbush | 5.00 | 6.31 |
| *Atriplex confertifolia* | Shadscale | 5.00 | 7.35 |
| *Atriplex corrugata* | Mat saltbush | 5.00 | 6.89 |
| *Atriplex gardneri* var. *cuneata* | Castle Valley clover | 3.00 | 7.64 |
| *Krascheninnikovia lanata* | Winterfat | 5.00 | 6.31 |
| | | | |
| **FORBS** | | | |
| *Eriogonum unbellatum* | Sulfur buckwheat | 1.50 | 7.20 |
| *Helianthus annuus* | Sunflower | 5.00 | 6.66 |
| *Phacelia crenulata var. corrugata* | Corrugate phacelia | 0.30 | 5.51 |
| *Sphaeralcea grossulariaefolia* | Goose-berry leaf globemallow | 0.50 | 5.74 |
| | | | |
| **GRASSES** | | | |
| *Elymus junceus* | Russian wildrye | 0.30 | 4.02 |
| *Elymus smithii* | Western wheatgrass | 2.00 | 5.79 |
| *Hilaria jamesii* | Galleta | 2.00 | 7.30 |
| *Sporobolus airoides* | Alkali sacaton | 0.15 | 6.03 |
| *Sporobolus flexuosus* | Mesa dropseed | 0.10 | 7.64 |
| *Stipa hymenoides* | Indian ricegrass | 1.50 | 6.47 |
| | | | |
| **Totals** | | **36.35** | **96.85** |

* Rates based on employing broadcast seeding methods (reduce by 50% when drill-seeded).

** Due to commercial availability, species can be substituted by a qualified botanist.

3. The qualitative part of the Phase II study will be performed annually and the quantitative aspects of the Phase II study will be performed between the 4th and 6th year, following initial implementation of enhancement methods. The present reclamation methods shall be correlated with the historical weather information obtained from on-site weather station.

4. Based on the follow-u p study, a total reclamation plan shall be developed for the Emery mine site. The plan is to incorporate and utilize the best reclamation practices found through the previous investigative studies. The final reclamation plan will be developed in conjunction with DOGM and submitted 12 months prior to initiating final reclamation.

All information obtained through all studies shall be submitted with the annual report.

Inserted 8/14

**UMC 817.100, UMC 817.101(a), UMC 817.113**

A description of each item listed under Contemporaneous Reclamation in the reclamation schedule follows.

The sections of road reclaimed in 1982 were completed in conjunction with upgrading the road to borehole pump #1. Reclamation consisted of removing existing culverts across Quitchupah Creek and disking and harrowing of the roadbeds. Since no earth materials were removed and no road surfacing material was placed during construction (prior to Aug. 3, 1977) of these roads, no grading, backfilling or topsoil re-spreading was required. Following this the reclaimed site was seeded with the following seed mix.

| Species | Lbs PLS[1] | PLS/Sq.Ft. |
|---|---|---|
| Crested wheatgrass | 0.5 | 10 |
| Western wheatgrass | 1.0 | 14 |
| Indian ricegrass | 0.5 | 11 |
| Galleta | 0.5 | 9 |
| Streambank wheatgrass | 1.0 | 18 |
| Fourwing saltbush | 1.5 | 12 |
| TOTAL | 5.0 | 74 |

Seeding was performed with a grass seed drill with disc furrow openers and press or packing wheels. No chemical soil amendments, irrigation or herbicides were necessary. Straw mulch was applied to the reclaimed areas and crimped at the rate of 1.5 tons/acre.

The reclamation of an old abandoned mine portal and associated borrow area for backfill was completed in 1986 in conjunction with fire control activities. The method utilized to seal the portal is described in Chapter III.C.2. Since the sealed portal was riprapped to protect the area from erosion, no seed was applied. The reclaimed borrow area is located along Christiansen Wash approximately three hundred feet upstream of the sealed portal. It is located in an area where soils consist of gullied and alluvial land (Plate VII-1) and the vegetation is of the greasewood shrubland type (Plate VIII-1). Reclamation of the borrow area consisted of grading to approximate predisturbance conditions and broadcasting according to seed plan B (Chapter VIII.C.4). The application rate for seed plan B was doubled and the area was lightly raked to aid in covering the seeds since the seed was applied by broadcasting.

The area affected by vehicle traffic to install wooden poles along the east fence line of the 4th East Portal was seeded and hydro-mulched with native seed mix described in Chapter VIII.C.3 on August 19, 2003.

Areas affected along the south and southeast corner of the fence line by vehicle traffic during the construction of the transmission lines and subsequence repair was hydromulched only in the fall of 2002.

The area affected along the west fence line during construction of the perimeter fence was hydromulched only during the fall of 2002.

Inserted 10/2002
Revised 10/2003
Revised 1/2004
Revised 8/13

[1]Pure Live Seed

1 a. 4th East Portal Site

Fugitive dust emission at the 4th East Portal will consist primarily from the coal handling and stockpiling of coal. The coal stockpile will be sprayed with water, when conditions warrant, as it is discharged into the pile. In addition the stockpile will be protected to some degree by the rock stockpile located to along the west side of the boxcut. This rock stockpile will function as a wind break from the prevailing westerly winds. The rock stockpile consists primarily of cobble to boulder size sandstone.

The road to the coal loadout will be watered to reduce fugitive dust periodically as needed as determined by mine personnel throughout the day. Topsoil stockpile will be roughened, seeded and mulched to prevent wind and water erosion. Berms shall remain roughened and seeded. Rock or wood mulch as well as erosion control netting may be utilized as situation warrants to minimize effects of erosion.

