

June 27, 2019

Permit Supervisor
Utah Coal Regulatory program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, UT 84114-5801

Re: Phase 3,4 Construction As-built Information Amendment, Canyon Fuel Company, LLC, Sufco Mine, Sufco Waste Rock Site, Permit Number C/041/0002

Dear Sirs,

The construction of phase 3 and 4 of the Sufco Waste Rock Site was completed fall of 2018. This amendment includes as-built information and other required documentation regarding construction and soil salvage. The lab data associated with the topsoil composite samples required by the division is still being processed. This data will be submitted to the division as soon as the results are received.

Topsoil and subsoil piles were pocked and gouged and berms were constructed as required. Seeding and stabilization of the piles will occur fall 2019. Proper signage has been installed and all drainage controls are in place and functioning properly throughout the site.

The chapter text submitted contains redline/strikeout formatting. Clean copies of this amendment will include adjusted pagination and updated tables of contents as needed.

Thank you for reviewing this amendment. If you have questions or need additional information, please contact Bryant Bunnell at (435) 286-4490.

Regards,



Bryant Bunnell
Environmental Engineer

Canyon Fuel Company, LLC
SUFSCO Mine
P: (435) 286 – 4490
E: bbunnell@wolverinefuels.com

Encl.

cc: DOGM Correspondence File

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine, WRS

Permit Number: C/041/0002

Title: WRS As-Built Information Amendment

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

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

- Yes No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
- Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does the application require or include public notice publication?
- Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
- Yes No 10. Is the application submitted as a result of other laws or regulations or policies?

Explain: _____

- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- Yes No 13. Does the application require or include collection and reporting of any baseline information?
- Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 15. Does the application require or include soil removal, storage or placement?
- Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes No 19. Does the application require or include certified designs, maps or calculation?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided?
- Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
- Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach one (1) review copy of the application.

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

Jim Abshire
Print Name

[Signature] Engineering Manager, 6/27/19
Sign Name, Position, Date

Subscribed and sworn to before me this 27th day of June, 2019

Jill White
Notary Public
My commission Expires: 3/28, 2020
Attest: State of Utah } ss:
County of Sevier



JILL WHITE
Notary Public
State of Utah
My Commission Expires 03/28/2020
COMMISSION NUMBER 687959

<p>For Office Use Only:</p>	<p>Assigned Tracking Number:</p>	<p>Received by Oil, Gas & Mining</p>
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CHAPTER 2
SOILS

Phase 1, 2 - Soil Salvage Summary - Post Construction (Completed 2016)

Salvage Estimates	Phase 1, 2 - Topsoil (cy)	Phase 1,2 - Subsoil (cy)	Total (cy)
Estimated Potential Salvage ^{1,2,3}	36,356	29,730	66,086
Estimated Salvage - Soil in Storage ⁴	27,900	25,850	53,750

Notes:

0. All quantities are approximate.
1. See Section 222 and 234 for more information on soil types, soil unit designation and topsoil/subsoil salvage quantities.
2. This estimate includes topsoil previously stored and re-handled, see Pre-Expansion- Historic Table MRP, Volume 3, p. 2-4.
3. This estimate reflects a deduction of topsoil and subsoil placed on lift 5 (pre-expansion) in June 2016.
4. See Appendix VIII for As-Built Information.

Phase 3, 4 - Soil Salvage Summary - Post Construction (Completed 2018)

Salvage Estimates	Phase 3, 4 - Topsoil (cy)	Phase 3, 4 - Subsoil (cy)	Total (cy)
Estimated Potential Salvage ^{1,2}	32,538	36,972	69,510
Estimated Salvage - Soil in Storage ³	36,510	29,493 ⁴	66,003

Notes:

0. All quantities are approximate.
1. See Section 222, 234 and Appendix V(A) for more information on soil types, soil unit designation and topsoil/subsoil salvage quantities.
2. This estimate includes re-handled material, see Pre-Expansion- Historic Table MRP, Volume 3, p. 2-4.
3. See Appendix VIII for As-Built Information.
4. This estimate includes soil stock piled as well as soil used to construct berms.

Phase 5, 6 - Soil Salvage Summary - Pre – Construction (TBD)

Salvage Estimates	Phase 5, 6 - Topsoil (cy)	Phase 5,6 - Subsoil (cy)	Total (cy)
Estimated Potential Salvage ^{1,2}	33,429	28,680	62,109
Estimated Salvage - Soil in Storage	TBD	TBD	TBD

Notes:

0. All quantities are approximate.
1. See Section 222, 234 and Appendix V(A) for more information on soil types, soil unit designation and topsoil/subsoil salvage quantities.
2. This estimate includes re-handled material, see Pre-Expansion- Historic Table MRP, Volume 3, p. 2-4.

