A3. Interim Cover

Standard Proctor Test Results Summary

Lift Approval Summary

Lift Approval Package

Buyoff Surveys

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A3. Interim Cover
Standard Proctor Test Results Summary

Set	Proctor ID #	Date Sampled	Date Approved	Maximum Dry Density (lb/ft^3)	Optimum Moisture Content (%)	Soils Description
Set #1	Interim Cover #1	04/21/10	06/08/10	124.5	12.0	Brown (10YR5/3) clay with abundant very fine to fine, subround to subangular, moderate to well sorted, sand
	Interim Cover #2	04/21/10	06/08/10	123.9	12.2	Brown (10YR5/3) clay with abundant very fine to fine, subround to subangular, moderate to well sorted, sand
	Interim Cover #3	04/21/10	06/08/10	123.7	12.2	Brown (10YR5/3) clay with abundant very fine to fine, subround to subangular, moderate to well sorted, sand
	Interim Cover #1 (2011)	03/21/11	03/28/11	119.7	11.0	Grayish in color and consists mostly fines
	Interim Cover #2 (2011)	08/05/11	08/11/11	115.6	13.5	Grayish in color and consists mostly fines
	Interim Cover #3 (2011)	09/20/11	10/04/11	115.0	14.5	Tannish in color and consists of mostly fines
	Interim Cover #4 (2011)	11/30/11	12/19/11	114.8	15.3	Tannish in color and consists of mostly fines
Interim Cover Top Soil						
	Top Soil #1	01/04/10	02/08/10	115.6	12.3	Gray in color consist of mostly fines
	Top Soil #2	01/15/10	02/08/10	116.6	13.9	Grayish-red in color
	Top Soil #3	01/21/10	02/08/10	113.5	13.9	Grayish in color consist of mostly fines
	Top Soil #4	02/12/10	02/18/10	110.3	14.5	Grayish in color consist of mostly fines
	Top Soil #5	03/12/10	03/30/10	114.1	13.5	Grayish in color consist of mostly fines
	Top Soil #6	03/25/10	03/30/10	116.7	13.0	Grayish in color consist of mostly fines
	Top Soil #7	04/01/10	06/08/10	117.2	12.3	Brownish-gray in color consists mostly fines
	Top Soil #8	04/07/10	06/08/10	117.3	12.9	Brownish-gray in color consists mostly fines
	Top Soil #9	04/15/10	06/08/10	118.4	11.9	Brownish-gray in color consists mostly fines
	Top Soil #10	04/20/10	06/08/10	119.9	11.7	Material contains a small amount of shale and is gray in color
	Top Soil #11	04/27/10	06/08/10	118.2	12.2	Material contains a small amount of shale and is gray in color
	Top Soil #12	05/03/10	06/08/10	117.8	13.1	Gray in color consist of mostly fines
	Top Soil #13	05/06/10	06/08/10	115.7	13.8	Gray in color consist of mostly fines
	Top Soil #14	05/12/10	06/08/10	116.1	12.6	Gray in color consist of mostly fines
	Top Soil #15	05/18/10	06/08/10	115.0	13.9	Gray in color consist of mostly fines
	Top Soil #16	05/24/10	06/08/10	118.2	12.0	Gray in color consist of mostly fines
	Top Soil #17	05/27/10	06/08/10	120.3	10.8	Gray in color consist of mostly fines
	Top Soil #18	06/03/10	06/14/10	116.1	11.0	Grayish-yellow in color consist of mostly fines
	Top Soil #19	06/08/10	06/14/10	120.2	11.4	Grayish-yellow in color consist of mostly fines
	Top Soil #20	06/14/10	06/30/10	117.6	13.0	Gray in color consist of mostly fines
	Top Soil #21	06/17/10	06/30/10	119.7	13.1	Gray in color consist of mostly fines
	Top Soil #22	06/23/10	06/30/10	119.5	12.3	Gray in color consist of mostly fines
	Top Soil #23	07/07/10	07/29/10	115.0	11.2	Gray in color consist of mostly fines
	Top Soil #24	07/19/10	07/29/10	117.0	10.8	Grayish-yellow in color consist of mostly fines
	Top Soil #25	07/26/10	07/29/10	117.3	10.9	Gray in color consist of mostly fines
	Top Soil #26	08/02/10	08/26/10	115.7	11.7	Gray in color consist of mostly fines
	Top Soil #27	08/12/10	08/26/10	117.1	11.8	Gray in color consist of mostly fines
	Top Soil #28	08/24/10	09/07/10	119.4	11.4	Gray in color consist of mostly fines
	Top Soil #29	08/30/10	09/07/10	118.8	10.7	Gray in color consist of mostly fines
	Top Soil #30	09/09/10	09/24/10	119.6	11.2	Gray in color consist of mostly fines
	Top Soil #31	09/13/10	10/04/10	119.4	11.3	Gray in color consist of mostly fines
	Top Soil #32	09/15/10	10/04/10	118.0	11.4	Gray in color consist of mostly fines

A3. Interim Cover
Standard Proctor Test Results Summary

Set	Proctor ID #	Date Sampled	Date Approved	Maximum Dry Density (lb/ft^3)	Optimum Moisture Content (%)	Soils Description
	Top Soil #33	09/16/10	10/04/10	119.6	11.3	Gray in color consist of mostly fines
	Top Soil #34	09/20/10	10/04/10	118.0	11.9	Gray in color consist of mostly fines
	Top Soil #35	09/21/10	10/04/10	116.8	12.4	Reddish in color consist of mostly fines
	Top Soil #36	09/23/10	10/05/10	117.8	12.0	Grayish in color consist of mostly fines
	Top Soil #37	09/27/10	10/05/10	118.7	11.9	Grayish in color consist of mostly fines
	Top Soil #38	09/29/10	10/06/10	119.7	11.6	Grayish in color consist of mostly fines
	Top Soil #39	10/04/10	10/15/10	118.1	12.0	Grayish in color consist of mostly fines
	Top Soil #40	10/07/10	10/15/10	118.8	11.8	Grayish in color consist of mostly fines
	Top Soil #41	10/12/10	11/01/10	118.1	11.7	Grayish in color consist of mostly fines
	Top Soil #42	10/14/10	11/01/10	116.7	11.7	Grayish in color consist of mostly fines

A3. Interim Cover
Lift Approval Summary

Date	Lift ID #	# of Passing Moisture Tests	Quantity Approved (yd^3)	Cumulative Quantity Approved (yd^3)	Average Thickness (ft.)	Northing	Easting	# of Nuclear Density Gauge Verifications	# of Sandcone Verifications
07/09/10	UIF27100709-00	0	156	156	0.1	6794574	2122394	1	0
07/21/10	UIB18100721-00	1	9,391	9,547	1.0	6795037	2122151	4	1
07/26/10	UIA18100726-00	0	1,096	10,643	0.9	6795027	2122117	0	0
08/05/10	UIA02100805-00	0	6,898	17,541	0.8	6795839	2122044	0	0
09/07/10	UIA01100907-00	0	1,403	18,944	1.0	6795943	2122062	0	0
11/30/10	UIE01101129-00	1	2,646	21,590	1.0	6795942	2122340	0	0
03/21/11	UII12110321-00	3	2,677	24,267	0.9	6795685	2122344	2	0
03/21/11	UIJ21110321-00	2	1,610	25,877	0.8	6795205	2122358	1	0
03/22/11	UIM12110322-00	1	2,307	28,184	1.0	6795690	2122512	0	0
03/22/11	UIK28110322-00	1	1,748	29,932	1.0	6794440	2122467	0	0
03/22/11	UII24110322-00	1	2,418	32,350	0.8	6794868	2122406	0	0
03/29/11	UII12110329-00	0	297	32,647	0.1	6795685	2122343	0	0
03/29/11	UIK28110329-00	1	175	32,822	0.1	6794436	2122467	0	0
03/29/11	UIM12110329-00	1	461	33,283	0.2	6795690	2122512	0	0
03/30/11	UIJ21110330-00	1	604	33,887	0.3	6795205	2122358	0	0
03/30/11	UII24110330-00	0	537	34,424	0.2	6794869	2122406	0	0
04/06/11	UIJ12110406-00	2	3,640	38,064	0.6	6795350	2122545	0	0
04/11/11	UIJ35110411-00	1	62	38,126	0.8	6794164	2122572	1	0
04/12/11	UIJ12110411-00	1	1,820	39,946	0.3	6795350	2122545	0	0
08/08/11	UIM18110805-00	1	2,988	42,934	0.7	6795069	2122708	2	0
08/09/11	UIM30110809-00	1	2,881	45,815	1.0	6794498	2122724	2	0
08/10/11	UIM18110809-00	1	2,376	48,191	0.3	6795067	2122691	2	0
08/10/11	UIN35110810-00	0	150	48,341	0.9	6794198	2122754	1	0
08/10/11	UIN35110810-01	1	83	48,424	0.5	6794198	2122754	1	1
09/21/11	UIR28110921-00	1	2,669	51,093	0.8	6794560	2122953	2	0
09/22/11	UIR28110922-00	1	1,501	52,594	0.4	6794560	2122934	2	0
09/26/11	UIQ23110926-00	1	1,784	54,378	0.8	6794806	2122939	2	0
09/23/11	UIS35110926-00	0	88	54,466	0.7	6794216	2123001	1	0
09/27/11	UIQ23110927-00	1	939	55,405	0.4	6794807	2122920	2	0
10/14/11	UIQ18111014-00	1	1,429	56,834	0.9	6795025	2122940	2	0
10/14/11	UIQ18111017-00	1	493	57,327	0.3	6795023	2122940	2	0
11/30/11	UIM10111130-00	1	4,880	62,207	1.0	6795440	2122710	3	0
12/01/11	UIM10111201-00	1	1,464	63,671	0.3	6795440	2122710	2	0
03/15/12	UIM01120313-00	1	5,643	69,314	0.8	6795994	2122773	4	0
03/16/12	UIM01120315-00	1	2,551	71,865	0.3	6796069	2122774	2	0