On January 9, 2003, Notice of Violation was written for wind-blown coal fines outside the permit area. To abate the violation a dust control plan was initiated.

Details for each of these engineering controls and other measures are discussed in Appendix X.C-3. Consol has implemented Phase I of Norwest's dust control plan as described in App.X.C-3 of the MRP. Maintenance of the engineering controls in Phase I will be discontinued when coal is no longer stockpiled or processed at the site. Once processing resumes CONSOL will ensure the engineering controls and maintenance of them are carried out per Phase I of Norwest's report in Appendix X C-3.

Inserted 9/2003
Revised 1/2004
Revised 5/2004
Revised 8/14

As a measure of success of the dust control plan and to establish a baseline, Consol has agreed to establish transects according NRCS guidelines. Consol has contacted NRCS for assistance in establishing a baseline on the area East of the road on Consol property. The baseline consists of three transects, each containing three sample sites. The sample points will be clearly marked for field identification. These nine sample sites will be monitored annually to calculate the % coal fines on the surface soil. On 05/04/04 the NRCS instructed DOGM mine personnel, and a representative from JBR consulting from the Field Book for Sampling Soils, on the method to determine % cover. Records of the initial baseline and a subsequent monitoring events are contained in 'Emery Mine Coal Dust Plots Monitoring Summary' dated May 2014 found in Appendix X.C-3a~~determination in 2008 follow. All future monitoring reports will be submitted in the annual report.~~ Based on the conclusions of this report CONSOL will discontinue the dust plot monitoring starting in 2015.

Inserted 01 /2004
Inserted 02/2004
Revised 5/2004
Revised 7 /08
Revised 8/14

## ~~Emery Mine 4th East Portal~~
## ~~Coal Dust Plots~~

| ~~Site~~ | ~~Coal Surface Cover (%) and Thickness~~ | | ~~Live Vegetative Cover (%)~~ | | ~~Presence of Cryptogams~~ | | ~~Notes~~ | |
|---|---|---|---|---|---|---|---|---|
| | ~~5/4/04~~ | ~~2/26/08~~ | ~~5/4/04~~ | ~~2/26/08~~ | ~~5/4/04~~ | ~~2/26/08~~ | ~~5/4/04~~ | ~~2/26/08~~ |
| ~~1A~~ | ~~85 (1-3 mm)~~ | ~~85 (up to 3 mm)~~ | ~~20~~ | ~~15~~ | ~~One 1/2 x 1/4 in~~ | ~~Several, largest 1.5x1"~~ | | |
| ~~1B~~ | ~~65 (1/2 – 2mm)~~ | ~~70 (2mm avg)~~ | ~~20~~ | ~~20~~ | ~~Three 2x1/2, 2x1/2, 1/2x1/4 in~~ | ~~At least 4 small colonies~~ | | |
| ~~1C~~ | ~~60 (.25 – 2mm)~~ | ~~50 (<1 mm)~~ | ~~25~~ | ~~15~~ | ~~One 1/4 in~~ | ~~4+, varying sizes~~ | ~~Lichen, rock & bedrock~~ | ~~Lichen, rock & bedrock~~ |
| ~~2A~~ | ~~85-90 (1-4 mm)~~ | ~~60 (up to 3mm)~~ | ~~40~~ | ~~5~~ | ~~None~~ | ~~None observed~~ | | ~~Stake uprooted~~ |
| ~~2B~~ | ~~80 (1/2 – 4mm)~~ | ~~85 (up to 4mm)~~ | ~~20~~ | ~~25~~ | ~~One 1x1 in~~ | ~~4 colonies, 1.5"~~ | | |
| ~~2C~~ | ~~20 (up to 2mm)~~ | ~~20 (surface only)~~ | ~~2~~ | ~~15~~ | ~~None~~ | ~~None observed~~ | ~~70% rock~~ | ~~Pebble cover~~ |
| ~~3A~~ | ~~85 (1/2 – 1mm)~~ | ~~60 (up to 6mm)~~ | ~~20~~ | ~~20~~ | ~~Two 1/4 in~~ | ~~None observed~~ | | |
| ~~3B~~ | ~~75 (1/4 – 4mm)~~ | ~~70 (up to 4mm)~~ | ~~10-15~~ | ~~10~~ | ~~None~~ | ~~7 or 8 up to 2"~~ | | |
| ~~3C~~ | ~~90 (1/4 – 1.5mm)~~ | ~~85 (<1 mm)~~ | ~~15-20~~ | ~~15~~ | ~~Three 1x1, 1/4x1/4, ¼ x 1/4 in~~ | ~~1 appx 1.25"~~ | | |

~~General Comments and Observations:~~

1) ~~Stakes were in place at all sites, except for Site 2A. Attempts were made to orient the plot frame along the same general alignment as during the 2004 survey, but it is obvious by vegetation that some variation occurred.~~

2) ~~Due to the season, vegetation was dormant and no annual forbs or grasses were present. While some species were identifiable and recorded in the field notes, they are not given here.~~

3) ~~Based upon visual observation and recollection of 2004 conditions, coal has generally become more vertically mixed with native particles. This makes thickness of coal cover, in particular, difficult to assess.~~

~~Inserted 7/08~~

# Emery Mine Coal Dust Plots Monitoring Summary

**Prepared for:**
CONSOL Mining Company LLC
1000 Consol Energy Drive
Canonsburg, PA 15317

**Prepared by:**
JBR Environmental Consultants, Inc., now Stantec
8160 S. Highland Drive
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August 2014