SUFCO WRS Expansion Sequence - Soil Salvage Summary

Sequence Event	Topsoil (cy)	Subsoil (cy)	Total (cy)
Ph. 1,2 Construction - Soil Salvaged (Completed 2016)	27,900	25,850	53,750
Total Soil in Storage	27,900	25,850	53,750
Ph. 3,4 Construction - Soil Salvaged (Completed 2018)	36,510	29,493	66,003
(Current as of Nov. 2018) Total Soil in Storage	64,410	55,343	119,753
Ph. 1,2 Reclamation - Soil Placed ¹	17,779	17,779	35,558
Total Soil in Storage	46,631	37,564	84,195
Ph. 3 Reclamation - Soil Placed	19,295	19,295	38,591
Total Soil In Storage	27,336	18,269	45,604
Ph. 5, 6 Construction - Soil Salvaged	33,429	28,680	62,109
Total Soil in Storage	60,765	46,949	107,713
Ph. 4 Reclamation - Soil Placed	15,907	15,907	31,815
Total Soil in Storage	44,857	31,041	75,898
Ph. 5 Reclamation - Soil Placed	17,489	17,489	34,977
Total Soil in Storage	27,369	13,553	40,921
Ph. 6 Reclamation - Soil Placed	8,325	8,325	16,650
Total Soil in Storage	19,044	5,228	24,272
Ph. 1 Reclamation - Soil Placed ²	4,496	4,496	8,993
Final Residual Storage³	14,548	732	15,279

Notes:

0. All quantities are approximate.
1. The portion of phase 1 that is part of the Phase 2 waste rock cell.
2. The portion of phase 1 that is not covered with waste rock (e.g. large sediment pond).
3. All final residual stored soils will be added to the last phase reclaimed.

Appendix V(A)
Soil Survey Reports

Phase 3, 4 Construction
Soil Survey and Soil Salvage Reports

Supplementary Soil Report

Sufco Mine Waste Rock Site Disposal Site Phase 3 and 4 Expansion Soil Salvage Project



Location:

Sufco Mine Waste Rock Disposal Site

Prepared for:

Sufo Mine

Prepared by:

Jones & DeMille Engineering
1535 South 100 West
Richfield, Utah 84701
(435) 896-8266



September 21, 2018

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1. Introduction

Jones and DeMille Engineering conducted a soil survey to supplement a survey conducted by Long Resource Consultants (LRC) in 2013 for the Sufco Mine Waste Rock Disposal Site expansion project (LRC 2013). The supplementary soil survey was conducted on August 31 and September 4, 2018. Jones and DeMille Engineering was also on-site during the majority of the topsoil salvage operation for Phase 3, and has provided estimated salvage depths based on observations.

Sufco Environmental Engineering staff have reviewed the findings of this supplementary report and concur with the findings.

2. Methodology

This soil survey is meant to provide supplementary soils information for the Waste Rock Disposal Site expansion project, beyond what soils information is provided by the LRC soil survey report. The LRC soil survey included several soil test pits in the general vicinity of the project area, and the LRC survey report was used as a guide and reference to extrapolate topsoil and subsoil salvage depth information based on surveys of soil pits that were excavated specifically for the Phase 3 and 4 portions of the expansion project.

3. Results

Test pits were excavated to an approximate depth of 6 feet by a trackhoe, or test pits were hand-excavated to a depth of approximately 15 inches (TP-4.8 and TP-4.9). Seven test pits were excavated for the Phase 3 cell, while nine test pits were excavated for the Phase 4 cell. The soil survey results are summarized as follows:

Test Pit TP-3.1

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; leaves and twigs.

A – 1 to 36 cm (0.4 to 14 in.); 10YR 4/2 dry; 10YR 2/2 moist; sandy loam; soft; weak medium subangular blocky to moderate medium granular structure.

B – 36 to 79 cm (14 to 31 in.); 10YR 5/2 dry; 10YR 3/2 moist; sandy loam; slightly hard; moderate medium subangular blocky structure.

C – 79 to 128 cm (31 to 50.5 in.); 2.5Y 7/4 dry; 2.5Y 6/4 moist; sand; slightly hard; gravel and cobbles 25% by volume; moderate medium subangular blocky structure.

R – Castlegate sandstone at 128 cm (50.5 in.) depth

Test Pit TP-3.2

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; leaves and twigs.

A – 1 to 25 cm (0.4 to 10 in.); 10YR 4/2 dry; 10YR 3/2 moist; sandy loam; soft; weak medium subangular blocky to moderate medium granular structure.

B – 25 to 64 cm (10 to 25 in.); 10YR 5/2 dry; 10YR 3/2 moist; sandy loam; slightly hard; some 10-inch diameter boulders in horizon; moderate medium subangular blocky structure.

C – 64 to 84 cm (25 to 33 in.); 10YR 6/3 dry; 10YR 6/4 moist; sand; slightly hard; gravel and cobbles throughout horizon 50% by volume; weak to moderate medium subangular blocky structure.

R – Castlegate sandstone at 84 cm (33 in.) depth

Test Pit TP-3.3

A – 0 to 34 cm (0 to 13.5 in.); 10YR 6/3 dry; 10YR 4/3 moist; sandy loam; soft; weak medium subangular blocky to moderate medium granular structure.