Total Quantity Approved (yd^3) = 71,865

Total # of Nuclear Density Gauge Tests = 41

Total # of Moisture Tests = 31

Quantity per Moisture Test (yd^3) = 2,318

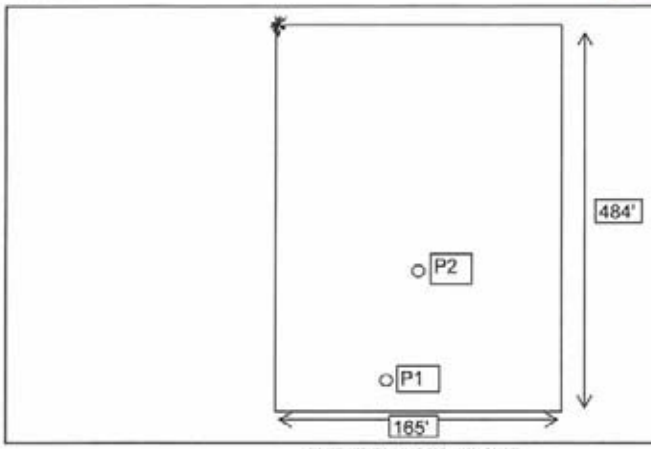
Total Average Thickness (ft.) = 0.63

ENERGYSOLUTIONS

LIFT APPROVAL FORM

PROJECT: Moab UMTRA OTHER

NW CORNER DATE: 3/21/2011



P 1	6795248 N. 2122409 E.				
EW:	165	X	0.394	=	65
NS:	484	X	0.903	=	437
P 2	6795334 N. 2122417 E.				
EW:	165	X	0.442	=	73
NS:	484	X	0.725	=	351
P 3					
EW:		X		=	
NS:		X		=	
P 4					
EW:		X		=	
NS:		X		=	
P 5					
EW:		X		=	
NS:		X		=	

N A

Page 2 attached: Y N

IDENTIFY LOTS ABOVE

LIFT ID: UII12110321-00 NW CORNER: 6795685 N. 2122344 E.

Uncompacted Thickness: 0.9 Compacted Thickness: N/A Debris Insp. By: N/A Date: N/A Time: N/A

NW CORNER of debris placement: N/A EW Dimension N/A NS Dimension N/A

Lift Area (ft²): 80,305 Lift Volume (yd³): 2,677

Comments: QC verified that the underlying RRM material was scarified prior to placement of Interim Cover material. Johansen & Tuttle personnel surveyed the lift to verify lift elevation/thickness. Johansen and Tuttle personnel pulled a moisture sample prior to compaction efforts. Results were satisfactory. Nielsons then began compaction efforts on this lift. Compaction was verified and results were satisfactory. Johansen & Tuttle personnel then performed two Troxler tests on the lift in correlation with the CAES system. Results were found to be satisfactory and the lift was approved.

KEYING IN NOTES: N E S [W] Satisfactory MOISTURE/ DENSITY TESTS ID # (S): 1 thru 3

LIFT APPROVED BY: Kevin Keele Kevin Keele DATE: 3/28/2011 TIME: 09:30

QA/QC APPROVAL DATE 4-1-11 BB 3-31-2011

Density Testing
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Slope Elevation Survey

	Average lift thickness=	0.9	Bounding Box	Northing	Easting		
	Grid Size=	50'	Lower Left	N			
Lift ID:	UI112110321-00		Upper Right		A		
Last Lift Elevations			Lift Approval Elevations			Lift Thickness	
Northing	Easting	Elevation	Northing	Easting	Elevation	Thickness	
6795311	2122399	4993.0	6795311	2122399	4993.9	0.9	OK
6795461	2122399	4995.1	6795461	2122399	4996.0	0.9	OK
6795511	2122399	4994.2	6795511	2122399	4995.1	0.9	OK
6795261	2122449	4992.1	6795261	2122449	4992.8	0.7	OK
6795461	2122449	4995.2	6795461	2122449	4996.2	1.0	OK
6795211	2122499	4990.7	6795211	2122499	4991.5	0.8	OK
6795361	2122499	4994.3	6795361	2122499	4995.3	1.0	OK
6795411	2122499	4995.6	6795411	2122499	4996.6	1.0	OK
6795561	2122499	4993.8	6795561	2122499	4994.8	1.0	OK
6795361	2122549	4994.6	6795361	2122549	4995.4	0.8	OK
6795511	2122599	4995.7	6795511	2122599	4996.3	0.6	OK
6795561	2122599	4994.6	6795561	2122599	4995.4	0.8	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
			N			0.0	OK
			A			0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK

EnergySolutions

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% =6	97.8%
Elevation Avg	4994.7
Total =6	7222
Total Lines	7385

Pass

Minimum Number of Machine Passes: 3

Lift ID: UII12110321-00

Northing	Easting	Elevation	# of Passes	Passes =6	Count
6795636	2122346	4993.6	4		1
6795682	2122346	4992.2	2		1
6795518	2122349	4994.7	6	1	1
6795521	2122349	4994.7	6	1	1
6795524	2122349	4994.6	6	1	1
6795527	2122349	4994.5	6	1	1
6795531	2122349	4994.4	6	1	1
6795534	2122349	4994.4	6	1	1
6795537	2122349	4994.4	6	1	1
6795541	2122349	4994.3	6	1	1
6795544	2122349	4994.3	6	1	1
6795547	2122349	4994.3	5		1
6795550	2122349	4994.3	6	1	1
6795554	2122349	4994.2	5		1
6795557	2122349	4994.4	3		1
6795560	2122349	4994.3	4		1
6795564	2122349	4994.5	2		1
6795567	2122349	4994.5	1		1
6795593	2122349	4992.9	0		1
6795626	2122349	4993.6	4		1
6795629	2122349	4993.6	2		1
6795632	2122349	4993.6	5		1
6795636	2122349	4993.5	6	1	1
6795639	2122349	4993.5	2		1
6795642	2122349	4993.4	5		1
6795646	2122349	4993.3	2		1
6795652	2122349	4993.1	4		1
6795655	2122349	4993.1	2		1
6795662	2122349	4992.7	6	1	1
6795668	2122349	4992.8	2		1
6795672	2122349	4992.3	3		1
6795675	2122349	4992.3	2		1
6795678	2122349	4992.2	6	1	1
6795682	2122349	4992.1	6	1	1
6795685	2122349	4992.2	6	1	1
6795403	2122352	4996.6	6	1	1
6795406	2122352	4996.8	6	1	1
6795409	2122352	4996.6	6	1	1
6795413	2122352	4996.7	6	1	1
6795416	2122352	4996.7	6	1	1
6795419	2122352	4996.7	6	1	1
6795422	2122352	4996.8	6	1	1
6795426	2122352	4996.8	6	1	1
6795429	2122352	4997.0	6	1	1
6795432	2122352	4997.0	6	1	1
6795436	2122352	4996.9	6	1	1

Lift Height: 1' 0"

Thick Lift Threshold: 2' 0"