P.O. 4700459954

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**Appendix A: Annual Results**

**Appendix B: May 21, 2014 Plot Photos**

# Emery Mine Coal Dust Plots Monitoring Summary

## 1.0 INTRODUCTION

On behalf of CONSOL Mining Company LLC (Consol), JBR Environmental Consultants, Inc., now Stantec (JBR) has collected several years of annual ocular data from plots sited along three transects located downwind of the 4th East Portal at Consol's Emery Mine. The primary focus of the ocular monitoring program is to observe deposits of wind-blown coal dust on the ground surface, documenting coal presence and tracking its continued accumulation or diminishment. Monitoring this coal dust originated as a result of a Notice of Violation (NOV) written by Utah Division of Oil, Gas and Mining (DOGM) in January 2003.Consol abated the NOV by implementing a dust control plan, and coal dust monitoring is used to measure the success of the plan.

The transects and plots were originally established and characterized on May 4, 2004. Annual monitoring began in 2008. The mine has been idle since December of 2011, but monitoring has continued. This report provides and discusses the results through the May 21, 2014 monitoring event.

## 2.0 METHODS

Mr. Leland Sasser, a soil scientist with the Natural Resources Conservation Service (NRCS), provided advice, recommendations, and training on methods and procedures to document the baseline conditions on the area over which windblown coal dust had accumulated. Mr. Sasser was present when the plot locations were established, and as the recognized expert, he made the first set of ocular observations on May 4, 2004. Representatives from Consol, DOGM, and JBR were also present for the initial May 4 observations, which represent the baseline conditions for the coal accumulation near the 4th East Portal.

Upon arriving at the Emery Mine on May 4th, three yard-square (3-foot by 3-foot) plots were laid out along each of three east-west oriented linear transects located east of the County Road that is, in turn, immediately east of the 4th East Portal site. The southwest corner of each plot location was marked by installing wooden survey stakes along each transect line at the 50-, 100-, and 150-foot marks. Care was taken to remain on the south side of the transect line so as not to disturb the ground where the plots would be located. Plot markers were labeled 1A, 1B, and 1C along the northern-most transect, with the same naming convention followed for the second and third transects.

Next, at each plot, in turn, a PVC yard-square frame was placed northward of the staked corner. Mr. Sasser made ocular estimates of the percent area within the frame that was covered by coal, vegetation, and bare ground. Notes were also made on estimated depth of coal cover, presence of cryptogams, and other observations of interest. Representatives from DOGM and JBR participated in the monitoring efforts, contributing individual input to the inherently subjective process. However, as the expert, Mr. Sasser made the final baseline determinations during the May 4, 2004 event. Results were compiled by both JBR and DOGM, and these became part of the official record.

Subsequent monitoring events occurred in February and May of 2008, and then in May each year from 2009 through 2014. (In 2005, 2006, and 2007, the DOGM inspector simply noted general coal dust conditions during monthly inspections.) Beginning in 2008, all data was collected by Ms. Karla Knoop (the JBR representative who was present during the initial May 4, 2004 monitoring). DOGM and/or Consol representatives were also present at times and contributed to the observations. Not all of the corner stakes that were originally placed in 2004 remain, but photographic records make it possible to place the plot square in the same locations each year. In 2010, two of the nine plots were noted to be obliterated by power line placement; monitoring had to be discontinued at those two locations.

Observation methods have generally remained consistent throughout the study period. However, with each subsequent monitoring event, the percentage of ground covered by coal and coal layer thickness became more difficult to estimate, due to the observed coal integration with native soils. In 2010, Munsell soil color charts were also used as another means of describing coal presence. In effect, as the percentage of discrete coal particles residing on the surface declines, the ground surface color more closely approximates the native soil color. In areas where coal particles are present on the surface at a higher proportion, ground surface color appears darker/grayer than the native soil color. Use of this supplemental method was tested during the May 18, 2010 survey, at which Ms. Priscilla Burton was present. Ms. Burton is a DOGM representative who also participated in the original 2004 monitoring event.

## 3.0 RESULTS AND DISCUSSION

The percentages of surface coal and live vegetative cover made by Mr. Leland Sasser (NRCS) on May 4, 2004 (the baseline dust plot conditions) are provided in Table 1 below. Appendix A provides more detailed observations. Coal coverage ranged from a low of 20 percent (at Plot 2C) to a high of 90 percent (at Plot 3C); overall average for all of the plots was 72 percent. Live vegetative cover averaged 20 percent overall. In general, percent coal diminished with distance away from the 4$^{th}$ East Portal area. Although not noted in the original results, JBR recollections

are that in areas where coal surface cover was present, it presented as essentially a solid coal layer atop the native soil and was black in color. Measured thickness of the coal deposits ranged from <1 mm to 10 mm.

**Table 1. Coal Dust Plot Observations Made on May 4, 2004**

| Plot ID | Coal Surface Cover (%) | Live Vegetative Cover (%) |
|---|---|---|
| 1A | 85 | 20 |
| 1B | 65 | 20 |
| 1C | 60 | 25 |
| 2A | 85-90 | 40 |
| 2B | 80 | 20 |
| 2C | 20 | 2 |
| 3A | 85 | 20 |
| 3B | 75 | 15 |
| 3C | 90 | 15-20 |

The plots were next monitored in late February 2008. However, after noting that vegetation was still in its winter dormancy, which did not represent optimum conditions for comparison with the 2004 record, observations on coal surface cover and live vegetative cover were repeated on May 22, 2008. Table 2 presents these latter results (all data are included in Appendix A). At six of the plots, percent coal cover was less than had been estimated in 2004, and at the other three plots, it was greater; the average was 70 percent, or essentially the same as in 2004. Vegetative cover average was 17 percent, which is essentially the same as the 2004 average, given the subjective nature of the estimates.