AB – 34 to 72 cm (13.5 to 28.5 in.); 10YR 5/2 dry; 10YR 4/2 moist; sandy loam; slightly hard. Narrow band (2 inches) of increased clay content, but is not representative of the horizon as a whole; weak to moderate medium subangular blocky structure.

Bt – 72 to 168 cm (28.5 to 66 in.); 10YR 4/2 dry; 10YR 3/2 moist; silty clay loam; slightly hard; white streaking throughout horizon, likely carbonate leaching; moderate medium subangular blocky structure.

Restrictive Layer: None

Test Pit TP-3.4

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; Leaves and Twigs.

A – 1 to 46 cm (0.4 to 18 in.); 10YR 4/2 dry; 10YR 2/2 moist; sandy loam; soft; weak medium subangular blocky to moderate medium granular structure.

B – 46 to 74 cm (18 to 29 in.); 10YR 4/2 dry; 10YR 2/2 moist; sandy loam; slightly hard; occasional sandstone boulder in horizon, but no other rock; moderate medium subangular blocky structure.

C – 74 to 100 cm (29 to 39.5 in.); 10YR 6/4 dry; 10YR 5/4 moist; sandy clay loam; very hard; few rocks scattered throughout horizon; strong medium subangular blocky structure.

R – Castlegate sandstone at 100 cm (39.5 in.) depth

Test Pit TP-3.5

A – 0 to 48 cm (0 to 19 in.); 10YR 5/2 dry; 10YR 3/2 moist; silty clay loam; slightly hard; weak medium subangular blocky to moderate medium granular structure.

AB – 48 to 99 cm (19 to 39 in.); 10YR 4/2 dry; 10YR 2/2 moist; silt loam; moderately hard; white streaking throughout, likely carbonate leaching; weak to moderate medium subangular blocky structure.

Bt – 99 to 168 cm (39 to 66 in.); 10YR 4/2 dry; 10YR 3/2 moist; clay loam; slightly hard; white streaking throughout, likely carbonate leaching; moderate medium subangular blocky structure.

Restrictive Layer: None

Test Pit TP-3.6

A1 – 0 to 34 cm (0 to 13.5 in.); 2.5Y 7/3 dry; 2.5Y 6/3 moist; silt loam; very hard; moderate medium platy structure (30% by volume), strong medium subangular blocky structure (70% by volume).

A2 – 34 to 77 cm (13.5 to 30.5 in.); 10YR 5/3 dry; 10YR 3/3 moist; sandy loam; soft; weak medium subangular blocky to moderate medium granular structure.

Bt – 77 to 168 cm (30.5 to 66 in.); 10YR 4/2 dry; 10YR 3/2 moist; clay loam; slightly hard; moderate medium subangular blocky structure.

Restrictive Layer: None

Test Pit TP-3.7

A1 – 0 to 33 cm (0 to 13 in.); 2.5Y 6/2 dry; 2.5Y 5/2 moist; clay; very hard; moderate medium platy structure.

A2 – 33 to 66 cm (13 to 26 in.) 10YR 5/3 dry; 10YR 4/3 moist; sandy loam; hard; moderate medium subangular blocky structure.

B – 66 to 168 cm (26 to 66 in.); 10YR 4/2 dry; 10YR 2/2 moist; silt loam; slightly hard; moderate medium subangular blocky structure.

Restrictive Layer: None

Test Pit TP-4.1

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; Leaves and Twigs.

A – 1 to 36 cm (0.4 to 14 in.); 10YR 5/2 dry; 10YR 3/2 moist; sandy loam; soft; weak medium granular structure.

B – 36 to 86 cm (14 to 34 in.) 10YR 5/2 dry; 10YR 3/2 moist; sandy loam; slightly hard; moderate medium subangular blocky structure.

C – 86 to 127 cm (34 to 50 in.): 10YR 6/3 dry and 10YR 5/4 moist (50%); 10YR 6/6 dry and 10YR 5/6 moist (50%); loamy sand; slightly hard; weak medium granular structure; gravel and cobbles throughout, with some sandstone boulders.

Restrictive Layer: gravel and cobbles in C Horizon.

Test Pit TP-4.2

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; Leaves and Twigs.

A – 1 to 28 cm (0.4 to 11 in.); 10YRY 5/2 dry; 10YR 2/2 moist; sandy loam; soft; weak medium subangular blocky to weak medium granular structure.

B – 28 to 79 cm (11 to 31 in.) 10YR 6/3 dry; 10YR 4/3 moist; loamy sand; moderately hard; moderate medium subangular blocky structure.

C – 79 to 142 cm (31 to 56 in.): 10YR 7/2 dry; 10YR 5/3 moist; sandy loam; soft; moderate medium granular structure.

Restrictive Layer: Some rock in C Horizon.

Test Pit TP-4.3

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; Leaves and Twigs.

A – 1 to 39 cm (0.4 to 15.5 in.); 10YR 3/2 dry; 10YR 2/2 moist; sandy loam; soft; weak medium granular structure.

B – 39 to 90 cm (15.5 to 35.5 in.) 10YR 5/2 dry; 10YR 3/2 moist; sandy loam; moderately hard; moderate medium subangular blocky structure.