Last Lift Elevation: N/A

Min. # of Wheel Passes: 6

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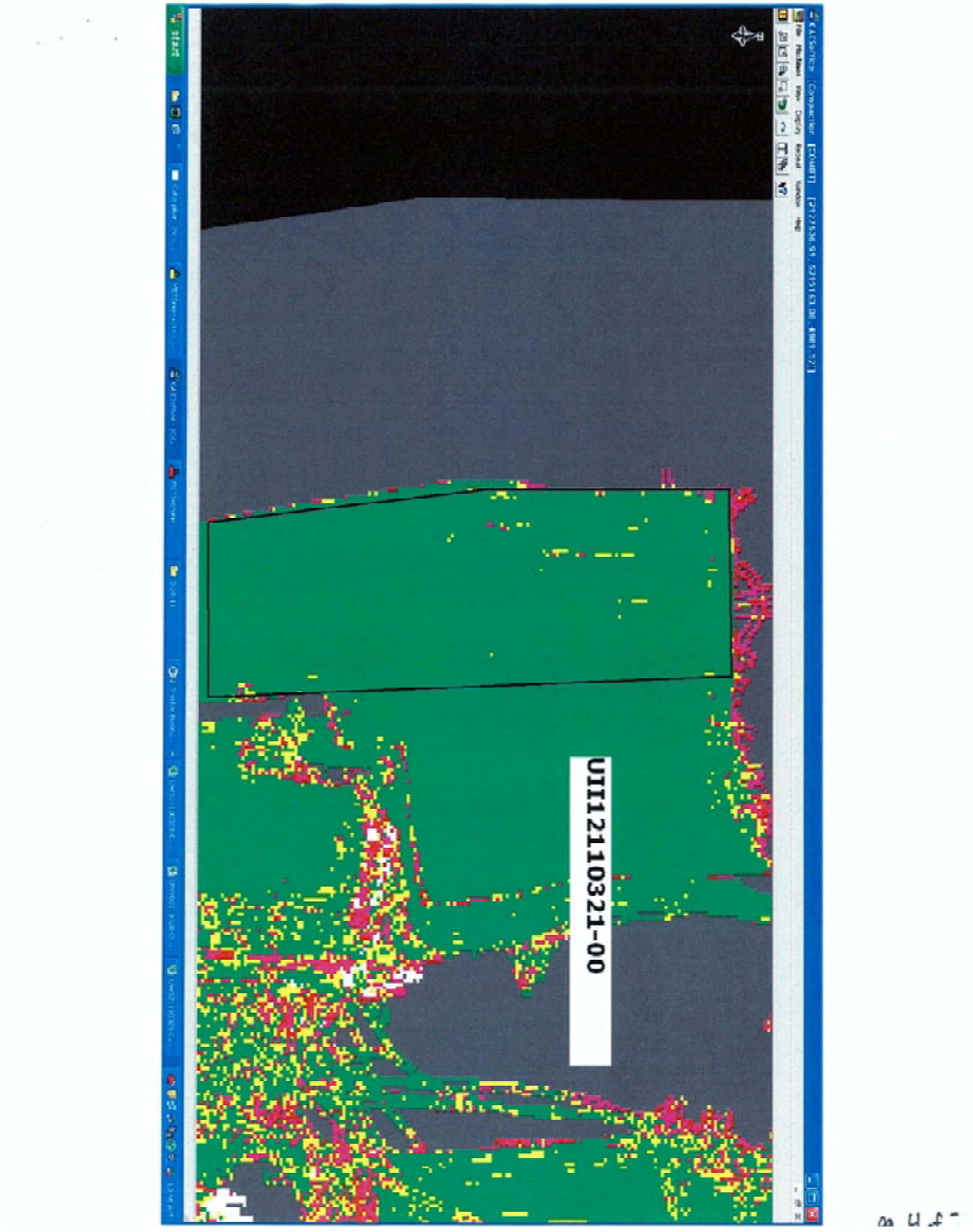
A3. Interim Cover
Lift Approval Package



ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER** _____

LIFT IDENTIFICATION: UII12110321-00 DATE: 3/23/2011

TEST ID NUMBER(S): 1

TEST LOCATION: Lift Area TEST METHOD: N/A D1556 N/A D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model _____ Gauge Serial # _____

Last Calibration Date: _____

Daily Standard Counts:

Density _____ Moisture _____

_____ *Method A (Direct Transmission)* or _____ *Method B (Backscatter)*

Depth Setting _____ *(inches)* Count Time _____ *(minutes)*

Moisture Count _____ Density Count _____

Wet Density (ρ_m) _____ *(lbs/ft³)* Dry Density _____ *(lbs/ft³)*

Moisture Density _____ *(lbs/ft³)* Moisture Fraction _____ *(%)*

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus _____ Calibrated Vol. *(lbs/ft³)* _____

Bulk Density of sand (ρ_1) _____ *g/cm³* _____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) _____ g

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container		g
Mass of container		g
Mass of wet soil (M_3)		g

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ _____ cm^3

Dry Mass of soil
$M_4 = 100\ M_3 / (w + 100)$ _____ g

Wet Denisty
$\rho_m = (M_3 / V) \times 62.43$ _____ lbs/ft^3

Dry Denisty
$\rho_d = M_4 / V$ _____ g/cm^3

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ _____ lbs/ft^3

MOISTURE DETERMINATION

ASTM D4643

Container ID 1263

Mass of container & wet specimen (M_{cms})	1540.0	g
Mass of container & dry specimen (M_{cds})	1516.3	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	23.7	g
Mass of container (M_c)	1263.0	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	253.3	g
Moisture content (w) $w = (M_w / M_s) \times 100$	9.4	%

Soil Description: Brown (10YR5/3) Clay w/abundant very fine to fine, subround to subangular, Sand

Proctor ID: Interim Cover # 1

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 124.5 (lbs/ft³)

Optimum Moisture (w_{opt}) 12.0 (%)

Required Moisture: 7.0 % to 17.0 %

Required Percent Compaction: 90.0 (%)

Dry Density (ρ_d) $= (100 \times \rho_m)/(100 + w)$

$\rho_d = (\ 100 \times$ ##### $\ ) / (100 +$ 9.4 $) =$ 0.0 lbs/ft^3

Note: Wet Density from ASTM D 1556 (ρ_m) takes precedence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max \times 100$

0.0 / 124.5 x 100 = 0.0 %

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 3/23/11

Failed Moisture

Failed Compaction Time: 09:00

By: Kevin Keele (print) / Kevin Keele (signature)

QA/QC APPROVAL 03.31.2011 DATE

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ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER** _____

LIFT IDENTIFICATION: UII12110321-00 DATE: 3/28/2011

TEST ID NUMBER(S): 2

TEST LOCATION: P1 TEST METHOD: N/A D1556 X D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 25142

Last Calibration Date: 3/7/11

Daily Standard Counts: *On-Cell Standard*

Density 2396 Moisture 647

Method A (Direct Transmission)

Depth Setting 8" *(inches)* Count Time 1 *(minutes)*

Moisture Count 106 Density Count 1394

Wet Density (ρ_m) 123.8 *(lbs/ft³)* Dry Density 115.0 *(lbs/ft³)*

Moisture Density 8.8 *(lbs/ft³)* Moisture Fraction 7.6 *(%)*

MOISTURE DETERMINATION

ASTM D4643

Container ID 1375

Mass of container & wet specimen (M_{cms})	1640.4	g
Mass of container & dry specimen (M_{cds})	1619.1	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	21.3	g
Mass of container (M_c)	1375.0	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	244.1	g
Moisture content (w) $w = (M_w / M_s) \times 100$	8.7	%

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = (100 \times 123.8) / (100 + 8.7 = 113.9$ *lbs/ft³*

Note: Wet Density from ASTM D 1556 (ρ_m) takes precedence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max \times 100$

113.9 / 124.5 x 100 = 91.5 %

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus _____ Calibrated Vol. *(lbs/ft³)* _____

Bulk Density of sand (ρ_1) _____ *g/cm³* _____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) _____ g

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container		g
Mass of container		g
Mass of wet soil (M_3)		g

N A

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ _____ cm^3

Dry Mass of soil
$M_4 = 100 M_3 / (w + 100)$ _____ g

Wet Denisty
$\rho_m = (M_3 / V) \times 62.43$ _____ *lbs/ft³*

Dry Denisty
$\rho_d = M_4 / V$ _____ *g/cm³*

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ _____ *lbs/ft³*

Soil Description: **Brown (10YR5/3) Clay w/abundant very fine to fine, subround to subangular.** SAND

Proctor ID: **Interim Cover # 1**

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 124.5 (lbs/ft³)

Optimum Moisture (w_{opt}) 12.0 (%)

Required Moisture: 7.0 % to 17.0 %

Required Percent Compaction: 90.0 (%)

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 3/28/11

Failed Moisture

Failed Compaction Time: 08:30

By: Kevin Keele / Kevin Keele
(print) *(signature)*

QA/QC APPROVAL 05/31/2011 DATE

Density Testing
DOE-EM/GJRAC1783
Rev. 0

QC-F-002
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ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER** _____

LIFT IDENTIFICATION: UII12110321-00 DATE: 3/28/2011

TEST ID NUMBER(S): 3

TEST LOCATION: P2 TEST METHOD: N/A D1556 X D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 25142

Last Calibration Date: 3/7/11

Daily Standard Counts: *On-Cell Standard*

Density 2396 Moisture 647

Method A (Direct Transmission)

Depth Setting 8" *(Inches)* Count Time 1 *(minutes)*

Moisture Count 114 Density Count 1235

Wet Density (ρ_m) 128.5 *(lbs/ft³)* Dry Density 118.9 *(lbs/ft³)*

Moisture Density 9.6 *(lbs/ft³)* Moisture Fraction 8.1 *(%)*

MOISTURE DETERMINATION

ASTM D4643

Container ID 1263

Mass of container & wet specimen (M_{cms})	1536.0	g
Mass of container & dry specimen (M_{cds})	1513.6	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	22.4	g
Mass of container (M_c)	1263.0	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	250.6	g
Moisture content (w) $w = (M_w / M_s) \times 100$	8.9	%

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = (100 \times 128.5) / (100 + 8.9 = 118.0$ *lbs/ft³*

Note: Wet Density from ASTM D 1556 (ρ_m) takes precidence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max \times 100$

118.0 / 124.5 x 100 = 94.7 %

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus _____ Calibrated Vol. *(lbs/ft³)* _____

Bulk Density of sand (ρ_1) _____ *g/cm³* _____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) _____ g

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container		g
Mass of container		g
Mass of wet soil (M_3)		g