**Table 2. Coal Dust Plot Observations Made on May 22, 2008**

| Plot ID | Coal Surface Cover (%) | Live Vegetative Cover (%) |
|---|---|---|
| 1A | 80-85 | 15 |
| 1B | 75 | 25 |
| 1C | 50 | 5 |
| 2A | 95 | 10 |
| 2B | 75 | 30 |
| 2C | 45 | 20 |
| 3A | 70 | 20 |
| 3B | 70 | 15 |
| 3C | 60 | 15 |

Notes attached to the 2008 results stated that coal cover was more difficult to estimate than it was in 2004. Coal appeared to be mixing with the native soil, resulting in areas where coal was present but not quantifiable to the same degree as in the original study. Some locations within the plots had coal present, but not as the essentially solid surface that was observed in 2004. Rather, coal particles were contained within a soil matrix, with the varying proportions of each being reflected in differing surface colors. The recorded coal surface percentages represented areas where these mixtures were present, and likely overestimated the true amount of coal present. Frost heave, livestock trampling, and wind/water erosion appeared to be likely mechanisms for the coal/soil mixing.

In May 2009, this phenomenon was even more pronounced, as described in notes attached to the submitted results (see Appendix A). Only very isolated areas within the plots appeared to contain free coal, either observed as a black coal surface, or as discrete particles on top of a soil surface. Instead, most areas where coal was present did not have distinguishable coal particles, but instead it appeared that coal had simply colored the native soil. In an attempt to quantify this effect, the coal surface cover measurement category was split, as reflected in Table 3. One column lists the estimated percentage of area where coal was present on the surface as discrete, identifiable particles. Another column lists the estimated percentage of ground where soil color indicated some proportion of coal within the soil, and a designation was also given to indicate the darkness of the color (with darker color indicating a higher percentage of coal).

**Table 3. Coal Dust Plot Observations Made on May 13, 2009**

| Plot ID | Free Coal Surface Cover (%) | Mixed Soil/Coal Cover (%)* | Live Vegetative Cover (%) |
|---|---|---|---|
| 1A | 2-3 | 90 -- d | <5 |
| 1B | 1-2 | 90 -- m | 10 |
| 1C | 0-1 | 15 -- l | 3-5 |
| 2A | 2-3 | 90 -- m | 7-10 |
| 2B | 1-2 | 70 -- l | 20-25 |
| 2C | 0-1 | 40 -- l | 15 |
| 3A | 5 | 85 -- d | 10-15 |
| 3B | 2-3 | 85 -- l | 10 |
| 3C | 4-5 | 65 -- l | 20-25 |

*color of mixture: d = dark gray dominant, m = moderately gray, l = light

Strictly speaking, the reported percentages of the area where coal is present (combined columns 2 and 3 in Table 3) are not directly comparable with the baseline data due to the noted mixing. (The percentages in the mixed soil/coal cover column in Table 3 represent overestimates of the true percentage of coal.) However, the average derived from the 2009 data set is 73 percent,

which is essentially the same as was reported during the baseline observations in 2004. The true percentage of coal would be less than this amount, and likely significantly less, given the noted light color at 5 out of the 9 plots.

In 2010, DOGM participated in the plot monitoring. JBR thought it important that the agency representative (Ms. Priscilla Burton) observe the existing conditions at the site, in order to understand the noted mixing phenomenon and the resultant difficulties in monitoring and data interpretation. During the May 18, 2010 monitoring event, joint estimates of the percent area where a mixed soil/coal cover was present were made and the dominant color of that mixture was reported (based upon standard Munsell soil color charts). Results are included in Appendix A. Two of the plots (No. 2A and No. 3A) had to be abandoned: ground disturbances associated with a recently installed power line had eliminated the plot stakes and thoroughly mixed the soils so that no coal was observed. However, in the remaining plots, the coal incorporation phenomenon was evident. According to the numeric estimates, the average percentage of the area where coal was found had decreased to 42 percent in 2010, significantly below the previous year's estimate of 72 percent. The average of the percent vegetative cover at all seven remaining plots was 13 percent, representing a decline from the baseline condition (in 2004) but essentially the same as was reported in 2009.

Using the Munsell soil color appeared to be a useful means of documenting the presence of coal mixed within the native soils. When the ratio of coal to soil appears to lessen, the mixture's color begins to reach that of adjacent native soils were coal is absent. Conversely, where coal fines appear to make up a larger percentage of the mixture, the mixture's color is more disparate. Therefore, in subsequent years, the same procedure was followed and results have been included in the annual reports that Consol submits to DOGM. They are also attached in Appendix A.

These results continue to demonstrate the subjective nature of the observations. In particular, a review of available data from 2004 to 2014 indicates that the 2010 estimates were likely skewed lower due to the collaborative nature of the observations. As noted above, the average percentage of the area where coal was found in 2010 was significantly below the previous year's estimate. As shown below in Table 4, during the 2011 to 2014 monitoring events, the average percentage of the area where the coal was found fluctuated from 51 percent to 58 percent, a reduction from the 2004, 2008 and 2009 estimates but above the 2010 estimate. Therefore, the 2010 estimates were not used in making final conclusions about coal or coal/soil mix percentages at the sites.