B – 90 to 152 cm (35.5 to 60 in.): 10YR 5/3 dry; 10YR 4/4 moist; sandy loam; slightly hard; weak fine subangular blocky structure.

Restrictive Layer: Some cobbles and gravel at approximately 50 inches depth.

Test Pit TP-4.4

A – 0 to 38 cm (0 to 15 in.); 10YR 5/2 dry; 10YR 4/2 moist; silt loam; soft to slightly hard; moderate medium granular to weak medium subangular blocky structure.

AB – 38 to 75 cm (15 to 29.5 in.) 10YR 5/3 dry; 10YR 4/2 moist; sandy loam; slightly hard; weak to moderate medium subangular blocky structure.

B – 75 to 168 cm (29.5 to 66 in.): 10YR 4/2 dry; 10YR 3/2 moist; sandy clay loam; soft to slightly hard; weak medium subangular blocky structure; white streaking throughout horizon, likely carbonate leaching.

Restrictive Layer: None

Test Pit TP-4.5

O – 0 to 1 cm (0 to 0.4 in.); 10YR dry; 10YR moist; Leaves and Twigs.

A1 – 1 to 23 cm (0.4 to 9 in.); 10YR 5/2 dry; 10YR 3/2 moist; silty clay loam; moderately hard; moderate medium subangular blocky to moderate medium granular structure.

Bt – 23 to 168 cm (9 to 66 in.): 10YR 4/2 dry; 10YR 2/2 moist; silty clay loam; moderately hard; moderate medium subangular blocky structure; 6% clay film on all faces of peds.

Restrictive Layer: None

Test Pit TP-4.6

A1 – 0 to 23 cm (0 to 9 in.); 10YR 5/2 dry; 10YR 4/2 moist; clay; very hard; moderate medium platy structure.

A2 – 23 to 53 cm (9 to 21 in.)

Sandy loam (50%): 10YR 6/3 dry; 10YR 5/3 moist; moderately hard; moderate medium subangular blocky structure.

Sandy clay loam (50%): 10YR 6/2 dry; 10YR 4/2 moist; moderately hard; moderate medium subangular blocky structure.

B – 53 to 168 cm (21 to 66 in.): 10YR 4/2 dry; 10YR 3/2 moist; silty clay loam; moderately hard; weak medium subangular blocky structure.

Restrictive Layer: None

Test Pit TP-4.7

A – 0 to 18 cm (0 to 7 in.); 10YR 6/2 dry; 10YR 4/2 moist; clay; very hard; moderate medium platy structure.

Bt – 18 to 74 cm (7 to 29 in.) 10YR 5/2 dry; 10YR 3/2 moist; silty clay loam; moderately hard; strong medium subangular blocky structure; 12% clay film on all faces of peds.

B – 74 to 168 cm (29 to 66 in.): 10YR 5/2 dry; 10YR 3/2 moist; silty clay loam; moderately hard; strong medium subangular blocky structure.

Restrictive Layer: None

Test Pit TP-4.8

Hand-excavated pit revealed approximately 11.5 inches of topsoil associated with this location.

Test Pit TP-4.9

Hand-excavated pit revealed approximately 14.5 inches of topsoil associated with this location.

4. Conclusion

Topsoil and subsoil salvage depths were produced by evaluating the LRC soil survey report findings in-conjunction with information gathered from surveying new soil test pits for Phases 3 and 4. Sufco Environmental Engineering staff have reviewed and accepted the recommended soil salvage depths in the table below:

Table 4-1. Estimated Soil Salvage Depths

Test Pit #	Topsoil Depth (inches)	Subsoil Depth (inches)	Subsoil Depth Restrictions
TP-3.1	14	17	Rock and sandstone
TP-3.2	10	15	Rock and sandstone
TP-3.3	28.5	50*	None
TP-3.4	18	29	Hard clay/rock and sandstone
TP-3.5	39	50*	None
TP-3.6	30.5	50*	None
TP-3.7	26	50*	None
TP-4.1	14	20	Rock and sandstone
TP-4.2	11	20	Rock and sandstone
TP-4.3	15.5	35	Rock
TP-4.4	29.5	50*	None
TP-4.5	10	50*	None
TP-4.6	21	50*	None
TP-4.7	7	50*	None
TP-4.8	11.5	50**	None
TP-4.9	14.5	50**	None

*Estimate based on lack of restrictive layers, but limiting depth based on LRC report for nearby 13SF03 and 13SF05, which decreased in AWC in subsoil and decreased in soil OM near this depth.

**Pit was hand-excavated to determine depth of topsoil only. Estimating 50 inches of available subsoil based on characteristics of adjacently located test pits.

Phase 3 Topsoil Depth Verification

Approximate topsoil depths were monitored during the majority of topsoil salvage for Phase 3, and are represented on the map in Figure 18. Generally, topsoil depth estimations derived from soil pit data were relatively representative of observed topsoil depths of Phase 3 as a whole.