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ _____ cm^3

Dry Mass of soil
$M_4 = 100\ M_3 / (w + 100)$ _____ g

Wet Denisty
$\rho_m = (M_3 / V) \times 62.43$ _____ lbs/ft^3

Dry Denisty
$\rho_d = M_4 / V$ _____ g/cm^3

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ _____ lbs/ft^3

Soil Description: **Brown (10YR5/3) Clay w/abundant very fine to fine, subround to subangular,** Sand

Proctor ID: **Interim Cover # 1**

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 124.5 (lbs/ft³)

Optimum Moisture (w_{opt}) 12.0 (%)

Required Moisture: 7.0 % to 17.0 %

Required Percent Compaction: 90.0 (%)

TEST RESULTS:

X Pass Date: 3/28/11

Failed Moisture

Failed Compaction Time: 09:00

By: Kevin Keele / Kevin Keele
(print) *(signature)*

QA/QC APPROVAL 03.31.2011 DATE

Density Testing
DOE-EM/GJRAC1783
Rev. 0

QC-F-002
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CRJ 000748

LIFT ID: UIB18

Interim Cover Buy Off Survey

Point #	Northing	Easting	Surveyed Elevation	Design Elevation	Difference in feet	Difference in inches
	6794150	2122300	4964.7	4964.7	0.0	0.0
	6794142	2122322	4964.6	4964.6	0.1	0.7
	6794165	2122283	4965.3	4965.2	0.1	0.8
	6794168	2122322	4965.3	4965.2	0.1	0.6
	6794173	2122372	4965.5	4965.4	0.1	0.7
	6794176	2122422	4965.5	4965.5	0.0	0.3
	6794170	2122477	4965.5	4965.5	0.0	0.0
	6794178	2122470	4965.7	4965.7	0.1	0.6
	6794171	2122515	4965.4	4965.4	0.0	0.5
	6794200	2122550	4966.2	4966.1	0.0	0.4
	6794200	2122500	4966.2	4966.1	0.0	0.4
	6794200	2122450	4966.2	4966.1	0.1	0.9
	6794200	2122400	4966.1	4966.1	0.0	0.5
	6794200	2122350	4966.1	4966.0	0.0	0.5
	6794192	2122315	4965.9	4965.8	0.1	0.7
	6794200	2122300	4966.1	4966.0	0.1	0.6
	6794191	2122266	4965.9	4965.8	0.0	0.6
	6794242	2122265	4967.1	4967.1	0.0	0.4
	6794250	2122250	4967.3	4967.2	0.0	0.4
	6794242	2122315	4967.1	4967.1	0.0	0.2
	6794250	2122300	4967.3	4967.3	0.0	0.2
	6794250	2122350	4967.3	4967.3	0.0	0.4
	6794227	2122370	4967.0	4967.0	0.0	0.0
	6794227	2122420	4966.8	4966.8	0.0	0.3
	6794227	2122471	4966.8	4966.8	0.0	0.2
	6794220	2122507	4966.7	4966.7	0.0	0.5
	6794219	2122548	4966.7	4966.7	0.0	0.2
	6794250	2122550	4967.4	4967.4	0.0	0.0
	6794250	2122500	4967.4	4967.4	0.0	0.4
	6794250	2122450	4967.4	4967.4	0.0	0.3
	6794250	2122400	4967.3	4967.3	0.0	0.1
	6794269	2122486	4967.9	4967.9	0.0	0.2
	6794270	2122537	4968.0	4968.0	0.0	0.1
	6794300	2122500	4968.7	4968.6	0.0	0.4
	6794300	2122450	4968.6	4968.6	0.0	0.2
	6794283	2122440	4968.2	4968.2	0.0	0.3
	6794277	2122420	4968.1	4968.1	0.0	0.5
	6794311	2122426	4968.9	4968.9	0.0	0.3
	6794310	2122420	4968.9	4968.9	0.0	0.1
	6794300	2122400	4968.6	4968.6	0.0	0.1
	6794310	2122371	4969.0	4968.9	0.0	0.4
	6794300	2122350	4968.6	4968.6	0.1	0.7
	6794277	2122317	4968.0	4968.0	0.0	0.3
	6794292	2122316	4968.4	4968.4	0.0	0.3
	6794310	2122321	4968.8	4968.8	0.0	0.4
	6794316	2122315	4969.0	4969.0	0.0	0.3
	6794333	2122338	4969.4	4969.4	0.0	0.4
	6794349	2122343	4969.9	4969.9	0.0	0.1
	6794350	2122350	4969.8	4969.8	0.0	0.1
	6794344	2122401	4969.8	4969.8	0.0	0.0
	6794354	2122404	4970.1	4970.1	0.0	0.1
	6794350	2122450	4969.9	4969.9	0.0	0.1
	6794350	2122500	4970.0	4969.9	0.0	0.6
	6794337	2122368	4969.6	4969.5	0.0	0.4
	6794359	2122320	4970.1	4970.1	0.0	0.1
	6794350	2122400	4969.9	4969.9	0.0	0.2

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	6794368	2122396	4970.4	4970.4	0.0	0.1
	6794191	2122333	4965.9	4965.9	0.0	0.3
	6794241	2122327	4967.1	4967.1	0.0	0.1
	6794300	2122300	4968.5	4968.5	0.0	0.0
	6794292	2122266	4968.4	4968.4	0.0	0.2
	6794291	2122258	4968.4	4968.4	0.0	0.2
	6794300	2122250	4968.5	4968.5	0.0	0.4
	6794309	2122270	4968.6	4968.5	0.1	1.2
	6794314	2122265	4968.9	4968.9	0.0	0.4
	6794278	2122444	4968.1	4968.1	0.0	0.3
	6794379	2122454	4970.7	4970.7	0.0	0.1
	6794392	2122470	4971.0	4971.0	0.0	0.5
	6794400	2122500	4971.2	4971.2	0.0	0.3
	6794411	2122471	4971.5	4971.5	0.0	0.0
	6794400	2122450	4971.2	4971.1	0.0	0.4
	6794411	2122421	4971.4	4971.4	0.0	0.5
	6794400	2122400	4971.1	4971.1	0.0	0.3
	6794383	2122389	4970.7	4970.7	0.0	0.3
	6794399	2122384	4971.1	4971.1	0.0	0.4
	6794420	2122376	4971.7	4971.6	0.0	0.2
	6794410	2122371	4971.4	4971.4	0.0	0.3
	6794433	2122372	4972.0	4972.0	0.0	0.3
	6794400	2122350	4971.1	4971.1	0.0	0.0
	6794415	2122346	4971.5	4971.5	0.0	0.3
	6794424	2122338	4971.7	4971.7	0.0	0.1
	6794375	2122359	4970.5	4970.5	0.0	0.0
	6794369	2122330	4970.4	4970.3	0.0	0.3
	6794350	2122300	4969.8	4969.8	0.0	0.1
	6794360	2122270	4970.0	4970.0	0.0	0.3
	6794390	2122253	4970.8	4970.8	0.0	0.5
	6794405	2122265	4971.2	4971.2	0.0	0.1
	6794391	2122285	4970.9	4970.9	0.0	0.1
	6794398	2122296	4971.1	4971.1	0.0	0.0
	6794389	2122310	4970.9	4970.8	0.0	0.5
	6794410	2122320	4971.4	4971.3	0.0	0.3
	6794420	2122311	4971.6	4971.6	0.0	0.1
	6794450	2122300	4972.3	4972.3	0.0	0.1
	6794460	2122323	4972.7	4972.6	0.0	0.4
	6794460	2122344	4972.7	4972.7	0.0	0.1
	6794450	2122350	4972.4	4972.3	0.0	0.1
	6794459	2122371	4972.7	4972.7	0.0	0.4
	6794450	2122400	4972.4	4972.4	0.0	0.2
	6794450	2122450	4972.4	4972.4	0.0	0.2
	6794450	2122500	4972.5	4972.4	0.1	0.7
	6794450	2122500	4972.4	4972.4	0.0	0.1
	6794460	2122470	4972.8	4972.8	0.0	0.3
	6794511	2122460	4974.0	4974.0	0.0	0.5
	6794500	2122450	4973.7	4973.7	0.0	0.0
	6794510	2122410	4974.0	4973.9	0.1	0.8
	6794510	2122410	4973.9	4973.9	0.0	0.4
	6794500	2122400	4973.7	4973.6	0.0	0.1
	6794511	2122379	4974.0	4974.0	0.0	0.1
	6794500	2122350	4973.6	4973.6	0.0	0.1
	6794510	2122324	4974.0	4973.9	0.0	0.4
	6794500	2122300	4973.6	4973.6	0.0	0.4
	6794510	2122275	4973.9	4973.9	0.0	0.2
	6794550	2122300	4974.9	4974.8	0.0	0.3
	6794560	2122325	4975.2	4975.1	0.0	0.3
	6794550	2122350	4974.9	4974.9	0.0	0.1
	6794561	2122371	4975.2	4975.2	0.0	0.1
	6794550	2122400	4974.9	4974.9	0.0	0.1