The determination of Munsell soil color has become more difficult over time as the soil/coal mix continues to evolve. Trampling by livestock and wind both seems to either cover or re-expose coal fines. For example, where protected beneath or adjacent to larger vegetation, coal dust may

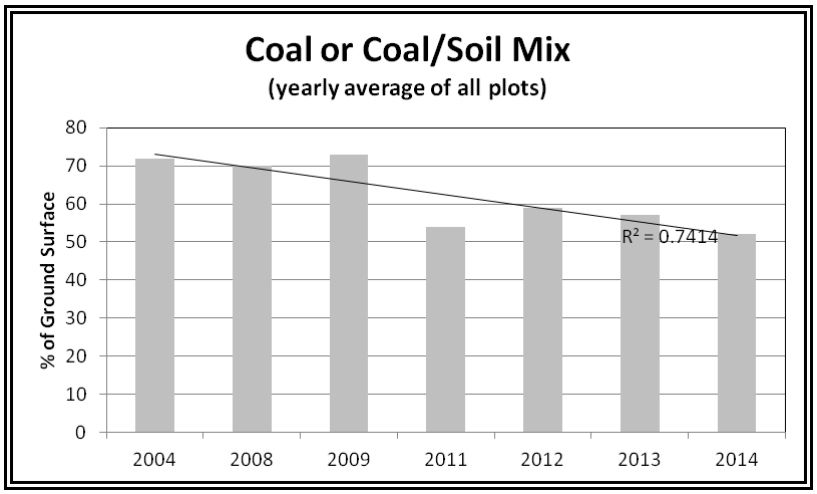
be more prevalent than in more exposed portions of the plot. In addition, blown-in native soil appears to cover the surface in some areas, leaving only scant individually visible coal particles on the surface. But within a hoof-print, the mixed soil/coal material is evident. Overall, it is evident that coal is still present on the site; however, it does not appear to be newly deposited. Further, the elements continue to mix, rearrange, and non-uniformly vary the proportion of soil and coal.

Table 4 provides a summary of the data collected between 2011 and 2014 (Appendix A includes the full results from all monitoring events). The noted average of mixed soil/coal cover does not reflect the proportion of soil and coal, but simply the proportion of ground surface wherein coal appears to be present within the soil. Given that, and the subjective nature of these ocular observations, there appears to be little or no change in recent years. However, compared to the years 2009 and prior, where percent coal coverage was estimated to be in the low 70s, the data suggests an improvement. Taken into account the non-quantitatively described mixing and coloration changes, the improvement is likely even greater than indicated by the percentages.

**Table 4. Coal Dust Plot Monitoring Summary 2011-2014**

| Year | Average Mixed Soil/Coal Cover (%) | Average Live Vegetative Cover (%) |
|---|---|---|
| 2011 | 54 | 14 |
| 2012 | 59 | 10 |
| 2013 | 57 | 14 |
| 2014 | 52 | 13 |

The following bar chart shows the trend in percent of the ground surface covered by coal fines or coal/soil mixture, again using the average of the plots for each year. As noted above, year 2010 was somewhat anomalous in that the JBR observer collaborated with the Division representative in assessing the plots, rather than making independent estimates. The result of this collaboration was that the data at most of the sites showed a significantly reduced coverage of coal fines present when compared to data from prior or subsequent years. Rather than making an interpretation that the sites experienced a significant reduction in coal fines in 2010, followed by four years of increased concentrations of coal fines, the more likely conclusion is that the 2010 observations were skewed due to input from an additional observer. While valid on its own and meeting the intent of the yearly requirement, the 2010 data should probably not be used in making final conclusions. Thus, the 2010 data is excluded from the chart.




Throughout the years of study, vegetation appeared to be greatly affected by precipitation and temperature patterns. For example, notes in the 2012 report stated "*Very dry conditions for this time of year: vegetation lacking, appears stressed*". The following year's report, conversely, noted "*Overall, vegetation looks much more robust than previous couple of years*". Between 2004 and 2014, the average percent vegetative cover has ranged between 10 and 20 percent. While the data may indicate a slight decline (the two highest percentages were in 2004 and 2008) during the study period, it cannot be attributed to the presence of the coal fines with any certainty. Again, the subjective nature of the observations, as well as the noted weather-related effects, obscure the results. What can be said with certainty is that all types of vegetation continue to be present and growing: shrubs, cacti, perennial forbs, grasses, and annual/colonizer forbs have been noted throughout the monitoring period. Photos from May 2014, provided in Appendix B, reflect these conditions.

## 4.0 CONCLUSIONS

In spite of inherent issues associated with applying the methodology, and the fact that it has become more difficult to implement over time as site conditions change, the data clearly show that the quantity of coal dust on the ground surface near the Emery Mine's 4$^{th}$ East Portal has diminished since the original plot observations were made in 2004. Coal appears to be generally incorporated into the soil matrix – likely due to frost heave, livestock trampling, erosion, runoff, and/or other mechanisms. There is no indication that coal continues to be introduced to the plots. These conclusions are supported by the estimated percent coal cover data (see the previous bar chart and associated trendline) as well as the visual observations of mixing and color changes. Further, vegetative growth appears to be sustained though influenced by weather cycles as typical of the environment around the Emery Mine.

Therefore, it appears that the dust control plan has been successful. As the mine has been idle since December 2011, and with no coal production expected in the near future, it appears that the annual coal dust monitoring has served its purpose. We recommend that it be discontinued at this time.