5. References

Long Resource Consultants. 2014. Proposed Expansion of the Existing Waste Rock Area at the Sufco Mine, Located East of Salina, Utah. January 26, 2014.

Appendix A. Figures and Photos

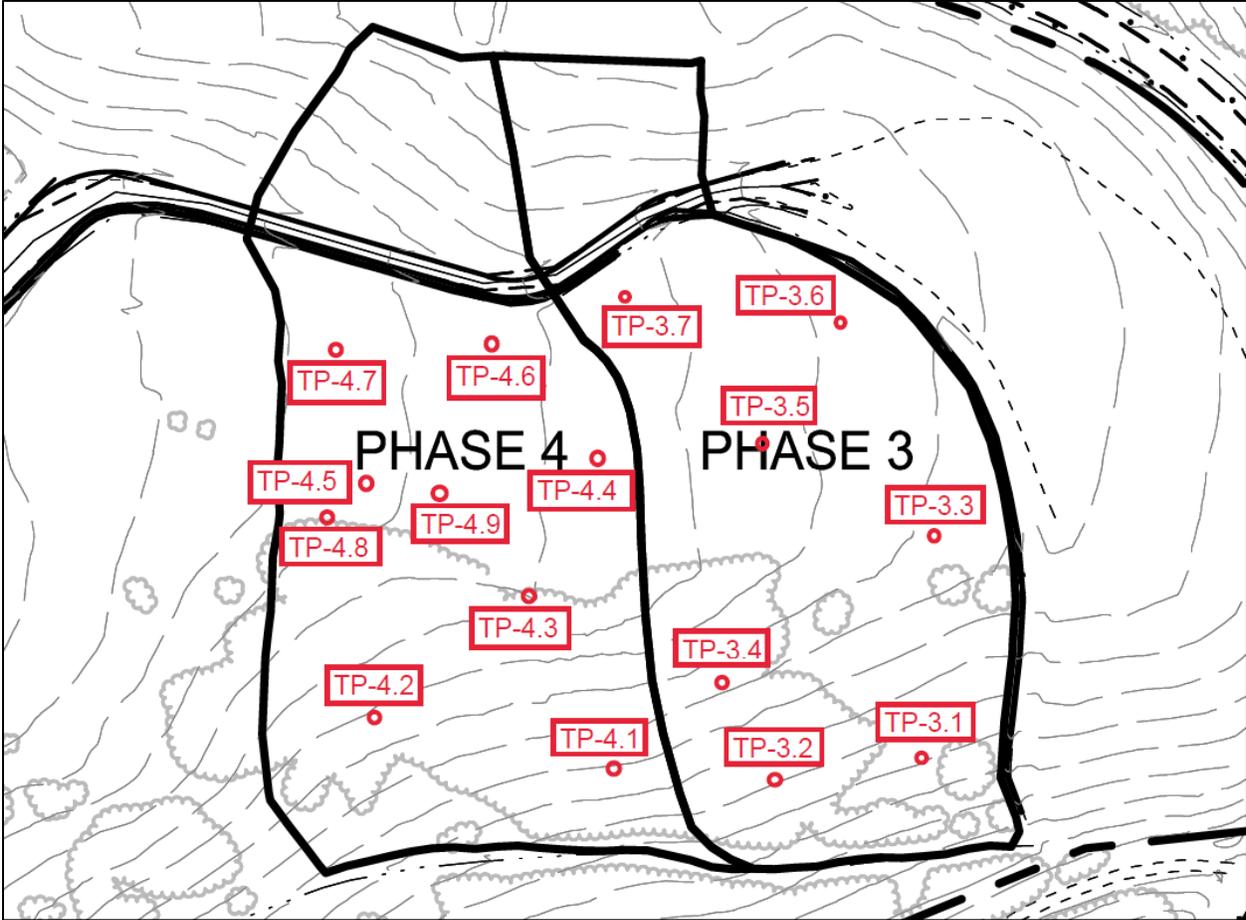


Figure 1. Approximate soil test pit locations in relation to the expansion phase boundaries.



Figure 2. Test Pit TP-3.1.



Figure 3. Test Pit TP-3.2.



Figure 4. Test Pit TP-3.3.



Figure 5. Test Pit TP-3.4



Figure 6. Test Pit TP-3.5.



Figure 7. Test Pit TP-3.6.



Figure 8. Test Pit TP-3.7.



Figure 9. Test Pit TP-4.1.



Figure 10. Test Pit TP-4.2



Figure 11. Test Pit TP-4.3.



Figure 12. Test Pit TP-4.4.



Figure 13. Test Pit TP-4.5.



Figure 14. Test Pit TP-4.6.



Figure 15. Test Pit TP-4.7.



Figure 16. Test Pit TP-4.8.



Figure 17. Test Pit TP-7.9.