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	6794561	2122411	4975.2	4975.2	0.0	0.0
	6794550	2122450	4975.0	4974.9	0.0	0.2
	6794561	2122461	4975.3	4975.3	0.0	0.0
	6794600	2122450	4976.2	4976.2	0.0	0.3
	6794611	2122430	4976.6	4976.6	0.0	0.3
	6794623	2122418	4976.8	4976.8	0.0	0.5
	6794630	2122400	4977.0	4977.0	0.0	0.0
	6794600	2122400	4976.2	4976.2	0.0	0.2
	6794610	2122381	4976.5	4976.5	0.0	0.0
	6794620	2122374	4976.8	4976.8	0.0	0.1
	6794611	2122368	4976.5	4976.5	0.0	0.0
	6794600	2122350	4976.2	4976.1	0.0	0.3
	6794630	2122350	4977.0	4977.0	0.0	0.1
	6794610	2122302	4976.5	4976.4	0.0	0.5
	6794650	2122300	4977.4	4977.4	0.0	0.4
	6794600	2122300	4976.1	4976.1	0.0	0.2
	6794660	2122302	4977.7	4977.7	0.0	0.0
	6794650	2122350	4977.4	4977.4	0.0	0.3
	6794650	2122400	4977.4	4977.4	0.0	0.2
	6794680	2122400	4978.2	4978.2	0.0	0.3
	6794700	2122400	4978.7	4978.7	0.0	0.2
	6794700	2122350	4978.7	4978.7	0.0	0.4
	6794680	2122350	4978.2	4978.2	0.0	0.5
	6794678	2122298	4978.2	4978.2	0.0	0.2
	6794700	2122300	4978.7	4978.6	0.0	0.4
	6794730	2122300	4979.5	4979.5	0.0	0.3
	6794730	2122400	4979.5	4979.5	0.0	0.5
	6794750	2122400	4980.0	4980.0	0.0	0.6
	6794780	2122400	4980.9	4980.8	0.0	0.5
	6794800	2122400	4981.3	4981.2	0.1	0.6
	6794830	2122400	4982.1	4982.1	0.0	0.2
	6794850	2122400	4982.5	4982.5	0.0	0.3
	6794880	2122400	4983.4	4983.3	0.0	0.6
	6794900	2122400	4983.8	4983.8	0.1	0.6
	6794930	2122400	4984.6	4984.6	0.0	0.3
	6794950	2122400	4985.0	4985.0	0.0	0.2
	6794980	2122400	4985.9	4985.9	0.0	0.3
	6795000	2122400	4986.3	4986.3	0.0	0.3
	6795030	2122350	4987.1	4987.1	0.0	0.6
	6795000	2122350	4986.3	4986.2	0.0	0.6
	6794980	2122350	4985.8	4985.8	0.0	0.4
	6794950	2122350	4985.0	4985.0	0.0	0.2
	6794930	2122350	4984.6	4984.5	0.0	0.5
	6794900	2122350	4983.8	4983.7	0.0	0.6
	6794880	2122350	4983.3	4983.3	0.0	0.3
	6794850	2122350	4982.5	4982.5	0.0	0.6
	6794800	2122350	4981.2	4981.2	0.1	0.6
	6794730	2122350	4979.5	4979.5	0.0	0.6
	6794750	2122350	4980.0	4979.9	0.0	0.4
	6794780	2122350	4980.8	4980.8	0.0	0.1
	6794750	2122300	4979.9	4979.9	0.0	0.3
	6794780	2122300	4980.7	4980.7	0.0	0.4
	6794800	2122300	4981.2	4981.2	0.0	0.4
	6794830	2122300	4982.1	4982.0	0.0	0.5
	6794850	2122300	4982.5	4982.4	0.0	0.3
	6794866	2122323	4982.9	4982.9	0.0	0.6
	6794880	2122300	4983.3	4983.2	0.0	0.6
	6794900	2122300	4983.7	4983.7	0.0	0.4
	6794909	2122323	4984.0	4984.0	0.0	0.1
	6794950	2122300	4985.0	4985.0	0.0	0.6
	6794960	2122323	4985.3	4985.3	0.0	0.5

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	6795000	2122300	4986.3	4986.2	0.0	0.4
	6795030	2122300	4987.0	4987.0	0.0	0.2
	6795009	2122273	4986.5	4986.5	0.0	0.1
	6794959	2122273	4985.2	4985.2	0.0	0.5
	6794950	2122250	4985.0	4984.9	0.0	0.3
	6794909	2122273	4983.9	4983.9	0.0	0.5
	6794900	2122250	4983.7	4983.7	0.0	0.4
	6794859	2122273	4982.7	4982.7	0.0	0.2
	6794850	2122250	4982.4	4982.4	0.0	0.1
	6794830	2122250	4982.0	4981.9	0.0	0.4
	6794800	2122250	4981.2	4981.1	0.0	0.6
	6794781	2122250	4980.7	4980.7	0.0	0.6
	6794750	2122250	4979.9	4979.9	0.0	0.3
	6794700	2122250	4978.6	4978.6	0.0	0.4
	6794689	2122250	4978.5	4978.4	0.0	0.6
	6794660	2122252	4977.7	4977.7	0.0	0.5
	6794650	2122250	4977.4	4977.3	0.0	0.4
	6794610	2122252	4976.6	4976.4	0.1	1.7
	6794600	2122250	4976.1	4976.1	0.0	0.5
	6794559	2122274	4975.2	4975.2	0.0	0.2
	6794550	2122250	4974.9	4974.8	0.0	0.4
	6794561	2122226	4975.2	4975.2	0.0	0.5
	6794510	2122224	4973.9	4973.9	0.0	0.3
	6794500	2122250	4973.6	4973.6	0.0	0.1
	6794462	2122225	4972.6	4972.6	0.0	0.1
	6794450	2122250	4972.3	4972.3	0.0	0.1
	6794460	2122274	4972.6	4972.6	0.0	0.1
	6794416	2122232	4971.4	4971.4	0.0	0.2
	6794400	2122250	4971.0	4971.0	0.0	0.1
	6794390	2122235	4970.8	4970.8	0.0	0.4
	6794350	2122250	4969.8	4969.8	0.0	0.2
	6794309	2122242	4968.8	4968.8	0.0	0.0
	6794400	2122300	4971.1	4971.1	0.0	0.2
	6794650	2122200	4977.4	4977.3	0.0	0.4
	6794660	2122202	4977.6	4977.6	0.0	0.1
	6794700	2122200	4978.6	4978.6	0.1	0.6
	6794696	2122200	4978.6	4978.6	0.0	0.6
	6794750	2122200	4979.9	4979.8	0.0	0.5
	6794800	2122200	4981.2	4981.1	0.0	0.6
	6794850	2122200	4982.4	4982.4	0.0	0.2
	6794859	2122223	4982.7	4982.7	0.0	0.3
	6794859	2122173	4982.6	4982.6	0.0	0.4
	6794900	2122200	4983.7	4983.6	0.0	0.5
	6794909	2122223	4983.9	4983.9	0.0	0.4
	6794909	2122173	4983.9	4983.9	0.0	0.5
	6794959	2122173	4985.2	4985.2	0.0	0.2
	6794950	2122200	4984.9	4984.9	0.0	0.3
	6794959	2122223	4985.2	4985.2	0.0	0.0
	6795000	2122250	4986.2	4986.2	0.0	0.3
	6795000	2122200	4986.2	4986.2	0.0	0.6
	6795009	2122173	4986.4	4986.4	0.0	0.6
	6795000	2122150	4986.2	4986.1	0.0	0.6
Date:	7/21/2010	QC signature: Beachem Bosh			Reviewed by: Dave Stewart	