# APPENDIX A

Annual Results

**Coal Dust Plots – May 4, 2004**

| Site | Coal Surface Cover (%) and Thickness | Live Vegetative Cover (%) | Presence of Cryptogams | Notes |
|---|---|---|---|---|
| 1A | 85 (1-3 mm thick) | 20 | 1 cryp, .5/.25” | |
| 1B | 65 (0.5-2 mm avg) | 20 | 3 colonies | |
| 1C | 60(0.25-2mm thick) | 25 | 1 cryp, qtr size | |
| 2A | 85-90 (1-4mm thick) | 40 | None observed | |
| 2B | 80 (.5- 4 mm thick) | 20 | 1big colony | |
| 2C | 20 (up to 2mm) | 2 | None observed | |
| 3A | 85 (.5-10mm thick) | 20 | 2 quarter size | |
| 3B | 75 (.25- 4 mm thick) | 15 | None observed | |
| 3C | 90 (.25-1.5mm thick) | 15-20 | Various crypts | |

**Coal Dust Plots – February 26, 2008**

| Site | Coal Surface Cover (%) and Thickness | Live Vegetative Cover (%) | Presence of Cryptogams | Notes |
|---|---|---|---|---|
| 1A | 85 (up to 3 mm thick) | 15 | Several, largest 1.5x1” | |
| 1B | 70 (2 mm avg) | 20 | At least 4 small colonies | |
| 1C | 50 (<1 mm thick) | 15 | 4+, varying sizes | Lichen, rock & bedrock |
| 2A | 60 (up to 3 mm thick) | 5 | None observed | Stake uprooted |
| 2B | 85 (up to 4 mm thick) | 25 | 4 colonies, 1.5” | |
| 2C | 20 (surface only) | 15 | None observed | Pebble cover |
| 3A | 60 (up to 6 mm thick) | 20 | None observed | |
| 3B | 70 (up to 4 mm thick) | 10 | 7 or 8 up to 2” | |
| 3C | 85 (<1 mm thick) | 15 | 1 appx 1.25” | |

General Comments and Observations:

1) Stakes were in place at all sites, except for Site 2A. Attempts were made to orient the plot frame along the same general alignment as during the 2004 survey, but it is obvious by vegetation that some variation occurred.

2) Due to the season, vegetation was dormant and no annual forbs or grasses were present. While some species were identifiable and recorded in the field notes, they are not given here.

3) Based upon visual observation and recollection of 2004 conditions, coal has generally become more vertically mixed with native particles. This makes thickness of coal cover, in particular, difficult to assess.

**Coal Dust Plots – May 22, 2008**

| Site | Coal Surface Cover (%) and Thickness | Live Vegetative Cover (%) |
|---|---|---|
| 1A | 80-85 | 15 |
| 1B | 75 | 25 |
| 1C | 50 | 5 |
| 2A | 95 | 10 |
| 2B | 75 | 30 |
| 2C | 45 | 20 |
| 3A | 70 | 20 |
| 3B | 70 | 15 |
| 3C | 60 | 15 |

General Comments and Observations:

1) While attempts were made to orient the plot frame along the same alignment as previous surveys, some variation occurred. If this survey is to continue, recommend placing another corner stake on the diagonal corner to ensure consistency.

2) Coal cover is getting more difficult to estimate. It is getting more mixed in with the native soil, due probably to frost heave, trampling, and perhaps wind. Rather than areas of black coal and brownish soil, most of the area is comprised of varying shades of blackish brown to brownish black, so it is difficult to assign a percentage. We may need to contemplate a soil color-based method if this survey is to continue.

3) Because of 1 and 2 above, along with the inherent subjectivity of the observations, assigning specific trends in either vegetation or coal cover by specific plots is probably not valid. Instead, we should look at averages, and realize that small percentage differences are more likely due to the observational variation and the fact that plots are not exactly replicated.

**Coal Dust Plots – May 13, 2009**

| Site | Free Coal Surface Cover (%) | Mixed Soil/Coal Cover (%)* | Bare Soil and/or Rock Cover (%) | Live Vegetative Cover (%) |
|---|---|---|---|---|
| 1A | 2-3 | 90 -- d | <5 | <5 |
| 1B | 1-2 | 90 -- m | 0-1 | 10 |
| 1C | 0-1 | 15 -- l | 80 | 3-5 |
| 2A | 2-3 | 90 -- m | <5 | 7-10 |
| 2B | 1-2 | 70 -- l | 10 | 20-25 |
| 2C | 0-1 | 40 -- l | 45 | 15 |
| 3A | 5 | 85 -- d | 0-1 | 10-15 |
| 3B | 2-3 | 85 -- l | 3-4 | 10 |
| 3C | 4-5 | 65 -- l | <5 | 20-25 |

*color of mixture: d = dark gray dominant, m = moderately gray, l = light

Note: Coal cover has gotten very difficult to estimate. There was only a very small quantity of coal on the ground surface that was distinguishable as a surface deposit consisting of distinct particles. Instead, continued mixing with the native soil is occurring, and rather than a observing distinct coal deposits, we observed mixtures that range in color from a light grayish brown to a darker brownish gray, depending upon the amount of coal entrained in the soil. We altered measurement categories to try to reflect these observations, but results are still very subjective. Within the mixed soil/coal column, there was a range of the amount of coal mixed in with the soil, as observed by color, but percentages within the mixture could not be estimated. For example, 90 percent of the area at both 1A and 1B was covered by the soil/coal mixture, but at 1A, the mixture contained more coal, as observed by the darker color of the mixture. We recommend using a Munsell soil color-based method, or other similar method, if this survey is to continue.