CORPORATE

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38 West 100 North
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435.781.1988

MEMORANDUM

DATE: October 26, 2018
TO: Bryant Bunnell – Project Manager/Environmental Engineer
FROM: Wyatt Shakespear
PROJECT: Sufco Mine Waste Rock Site Soil Salvage Project 2018
PROJECT NO: 1808-154
RE: Soil Salvage Progress as of 8-24-2018

Introduction

Jones and DeMille Engineering (JDE) conducted a soil survey to supplement a survey conducted by Long Resource Consultants (LRC) in 2013 for the Sufco Mine Waste Rock Disposal Site expansion project. The supplementary soil survey was conducted on August 31 and September 4, 2018. JDE conducted a site visit near the end of the soil salvage operation on October 24, 2018 in order to verify that all topsoil had been removed from areas consisting of Phases 3 and 4.

Sufco Environmental Engineering staff were present during the site visit, and concur with the findings of the site visit. The methods and results of the site visit are detailed in this memo.

Methods

JDE conducted a site visit of the soil salvage operation on October 24, 2018 in order to verify that all topsoil had been removed from areas consisting of Phases 3 and 4. Verification consisted of walking portions of the salvaged areas, excavating test pits with a shovel, and comparing soil characteristics to those found in LRC 2013 soil report and the JDE 2018 report.

Special attention was given to areas associated with the north facing slope on the southern boundary of Phases 3 and 4; these steep areas present challenges for equipment operators in salvaging all topsoil, and portions of the slope had suspect dark soils on the surface that appeared to either be an A or B horizon. Suspect soils were evaluated and determined to be either topsoil or subsoil.

Results and Conclusion

Overall, the salvage operation appears to have gone well. The vast majority of topsoil has been removed and stockpiled. The only previously salvaged areas that have residual topsoil were associated with the very southern edge of Phases 3 and 4, located on the steep north facing slope just below the undisturbed ditch. This topsoil identification determination was confirmed by excavating a test pit in an adjacent undisturbed area located south of the undisturbed ditch. Mr. Bryant Bunnell with Sufco Mine indicated that the contractor would salvage the residual topsoil and stockpile it appropriately.

Throughout the slope on the southern end of Phases 3 and 4, exposed soil consisted of either a yellow sand or loamy sand, or a somewhat dark and grey sandy loam or loamy sand. An evaluation of soil characteristics on the slope determined that the yellow sand or loamy sand was the C horizon, and the darker sandy loam or loamy sand was the B horizon. The darkness of the B horizon was made more noticeable than it would be otherwise because of the abundant soil moisture resulting from recent precipitation events. The apparent variation of soil color and distribution is a result of inconsistencies in the subsoil horizon depths below the topsoil, and portions of the yellow C horizon protruding into the darker B horizon.

Very little subsoil was salvaged from this area as the subsoil on the hill slope is generally quite rocky and would yield poor available water capacity for reclamation purposes.

Photos of the site visit are included below:



Figure 1. Located at the southern end of Phase 3 (facing north), analyzing soil characteristics following topsoil salvage operations of the area.



Figure 2. Located at the southeastern end of Phase 3 (facing northwest), following topsoil salvage operations of the area.



Figure 3. Located at the southern end of Phase 4 (facing east), following topsoil salvage operations of the area.

Appendix VIII

Density Data

Phase 3, 4 Construction
Density Lab Data and Compaction Reports



Jones & DeMille
 1535 South 100 West
 Richfield, Utah 84701
 Phone: (435) 896-8266
 Fax:

Project: Main 2019

Phone:
 Fax:

DENSITY REPORT

NUCLEAR MOISTURE DENSITY TEST DATA			
DATE:	6/10/2019	STANDARD COUNT N(D)=:	2091
REPORT NUMBER:	26	STANDARD COUNT N(M)=:	689
TECHNICIAN'S NAME:	Jaron Coleman	MATERIAL:	native on site
PROJECT NAME:	sufco waste rock	SOURCE:	
PROJECT NUMBER:	1607-335	MAXIMUM OBTAINABLE DENSITY (PCF):	119.5
ENGINEER:		OPTIMUM MOISTURE (%):	10.8
TROXLER NUMBER:	65823	COMPACTION REQUIRED (%):	95+

TEST RESULTS:							
TEST STATION	OFFSET	REFERENCE /LIFT	PROB DEPTH	WET DENSITY	DRY DENSITY	% MOISTURE	% COMPACTION
slope, east side 7		top	6"	127.3	116.4	9.4	97.4
slope, middle 8		top	6"	128.2	116.4	10.1	97.4
slope, west side 9		top	6"	127.6	118.7	7.5	99.3

COMMENTS:



ATTACH PICTURE:



EMAIL REPORT:

-



Jones & DeMille
 1535 South 100 West
 Richfield, Utah 84701
 Phone: (435) 896-8266
 Fax:

Project: Main 2019

Phone:
 Fax:

DENSITY REPORT

NUCLEAR MOISTURE DENSITY TEST DATA			
DATE:	6/10/2019	STANDARD COUNT N(D)=:	2091
REPORT NUMBER:	27	STANDARD COUNT N(M)=:	689
TECHNICIAN'S NAME:	Jaron Coleman	MATERIAL:	native on site
PROJECT NAME:	sufco waste rock	SOURCE:	
PROJECT NUMBER:	1607-335	MAXIMUM OBTAINABLE DENSITY (PCF):	113.4
ENGINEER:		OPTIMUM MOISTURE (%):	13.7
TROXLER NUMBER:	65823	COMPACTION REQUIRED (%):	95+