Dave Stewart

EnergySolutions

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CRJ 000746

LIFT ID: UIA01

Interim Cover Buy Off Survey

Point #	Northing	Easting	Surveyed Elevation	Design Elevation	Difference in feet	Difference in inches
1364	6795100	2122150	4988.670	4988.661	0.0	0.1
1363	6795100	2122200	4988.693	4988.690	0.0	0.0
1362	6795100	2122250	4988.744	4988.718	0.0	0.3
1361	6795100	2122300	4988.785	4988.747	0.0	0.5
1360	6795100	2122350	4988.792	4988.776	0.0	0.2
1339	6795150	2122350	4990.050	4990.039	0.0	0.1
1340	6795150	2122300	4990.020	4990.010	0.0	0.1
1341	6795150	2122250	4989.986	4989.982	0.0	0.0
1342	6795150	2122200	4989.982	4989.953	0.0	0.3
1343	6795150	2122150	4989.943	4989.924	0.0	0.2
1322	6795200	2122150	4991.218	4991.188	0.0	0.4
1321	6795200	2122200	4991.245	4991.217	0.0	0.3
1320	6795200	2122250	4991.255	4991.245	0.0	0.1
1319	6795200	2122300	4991.280	4991.274	0.0	0.1
1318	6795200	2122350	4991.345	4991.303	0.0	0.5
1297	6795250	2122350	4992.571	4992.566	0.0	0.1
1298	6795250	2122300	4992.542	4992.537	0.0	0.1
1299	6795250	2122250	4992.520	4992.509	0.0	0.1
1300	6795250	2122200	4992.507	4992.480	0.0	0.3
1301	6795250	2122150	4992.452	4992.451	0.0	0.0
1280	6795300	2122150	4993.763	4993.715	0.0	0.6
1279	6795300	2122200	4993.776	4993.743	0.0	0.4
1278	6795300	2122250	4993.784	4993.772	0.0	0.1
1277	6795300	2122300	4993.811	4993.801	0.0	0.1
1276	6795300	2122350	4993.831	4993.830	0.0	0.0
1255	6795350	2122350	4995.101	4995.093	0.0	0.1
1256	6795350	2122300	4995.061	4995.064	0.0	0.0
1257	6795350	2122250	4995.037	4995.035	0.0	0.0
1258	6795350	2122200	4995.025	4995.007	0.0	0.2
1259	6795350	2122150	4994.985	4994.978	0.0	0.1
1238	6795400	2122150	4995.817	4995.811	0.0	0.1
1237	6795400	2122200	4996.142	4996.120	0.0	0.3
1236	6795400	2122250	4996.315	4996.299	0.0	0.2
1235	6795400	2122300	4996.331	4996.328	0.0	0.0
1234	6795400	2122350	4996.390	4996.356	0.0	0.4
1215	6795450	2122300	4995.774	4995.770	0.0	0.0
1216	6795450	2122250	4995.497	4995.461	0.0	0.4
1217	6795450	2122200	4995.183	4995.151	0.0	0.4
1218	6795450	2122150	4994.855	4994.842	0.0	0.2
1198	6795500	2122150	4993.885	4993.873	0.0	0.1
1197	6795500	2122200	4994.220	4994.182	0.0	0.5
1196	6795500	2122250	4994.495	4994.492	0.0	0.0
1195	6795500	2122300	4994.830	4994.801	0.0	0.3
1195	6795500	2122300	4994.799	4994.801	0.0	0.0
1175	6795550	2122300	4993.858	4993.832	0.0	0.3
1176	6795550	2122250	4993.533	4993.523	0.0	0.1
1177	6795550	2122200	4993.242	4993.213	0.0	0.3
1178	6795550	2122150	4992.911	4992.904	0.0	0.1
1158	6795600	2122150	4991.961	4991.935	0.0	0.3
1157	6795600	2122200	4992.256	4992.244	0.0	0.1
1156	6795600	2122250	4992.554	4992.554	0.0	0.0
1155	6795600	2122300	4992.879	4992.863	0.0	0.2
1154	6795600	2122350	4993.174	4993.173	0.0	0.0
1134	6795650	2122350	4992.207	4992.204	0.0	0.0
1135	6795650	2122300	4991.911	4991.894	0.0	0.2
1136	6795650	2122250	4991.590	4991.585	0.0	0.1
1137	6795650	2122200	4991.306	4991.275	0.0	0.4
1138	6795650	2122150	4990.980	4990.966	0.0	0.2
1118	6795700	2122150	4990.002	4989.997	0.0	0.1
1117	6795700	2122200	4990.356	4990.307	0.0	0.6

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1.2 & 2.1

1116	6795700	2122250	4990.652	4990.616	0.0	0.4
1115	6795700	2122300	4990.952	4990.925	0.0	0.3
1114	6795700	2122350	4991.237	4991.235	0.0	0.0
1094	6795750	2122350	4990.289	4990.266	0.0	0.0
1095	6795750	2122300	4989.987	4989.956	0.0	0.1
1096	6795750	2122250	4989.692	4989.647	0.0	0.5
1097	6795750	2122200	4989.364	4989.338	0.0	0.3
1098	6795750	2122150	4989.049	4989.028	0.0	0.3
1078	6795800	2122150	4988.072	4988.059	0.0	0.2
1077	6795800	2122200	4988.380	4988.369	0.0	0.1
1076	6795800	2122250	4988.692	4988.678	0.0	0.2
1075	6795800	2122300	4988.995	4988.987	0.0	0.1
1074	6795800	2122350	4989.309	4989.297	0.0	0.1
1054	6795850	2122350	4988.330	4988.328	0.0	0.0
1055	6795850	2122300	4988.032	4988.018	0.0	0.2
1056	6795850	2122250	4987.714	4987.709	0.0	0.1
1057	6795850	2122200	4987.400	4987.400	0.0	0.0
1058	6795850	2122150	4987.112	4987.090	0.0	0.3
Date:	8/9/2010	QC signature:Dave Stewart			Reviewed by:Beachem Bosh	

QA: JBT 8-25-10

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CRJ 000747

Interim Cover Buy Off Survey

Interim Buy off ID:			UIA01100813-00		Date:	8/13/2010
Point #	Northing	Easting	Surveyed Elevation	Design Elevation	Difference in feet	Difference in inches
1036	6795900	2122300	4987.081	4987.049	0.0	0.4
1037	6795900	2122250	4986.766	4986.740	0.0	0.3
1038	6795900	2122200	4986.457	4986.431	0.0	0.3
1039	6795900	2122150	4986.153	4986.121	0.0	0.4
					0.0	0.0
					0.0	0.0

Comments: This area is a small area that was placed in the far north end of the cell after the removal of a wet area in the tailings. Top of waste was re-bought off prior to placing Interim Cover.

Approval Date: 8/13/2010 Total Square Feet: 37,892 ft²

QC Signature: Dave Stewart Reviewed By: Beachem Bosh

8-25-10

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DS 8/23/10

B/B

A3. Interim Cover
Buyoff Surveys

CRJ 000661

Interim Cover Buy Off Survey

Interim Buy off ID: UIE01 | Date: 12/1/2010

Point #	Northing	Easting	Surveyed Elevation	Design Elevation	Difference in feet	Difference in inches
1	6795660.1	2122367	4992.1	4992.142	0.0	0.3
2	6795667.9	2122418	4992.3	4992.346	0.0	0.5
3	6795685.3	2122502	4992.5	4992.542	0.0	0.5
4	6795707.6	2122613	4992.8	4992.822	0.0	0.5
5	6795792.5	2122620	4991.2	4991.205	0.0	0.1
6	6795792.8	2122519	4990.6	4990.608	0.1	0.6
7	6795796.8	2122440	4989.9	4989.961	0.0	0.1
8	6795806.5	2122356	4989.2	4989.262	0.0	0.3
9	6795872.7	2122360	4988.0	4988.046	0.0	0.5
10	6795878.5	2122472	4988.6	4988.652	0.0	0.5
11	6795884.8	2122571	4989.1	4989.114	0.0	0.5
12	6795890.4	2122674	4989.6	4989.584	0.0	0.1
13	6795983.7	2122669	4987.8	4987.827	0.1	0.6
14	6795970.5	2122563	4987.4	4987.405	0.0	0.1
15	6795956.7	2122456	4987.0	4986.980	0.0	0.3
16	6795945.1	2122361	4986.6	4986.639	0.0	0.5
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
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					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0

Comments: North West Corner: 6795996 N. 2122325 E.

Approval Date: 12/1/2010 | Total Square Feet: 102,055

QC Signature: Mitch Hogan/ | Reviewed By: Beachem Bosh/

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43.8.3.1

A3. Interim Cover
Buyoff Surveys

CRJ 001027

ENERGYSOLUTIONS

Environmental Management - Grand Junction Office
MOAB
UMTRA Project

Interim Cover Buyoff Form

Client: Department of Energy
Project: Moab UMTRA Project
Date: 08-11-2011

In signing this document, the signatory agrees that the lift is complete and meets both the project specifications and RAIP requirements.

Lift Area	Lift Area
UIM18	

Approver Name/Title	Signature	Sign Date
Kevin Keele / J and T Eng. QA/QC Representative	Kevin Keele	08-11-2011
Brent Anderson / Energysolutions Construction Manager	Brent Anderson	08-11-2011
Beachem Bosh / Energysolutions QA/QC Representative	MITCH HOGAN FOR BEACHEM BOSH	08-11-2011
Mark Greenhalgh / Nielson Construction Manager	[illegible] / MWG	08-11-2011
Comments		

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OP-F-011
Rev 0, August 2010

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A3. Interim Cover
Buyoff Surveys

Moab UMTRA Crescent Junction Disposal Cell
Interim Cover Survey
Measured by Jason Knowlton
Checked by Kevin Keele
Johansen & Tuttle Engineering, Inc
August 10, 2011