**Consol Emery Mine - Coal Dust Plots 2010:** Observations made on May 18, 2010 by Karla Knoop (JBR Environmental Consultants, Inc.) and Priscilla Burton (Utah Division of Oil, Gas and Mining)

| Site | Mixed Soil/Coal Cover (%) | Dominant Color of Soil/Coal Mixture | Bare Soil and/or Rock Cover (%) | Color of Bare Soil | Live Vegetative Cover (%) | Notes |
|---|---|---|---|---|---|---|
| 1A | 95 | 10YR 7.5/1 | <2 | 10YR 6/3 | 3 | No cryptogams observed. |
| 1B | 35 | 10YR 5.5/1 | 40 | | 20-25 | No cryptogams observed. |
| 1C | 35 | 10YR 5/3 | 60 | | 4 | Lichen growth noted on a small percentage of the rock. No cryptogams observed. |
| 2A | Plot was destroyed by recent power line construction | | | | | |
| 2B | 35 | 10YR 5/1 | 30 | 10YR 6/2 | 25 | Lichen growth noted on a small percentage of the rock. No cryptogams observed. |
| 2C | 40 | 10YR 6/1 | 50 | 10YR 6/4 | 12 | Lichen growth noted on a small percentage of the rock. Several cryptogams observed. |
| 3A | Plot was destroyed by recent power line construction | | | | | |
| 3B | 10 | 10YR 5/1 | 70 | 10YR 6/3 | 20 | Several cryptogams observed. Recent water erosion appears to have removed some surface coal fines. |
| 3C | 45 | 10YR 6/2 | 45 | | 5 | No cryptogams observed. |

Note: Plots still contain observable amounts of coal particles residing on the ground surface. However, where present these coal particles have become intermixed with native soils. Rather than the more-or-less solid blackened areas that were observed during the first years of monitoring, the majority of the coal-impacted area is currently made up of varying ratios of very fine coal-to-soil particles. This blending results in areas whose colors vary both by value (lighter versus darker) and chroma (intensity versus grayness). To help describe these coal-soil intermixed areas, Munsell soil color notations were recorded. (All color observations at the site were in the same hue: yellow-red.) Where color in these areas begins to reach that of the adjacent native soil, the ratio of coal-to-soil appears to be greatly reduced.

**Consol Emery Mine - Coal Dust Plots 2011:** Observations made on May 11, 2011 by Karla Knoop (JBR Environmental Consultants, Inc.). Peter Behling (Consol Energy, Inc.) and Priscilla Burton (Utah Division of Oil, Gas and Mining) also present.

| Site | Mixed Soil/Coal Cover (%) | Dominant Color of Soil/Coal Mixture | Bare Soil and/or Rock Cover (%) | Color of Bare Soil | Live Vegetative Cover (%) | Notes |
|---|---|---|---|---|---|---|
| 1A | 85-90 | 10YR 4/3 | 5-8 | 10YR 5/4 | 5-10 | No cryptogams observed. Many very small, young annuals (weedy borage?); galleta grass. |
| 1B | 30-35 | 10YR 5/3 | 40 | | 25 | No cryptogams observed. Prickly pear, shadscale, weedy borage. Droppings included in bare soil category. |
| 1C | 25 | 10YR 5/2.5 | 70 | | 3 | Lichen growth noted on a small percentage of the rock. No cryptogams observed. More rock than soil. |
| 2A | Plot destroyed in 2010 during power line construction | | | | | |
| 2B | 50-60 | 10YR 4.5/2 | 5 | | 35-40 | Lichen growth noted on a small percentage of the rock. 3 cryptogams observed. Prickly pear, galetta, borage forb. |
| 2C | 45 | 10YR 5/3 | 50 | | 5 | No cryptogams observed. Galleta, borage, one small young shadscale. |
| 3A | Plot was destroyed by recent power line construction | | | | | |
| 3B | 40 | 10YR 4/2 | 40 | 10YR 5/4 | 15 | Several cryptogams observed. Indian ricegrass, galleta, shrubby flower (composite), small saltbush, borage. |
| 3C | 90 | 10YR 4/2 & 10YR 4.5/4 | 5 | | 5 | No cryptogams observed. Indian ricegrass, galleta, prickly pear, borage, shrubby composite, shad scale. Coal/soil mix varies in percentage – two colors are given. |

Note: Ground was moist/rain was occurring sporadically during the monitoring. Color observations were not consistent and were affected by the varying moisture conditions.

**Consol Emery Mine - Coal Dust Plots 2012:** Observations made on May 9, 2012 by Karla Knoop (JBR Environmental Consultants, Inc.). Peter Behling (Consol Energy, Inc.) also present.