TEST RESULTS:							
TEST STATION	OFFSET	REFERENCE /LIFT	PROB DEPTH	WET DENSITY	DRY DENSITY	% MOISTURE	% COMPACTION
north edge pad, east side 1		top	6"	126.1	112.5	12.1	99.2
north edge pad, middle 2		top	6"	124.3	110.7	12.3	97.6
north edge pad, west 3		top	6"	126.6	113.3	11.7	99.9

COMMENTS:

ATTACH PICTURE:



ATTACH PICTURE:



EMAIL REPORT:

-



Jones & DeMille
 1535 South 100 West
 Richfield, Utah 84701
 Phone: (435) 896-8266
 Fax:

Project: Main 2017

Phone:
 Fax:

DENSITY REPORT

NUCLEAR MOISTURE DENSITY TEST DATA			
DATE:	12/20/2018	STANDARD COUNT N(D)=:	2328
REPORT NUMBER:	254	STANDARD COUNT N(M)=:	683
TECHNICIAN'S NAME:	Jaron Coleman	MATERIAL:	native ph3
PROJECT NAME:	sufco waste rock testing	SOURCE:	
PROJECT NUMBER:	1607-335	MAXIMUM OBTAINABLE DENSITY (PCF):	113.4
ENGINEER:		OPTIMUM MOISTURE (%):	13.7
TROXLER NUMBER:	65824	COMPACTION REQUIRED (%):	90+

TEST RESULTS:							
TEST STATION	OFFSET	REFERENCE /LIFT	PROB DEPTH	WET DENSITY	DRY DENSITY	% MOISTURE	% COMPACTION
east edge pad middle section	4		4	115.5	107.0	8.0	94.4
middle pad middle section	5		4	117.0	107.9	8.4	95.1
west edge middle section	6		4	117.8	109.3	7.8	96.4

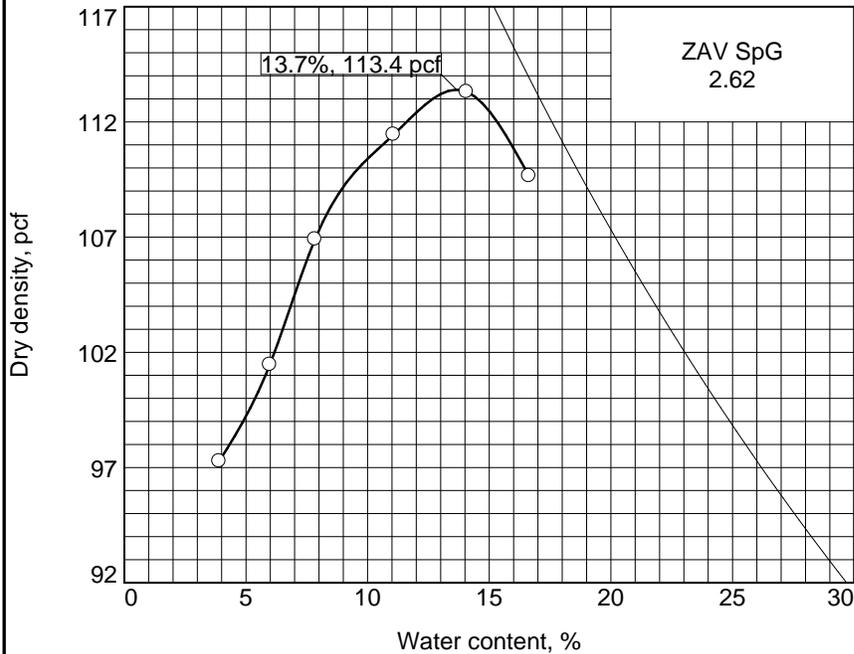
COMMENTS:
 tested in 3 lines (north, middle, south) where snow was cleared off pad. the north line was very dry and i tried multiple locations on west middle and east locations. the material was very silty on the top and though it was a bit frozen would not read very dense at all 80-85% was a constant avg (using the 113.4 proc) i tested between 6-8 areas in each quadrant (north west, north middle, north east, south west, south middle, south east) and same result 80-85% was as high as tests were coming in.
 there was an area that a dozer had pushed out down the middle section (east middle, middle middle, west middle) the area was 6-8" lower than the elevation of the rest of the pad and that where the 3 passing tests came from. each of those areas only required 1 test in each location.