Point #	Northing	Easting	Design Elevation	Measured Elevation	Difference (feet)	Difference (inches)
201	6795006.2	2122702.0	4986.61	4986.62	0.01	0.1
202	6795012.5	2122751.6	4986.79	4986.80	0.01	0.1
203	6795018.7	2122801.2	4986.98	4986.99	0.01	0.1
204	6794981.6	2122906.7	4986.10	4986.13	0.03	0.4
205	6794975.3	2122857.1	4985.92	4985.93	0.01	0.1
206	6794969.1	2122807.4	4985.73	4985.74	0.01	0.1
207	6794962.8	2122757.8	4985.54	4985.55	0.01	0.1
208	6794956.6	2122708.2	4985.36	4985.40	0.05	0.5
209	6794907.0	2122714.5	4984.11	4984.15	0.04	0.5
210	6794913.2	2122764.1	4984.29	4984.32	0.03	0.3
211	6794919.5	2122813.7	4984.48	4984.49	0.01	0.1
212	6794925.7	2122863.3	4984.67	4984.70	0.03	0.4
213	6794931.9	2122912.9	4984.85	4984.86	0.01	0.1
214	6794882.3	2122919.1	4983.60	4983.63	0.03	0.4
215	6794876.1	2122869.5	4983.42	4983.43	0.01	0.2
216	6794869.9	2122819.9	4983.23	4983.27	0.04	0.4
217	6794863.6	2122770.3	4983.04	4983.07	0.02	0.3
218	6794857.4	2122720.7	4982.86	4982.87	0.01	0.1
219	6794807.8	2122726.9	4981.61	4981.61	0.00	0.0
220	6794814.0	2122776.5	4981.79	4981.82	0.02	0.3
221	6794820.3	2122826.2	4981.98	4981.98	0.00	0.0
222	6794826.5	2122875.8	4982.17	4982.18	0.01	0.1
223	6794832.7	2122925.4	4982.35	4982.35	0.00	0.0
224	6794783.1	2122931.6	4981.10	4981.10	0.00	0.0
225	6794776.9	2122882.0	4980.92	4980.92	0.00	0.0
226	6794770.6	2122832.4	4980.73	4980.77	0.04	0.4
227	6794764.4	2122782.8	4980.54	4980.58	0.03	0.4
228	6794758.2	2122733.2	4980.36	4980.37	0.02	0.2
229	6794708.6	2122739.4	4979.11	4979.15	0.04	0.5
230	6794714.8	2122789.0	4979.29	4979.31	0.02	0.2
231	6794721.0	2122838.6	4979.48	4979.48	0.00	0.0
232	6794727.3	2122888.2	4979.67	4979.71	0.04	0.5
233	6794733.5	2122937.8	4979.85	4979.85	0.00	0.0
234	6794683.9	2122944.1	4978.60	4978.63	0.02	0.3
235	6794677.7	2122894.5	4978.42	4978.43	0.01	0.1
236	6794671.4	2122844.9	4978.23	4978.26	0.03	0.4
237	6794665.2	2122795.3	4978.04	4978.05	0.00	0.0
238	6794658.9	2122745.6	4977.86	4977.90	0.04	0.5
239	6794609.3	2122751.9	4976.61	4976.62	0.02	0.2
240	6794615.6	2122801.5	4976.79	4976.81	0.02	0.2
241	6794621.8	2122851.1	4976.98	4977.00	0.02	0.3
242	6794628.1	2122900.7	4977.17	4977.18	0.01	0.1
243	6794578.4	2122907.0	4975.92	4975.96	0.04	0.5
244	6794572.2	2122857.3	4975.73	4975.76	0.03	0.4
245	6794566.0	2122807.7	4975.54	4975.56	0.01	0.1
246	6794559.7	2122758.1	4975.36	4975.38	0.02	0.2
247	6794553.5	2122708.5	4975.17	4975.21	0.03	0.4

A3. Interim Cover
Buyoff Surveys

248	6794503.9	2122714.8	4973.92	4973.97	0.05	0.6
249	6794510.1	2122764.4	4974.11	4974.14	0.03	0.4
251	6794516.4	2122814.0	4974.29	4974.32	0.02	0.3
252	6794522.6	2122863.6	4974.48	4974.49	0.01	0.1
253	6794528.8	2122913.2	4974.67	4974.68	0.01	0.1
254	6794479.2	2122919.4	4973.42	4973.42	0.00	0.0
255	6794473.0	2122869.8	4973.23	4973.25	0.02	0.3
256	6794466.7	2122820.2	4973.04	4973.06	0.02	0.2
257	6794460.5	2122770.6	4972.86	4972.88	0.02	0.2
258	6794454.3	2122721.0	4972.67	4972.71	0.04	0.4
259	6794404.7	2122727.2	4971.42	4971.42	0.00	0.0
260	6794410.9	2122776.8	4971.61	4971.64	0.03	0.3
261	6794417.1	2122826.4	4971.79	4971.80	0.01	0.1
262	6794423.4	2122876.1	4971.98	4972.01	0.03	0.4
263	6794429.6	2122925.7	4972.17	4972.18	0.02	0.2
264	6794380.0	2122931.9	4970.92	4970.95	0.04	0.5
265	6794373.8	2122882.3	4970.73	4970.75	0.02	0.2
266	6794367.5	2122832.7	4970.54	4970.59	0.05	0.6
267	6794361.3	2122783.1	4970.36	4970.40	0.04	0.5
268	6794355.1	2122733.5	4970.17	4970.21	0.04	0.5
269	6794305.4	2122739.7	4968.92	4968.95	0.03	0.3
270	6794311.7	2122789.3	4969.11	4969.13	0.02	0.3
271	6794317.9	2122838.9	4969.29	4969.32	0.03	0.4
272	6794324.2	2122888.5	4969.48	4969.52	0.04	0.5
273	6794330.4	2122938.1	4969.67	4969.71	0.04	0.5
274	6794280.8	2122944.4	4968.42	4968.46	0.05	0.6
275	6794274.5	2122894.8	4968.23	4968.25	0.02	0.3
276	6794268.3	2122845.2	4968.04	4968.08	0.04	0.5
277	6794262.1	2122795.6	4967.86	4967.88	0.02	0.3
278	6794255.8	2122745.9	4967.67	4967.68	0.01	0.1
279	6794206.2	2122752.2	4966.42	4966.46	0.04	0.5
280	6794212.5	2122801.8	4966.61	4966.65	0.04	0.5
281	6794218.7	2122851.4	4966.79	4966.84	0.05	0.6
282	6794224.9	2122901.0	4966.98	4966.99	0.01	0.1
283	6794231.2	2122950.6	4967.17	4967.18	0.01	0.2
284	6794191.5	2122955.6	4966.17	4966.19	0.02	0.3
285	6794185.3	2122906.0	4965.98	4966.02	0.04	0.5
286	6794179.0	2122856.4	4965.79	4965.82	0.02	0.3
287	6794172.8	2122806.8	4965.61	4965.65	0.04	0.5
288	6794166.5	2122757.2	4965.42	4965.44	0.02	0.2

A3. Interim Cover
Buyoff Surveys

ENERGYSOLUTIONS

Environmental Management - Grand Junction Office
MOAB
UMTRA Project

CRJ 000982

Interim Cover Buyoff Form

Client: Department of Energy
Project: Moab UMTRA Project
Date: 09-27-2011

In signing this document, the signatory agrees that the lift is complete and meets both the project specifications and RAIP requirements.

Lift Area	Lift Area
UIR28	UIQ23

Approver Name/Title	Signature	Sign Date
Brent Anderson - Construction Manager		09-27-2011
Beachem Bosh - QA/QC Representative		09-27-2011
Adam Lucero - Nielson Construction		09-27-2011
Kevin Keele - J&T QC Representative		09-27-2011
Comments		
Surface was visually inspected and found to be satisfactory. See attached map for area location and square footage. KK 9-27-11		

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OP-F-011
Rev 0, August 2010

A3. Interim Cover
Buyoff Surveys

CRJ-000987

Moab UMTRA Crescent Junction Disposal Cell
Interim Cover Survey
Measured by Jason Knowlton
Checked by Kevin Keele
Johansen & Tuttle Engineering, Inc
Sep. 27, 2011

QA Review: 10/7/11

Point #	Northing	Easting	Design Elevation	Measured Elevation	Difference (feet)	Difference (inches)
295	6794789.36	2122981.22	4981.29	4981.33	0.05	0.6
296	6794795.60	2123030.83	4981.48	4981.49	0.01	0.1
297	6794801.83	2123080.44	4981.66	4981.67	0.01	0.1
298	6794758.46	2123136.29	4980.60	4980.60	0.00	0.0
299	6794752.22	2123086.68	4980.41	4980.44	0.02	0.3
300	6794745.99	2123037.07	4980.23	4980.25	0.03	0.3
301	6794739.75	2122987.46	4980.04	4980.07	0.03	0.3
302	6794690.14	2122993.70	4978.79	4978.82	0.03	0.3
303	6794696.38	2123043.31	4978.98	4979.01	0.03	0.4
304	6794702.61	2123092.92	4979.16	4979.19	0.03	0.3
305	6794708.85	2123142.53	4979.35	4979.37	0.02	0.3
306	6794659.24	2123148.76	4978.10	4978.12	0.02	0.2
307	6794653.01	2123099.15	4977.91	4977.92	0.01	0.1
308	6794646.77	2123049.55	4977.73	4977.74	0.01	0.2
309	6794640.53	2122999.94	4977.54	4977.56	0.02	0.3
310	6794634.29	2122950.33	4977.35	4977.36	0.01	0.1
311	6794584.68	2122956.56	4976.10	4976.14	0.03	0.4
312	6794590.92	2123006.17	4976.29	4976.31	0.03	0.3
313	6794597.16	2123055.78	4976.47	4976.48	0.00	0.0
314	6794603.40	2123105.39	4976.66	4976.66	0.00	0.0
315	6794609.63	2123155.00	4976.85	4976.85	0.00	0.0
316	6794560.02	2123161.24	4975.60	4975.61	0.01	0.1
317	6794553.79	2123111.63	4975.41	4975.43	0.02	0.3
318	6794547.55	2123062.02	4975.23	4975.24	0.01	0.2
319	6794541.31	2123012.41	4975.04	4975.06	0.02	0.3
320	6794535.07	2122962.80	4974.85	4974.88	0.02	0.3
321	6794485.46	2122969.04	4973.60	4973.61	0.01	0.1
322	6794491.70	2123018.65	4973.79	4973.81	0.02	0.2
323	6794497.94	2123068.26	4973.98	4973.99	0.01	0.1
324	6794504.18	2123117.87	4974.16	4974.19	0.03	0.3
325	6794510.42	2123167.48	4974.35	4974.39	0.04	0.5
326	6794460.81	2123173.72	4973.10	4973.12	0.02	0.2
327	6794454.57	2123124.11	4972.91	4972.92	0.01	0.1
328	6794448.33	2123074.50	4972.73	4972.73	0.00	0.0
329	6794442.09	2123024.89	4972.54	4972.58	0.04	0.5
330	6794435.85	2122975.28	4972.35	4972.38	0.02	0.3
331	6794386.24	2122981.52	4971.10	4971.11	0.01	0.1
332	6794392.48	2123031.13	4971.29	4971.31	0.02	0.3
333	6794398.72	2123080.74	4971.47	4971.51	0.03	0.4
334	6794404.96	2123130.34	4971.66	4971.68	0.02	0.2
335	6794411.20	2123179.95	4971.85	4971.85	0.00	0.0
336	6794361.59	2123186.19	4970.60	4970.60	0.00	0.0