| Site | Mixed Soil/Coal Cover (%) | Dominant Color of Soil/Coal Mixture | Bare Soil and/or Rock Cover (%) | Live Vegetative Cover (%) | Notes |
|---|---|---|---|---|---|
| 1A | 95 | 10YR 4/2 | 2 | 3 | No cryptogams observed. A few small, young annuals; galleta grass. Dead wood and other litter. |
| 1B | 40 | 10YR 5/4 | 40 | 20 | No cryptogams observed. Prickly pear, shadscale. Not clear distinction between mixed soil and bare soil, grades from one to the other based on color. |
| 1C | 20 | 10YR 6/4 | 80 | 1 | Lichen growth noted on a small percentage of the rock. No cryptogams observed. More rock than soil. |
| 2A | Plot destroyed during power line installation | | | | |
| 2B | 75 | 10YR 6/3 | 5 | 20 | Lichen growth noted on a small percentage of the rock. 3 cryptogams observed. Prickly pear, galetta indian ricegrass, forb (mustard?). Two small cryptogams. |
| 2C | 45 | 10YR 5/4 | 50 | 5 | No cryptogams observed. Galleta, forb, astragalus type, townsendia type. Not clear distinction between mixed soil and bare soil. |
| 3A | Plot destroyed during power line installation | | | | |
| 3B | 40 | 10YR 6/4 | 40 | 15 | Small cryptogams observed. Indian ricegrass, galleta, forbs, blooming mustard? Soil cracking (frost related?) Not clear distinction between mixed soil and bare soil. |
| 3C | 95 | 10YR 5/4 | 2 | 3 | One dead/dying cryptogam observed. Indian ricegrass, galleta, prickly pear, other. |

Note: Bare ground continues to evolve in coal/native soil percentages – seems to be less and less of a distinction (more mixing), except that coal (grayer) areas persist under larger wood plant structures. Very dry conditions for this time of year: vegetation lacking, appears stressed. For example, prickly pear and cryptogams were shriveled.

**Consol Emery Mine - Coal Dust Plots 2013:** Observations made on May 29, 2013 by Karla Knoop (JBR Environmental Consultants, Inc.).

| Site | Mixed Soil/Coal Cover (%) | Dominant Color of Soil/Coal Mixture | Bare Soil and/or Rock Cover (%) | Live Vegetative Cover (%) | Notes |
|---|---|---|---|---|---|
| 1A | 73 | 10YR 4/2 | 2 | 25 | One small cryptogam. Good growth of galleta grass; a lot of halogeton. Dead wood and other litter. Recent trampling/ground disturbance from cows. |
| 1B | 60 | 10YR 5/3 | 10 | 30 | No cryptogams observed. New grown on perennials; annuals sprouting. Not clear distinction between mixed soil and bare soil, grades from one to the other based on color; color noted is average color observed. |
| 1C | 18 | 10YR 6/3 | 80 | 2 | Lichen growth; no cryptogams observed. More rock than soil. |
| 2A | Plot destroyed during power line installation | | | | |
| 2B | 60 | 10YR 6/3 | 15 | 25 | 1 cryptogams observed. Prickly pear has new growth, galetta and indian ricegrass doing well, mustard and globe mallow present. Soil color ranges; average reflected in column. |
| 2C | 50 | 10YR 6/4 | 45 | 3 | No cryptogams observed. Robust vegetation; also halogeton. Litter also present. Not clear distinction between mixed soil and bare soil. |
| 3A | Plot destroyed during power line installation | | | | |
| 3B | 45 | 10YR 6/4 | 45 | 10 | No cryptogams observed. Indian ricegrass, galleta, forbs, blooming mustard. Soil trampling by cattle. Not clear distinction between mixed soil and bare soil. |
| 3C | 90 | 10YR 5/4 | 7 | 3 | One cryptogam observed. Indian ricegrass, galleta, prickly pear, other. |

Note: Overall, vegetation looks much more robust than previous couple of years. Cattle have been in area and some plots were trampled and stakes knocked over.

**Consol Emery Mine - Coal Dust Plots 2014:** Observations made on May 21, 2014 by Karla Knoop (JBR Environmental Consultants, Inc.).

| Site | Mixed Soil/Coal Cover (%) | | Bare Soil and/or Rock Cover (%) | Live Vegetative Cover (%) | Notes |
|---|---|---|---|---|---|
| 1A | 75 | 10YR 6/3 | 5 | 20 | Growth of galleta grass, but appears dry; old and new halogeton growth. Dead wood and other litter. Recent trampling/ground disturbance from cows. No cryptogams observed. |
| 1B | 35 | 2.5Y 6/4 | 40 | 25 | Shadscale, prickly pear; annuals sprouting. Only in spots is coal mix very evident; most so in disturbed area on left side of plot. No cryptogams observed. |
| 1C | 10 | 2.5Y 6/4 | 88 | 2 | Lichen growth; no cryptogams observed. More rock than soil. Shrubs, small annual borage noted. |
| 2B | 60 | 10YR 6/3 | 15 | 30 | Prickly pear, shadscale, galetta and indian ricegrass, mustard and globe mallow present. Some in bloom; halogeton sprouts present. Variations in soil color. No cryptogams observed within plot, but present just outside. |
| 2C | 45 | 10YR 7/4 | 45 | 5 | Animal presence obvious. Blooming forbs, also halogeton. Litter also present. Not clear distinction between mixed soil and bare soil. No cryptogams observed within plot, but present just outside. |
| 3B | 50 | 2.5Y 6/4 | 45 | 5 | No cryptogams observed. Indian ricegrass, galleta, forbs, blooming mustard. Soil trampling by cattle. Not clear distinction between mixed soil and bare soil. |
| 3C | 90 | 10YR 6/3 | 7 | 3 | One cryptogam observed. Indian ricegrass, galleta, prickly pear, low sage, small borage. |

Note: Vegetation less robust than in 2013, but actively growing. Many new halogeton sprouts across the site.

# APPENDIX B

May 21, 2014 Plot Photos

# 2014 DUST PLOT PHOTOS

**1c**

**1b**

**1a**

# 2014 DUST PLOT PHOTOS

**2c**

**2b**

# 2014 DUST PLOT PHOTOS

**3c**

**3b**