ATTACH PICTURE:

EMAIL REPORT:
 -mark@jonesanddemille.com

COMPACTION TEST REPORT

Curve No. 571



Preparation Method	As Received	
Rammer: Wt.	5.5 lb.	Drop 12 in.
Type	automatic	
Layers: No.	three	Blows per 56
Mold Size	0.075 cu. ft.	
Test Performed on Material	Passing 3/4 in. Sieve	
%>3/4 in.	%<No.200	
Atterberg (D 4318): LL	PI	
NM (D 2216)	Sp.G. (D 854) 2.62	
USCS (D 2487)		
AASHTO (M 145)		
Date: Sampled	11/15/18	
Received	11/15/18	
Tested	11/16/18	
Tested By	Kurt Bosshardt	

COMPACTION TESTING DATA AASHTO T 99-15 Method D Standard

	1	2	3	4	5	6
WM + WS	9171.0	9391.0	9655.0	9944.0	10130.0	10084.0
WM	5733.0	5733.0	5733.0	5733.0	5733.0	5733.0
WW + T #1	897.1	785.0	885.4	783.0	837.4	931.5
WD + T #1	872.7	754.6	838.9	721.6	756.2	834.7
TARE #1	246.5	246.1	245.6	166.9	179.1	252.8
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	3.9	6.0	7.8	11.1	14.1	16.6
DRY DENS.	97.3	101.5	106.9	111.4	113.3	109.7

SIEVE TEST RESULTS AASHTO T 27 AASHTO T 11

Opening Size	% Passing	Specs.

TEST RESULTS	Material Description
Maximum dry density = 113.4 pcf Optimum moisture = 13.7 %	Native
Project No. 1607-335 Client: Bowie Resource Partners Project: Sufco Waste Rock Site - Materials Testing <input type="radio"/> Location: Phase 3 Pad - West Side Sample Number: 18-S-571	Remarks:
JONES & DEMILLE ENGINEERING INC. Richfield, Utah	Checked by: Mark Rappleye Title: Lab Manager Figure

Appendix VIII

Construction As-Built Information

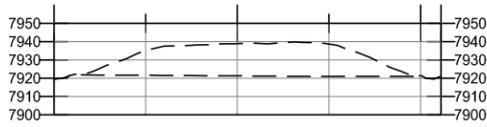
Phase 3,4 Construction

As-Built Information

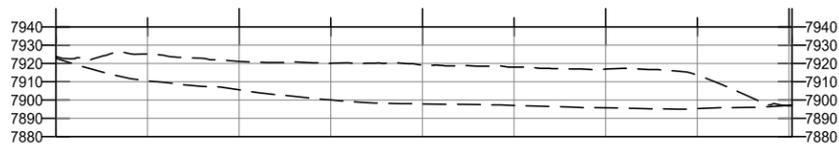


Compaction Test Locations

Sevier County		Sevier	
Sufco Waste Rock Site		COUNTY	
Phase 4 and Phase 5		PROJECT NUMBER: 1406-120	
APPROVAL RECOMM.	DATE	PROJECT DESIGN ENGINEER	DATE
DESIGN	DATE	DRAWN	DATE
CHECK	DATE	QUANT.	DATE
CHECK	DATE	CHECK	DATE
CHECK	DATE	CHECK	DATE
<p>Jones & DeMille Engineering, Inc. CIVIL ENGINEERING - SURVEYING - TESTING 1.800.748.5275 www.jonesanddemic.com</p>			
REVISIONS		REVIEW	
NO.	DATE	DESIGN	CHECK
DESIGN	DATE	DRAWN	CHECK
MAPS	DATE	QUANT.	CHECK
PARCELS	DATE	CHECK	DATE
REQUEST	DATE	CHECK	DATE
BY	DATE	CHECK	DATE
ORIGINAL SUBMISSION FOR AUTHORIZATION			
DWG NAME: SURVEY_DRAWING		BNSG CREATED: CR_DATE	
SHT SET: ###		PEN TBL: ###	
SCALE: 1"=100'		UPDATED: 6/24/2019	
		PLOTTED: 6/25/2019	
REMARKS			



PHASE 4



PHASE 5

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Phase 4	full	1.000	1.000	230707.19	0.13	14197.23	14197.10<Fill>
Phase 5	full	1.000	1.000	248293.35	958.28	37468.14	36509.86<Fill>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	479000.54	958.41	51665.37	50706.96<Fill>

* Value adjusted by cut or fill factor other than 1.0

SHEET NO. 02	Sevier County	 Jones & DeMille Engineering, Inc. CIVIL ENGINEERING - SURVEYING - TESTING GIS - ENVIRONMENTAL 1.800.748.5275 www.jonesanddemille.com											
	Sufco Waste Rock Site	APPROVAL RECOMM. DATE	PROJECT DESIGN ENGINEER	DESIGN: . . .	CHECK: . . .	REVIEW	NO.	DATE	DESIGN REV. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
	Phase 4 and Phase 5			DRAWN: . . .	CHECK: . . .	DATE: . . .	ORIGINAL SUBMISSION FOR AUTHORIZATION						
	PROJECT NUMBER: 1406-120	APPROVED: DATE		QUANT: . . .	CHECK: . . .	BY: . . .	REVISIONS						
						SCALE: 1"=100'	DWG NAME: SURVEY_DRONE	DWG CREATED: CR_DATE	UPDATED: 6/24/2019				
							SHT SET: ###	PEN TBL: 1stind-r2800.cb	PLOTTED: 6/25/2019				