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337	6794355.35	2123136.58	4970.41	4970.42	0.01	0.1
338	6794349.11	2123086.97	4970.23	4970.23	0.00	0.0
339	6794342.87	2123037.36	4970.04	4970.04	0.00	0.0
340	6794336.64	2122987.75	4969.85	4969.88	0.02	0.3
341	6794287.03	2122993.99	4968.60	4968.61	0.01	0.1
342	6794293.26	2123043.60	4968.79	4968.80	0.01	0.1
343	6794299.50	2123093.21	4968.98	4969.00	0.03	0.3
344	6794305.74	2123142.82	4969.16	4969.19	0.03	0.3
345	6794311.98	2123192.43	4969.35	4969.38	0.03	0.4
346	6794262.37	2123198.67	4968.10	4968.12	0.02	0.3
347	6794256.13	2123149.06	4967.91	4967.92	0.00	0.0
348	6794249.89	2123099.45	4967.73	4967.75	0.03	0.3
349	6794243.65	2123049.84	4967.54	4967.54	0.00	0.0
350	6794237.42	2123000.23	4967.35	4967.39	0.04	0.5
351	6794197.73	2123005.22	4966.35	4966.37	0.01	0.2
352	6794203.97	2123054.83	4966.54	4966.55	0.02	0.2
353	6794210.20	2123104.44	4966.72	4966.74	0.01	0.2
354	6794216.44	2123154.05	4966.91	4966.91	0.00	0.0
355	6794222.68	2123203.66	4967.10	4967.11	0.02	0.2

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A3. Interim Cover
Buyoff Surveys

ENERGYSOLUTIONS

Environmental Management · Grand Junction Office
MOAB
UMTRA Project

CRJ 000983

Interim Cover Buyoff Form

Client: Department of Energy
Project: Moab UMTRA Project
Date: 10-~~19~~-2011
18 [initials]

In signing this document, the signatory agrees that the lift is complete and meets both the project specifications and RAIP requirements.

Lift Area	Lift Area
UIQ18	

Approver Name/Title	Signature	Sign Date
Kevin Keele/ J&T Eng. QC Representative	[signature]	10-18-11
Mitch Hogan/ ENERGYSOLUTIONS QA/QC Representative	[signature]	10.19.2011
Brent Anderson/ ENERGYSOLUTIONS Construction Manager	[signature]	10/18/11
Mark Greenhalgh/ Nielsons Construction Manager	[signature]	10/18/11
Comments		
Lift area is approximately 42, 799 ft²		
Surface was visually inspected and found		
to be satisfactory. See attached map for		
area location. KK 10-18-11		

OP-F-011
Rev 0, August 2010

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A3. Interim Cover
Buyoff Surveys

Moab UMTRA Crescent Junction Disposal Cell
Interim Cover Survey: UIQ18
Measured by Jason Knowlton
Checked by Kevin Keele
Johansen & Tuttle Engineering, Inc
Oct. 17, 2011

Point #	Northing	Easting	Design Elevation	Measured Elevation	Difference (feet)	Difference (inches)
361	6794987.8	2122956.3	4986.29	4986.29	0.00	0.0
362	6794994.0	2123005.9	4986.48	4986.48	0.00	0.0
363	6795000.3	2123055.5	4986.66	4986.68	0.02	0.3
364	6794956.9	2123111.3	4985.60	4985.62	0.02	0.2
365	6794950.7	2123061.7	4985.41	4985.42	0.01	0.1
366	6794944.4	2123012.1	4985.23	4985.25	0.02	0.3
367	6794938.2	2122962.5	4985.04	4985.09	0.05	0.6
368	6794888.6	2122968.7	4983.79	4983.82	0.03	0.3
369	6794894.8	2123018.4	4983.97	4984.02	0.04	0.5
370	6794901.1	2123068.0	4984.16	4984.18	0.02	0.3
371	6794907.3	2123117.6	4984.35	4984.37	0.03	0.3
372	6794857.7	2123123.8	4983.10	4983.12	0.02	0.3
373	6794851.4	2123074.2	4982.91	4982.92	0.01	0.2
374	6794845.2	2123024.6	4982.73	4982.76	0.03	0.4
375	6794839.0	2122975.0	4982.54	4982.56	0.02	0.2
376	6794808.1	2123130.0	4981.85	4981.86	0.01	0.1

A3. Interim Cover
Buyoff Surveys

CRJ 000998
UMTRA Project

ENERGYSOLUTIONS

Interim Cover Buyoff Form

Client: Department of Energy
Project: Moab UMTRA Project
Date: 12-2-2011

In signing this document, the signatory agrees that the lift is complete and meets both the project specifications and RAIP requirements.

Lift Area	Lift Area
UIM10	

Approver Name/Title	Signature	Sign Date
Brent Anderson – EnergySolutions Construction Manager		12-2-11
Mark Greenhalgh – Nielson Construction Manager		12-2-11
Beachem Bosh – E.S. QA/QC Representative		12-2-11
Kevin Keele – J&T QC Representative		12-2-11
Comments		
Surface was inspected and found to be satisfactory. See attached map for area location and square footage.		

OP-F-011
Rev 0, August 2010

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A3. Interim Cover
Buyoff Surveys

QA Review: Brachon Hook 12-2-11

Moab UMTRA Crescent Junction Disposal Cell
Interim Cover Survey
Measured by Jason Knowlton Kevin Keele for JK 12-2-11
Checked by Kevin Keele Kevin Keele
Johansen & Tuttle Engineering, Inc
Dec. 1, 2011

Point #	Northing	Easting	Design Elevation	Measured Elevation	Difference (feet)	Difference (inches)
383	6795409.33	2122701.69	4996.79	4996.94	0.14	1.7
384	6795415.57	2122751.30	4996.98	4997.11	0.13	1.5
385	6795359.72	2122707.93	4995.54	4995.63	0.09	1.1
386	6795365.96	2122757.54	4995.73	4995.73	0.00	0.0
387	6795372.19	2122807.15	4995.92	4995.95	0.03	0.3
388	6795378.43	2122856.76	4996.10	4996.15	0.04	0.5
389	6795384.67	2122906.37	4996.29	4996.38	0.09	1.1
390	6795390.91	2122955.98	4996.47	4996.53	0.06	0.7
391	6795397.15	2123005.58	4996.66	4996.73	0.07	0.9
392	6795347.54	2123011.82	4995.41	4995.45	0.03	0.4
393	6795341.30	2122962.21	4995.22	4995.28	0.06	0.7
394	6795335.06	2122912.60	4995.04	4995.05	0.01	0.1
395	6795328.82	2122862.99	4994.85	4994.88	0.02	0.3
396	6795322.58	2122813.39	4994.67	4994.70	0.03	0.4
397	6795316.35	2122763.78	4994.48	4994.56	0.08	0.9
398	6795310.11	2122714.17	4994.29	4994.39	0.10	1.2
399	6795260.50	2122720.40	4993.04	4993.08	0.03	0.4
400	6795266.74	2122770.01	4993.23	4993.25	0.02	0.3
401	6795272.97	2122819.62	4993.42	4993.45	0.03	0.4
402	6795279.21	2122869.23	4993.60	4993.65	0.04	0.5
403	6795285.45	2122918.84	4993.79	4993.86	0.07	0.8
404	6795291.69	2122968.45	4993.98	4994.02	0.05	0.6
405	6795297.93	2123018.06	4994.16	4994.24	0.07	0.9
406	6795248.32	2123024.30	4992.91	4992.97	0.06	0.7
407	6795242.08	2122974.69	4992.73	4992.79	0.06	0.7
408	6795235.84	2122925.08	4992.54	4992.58	0.04	0.5
409	6795229.60	2122875.47	4992.35	4992.36	0.00	0.0
410	6795223.37	2122825.86	4992.17	4992.21	0.04	0.5
411	6795217.13	2122776.25	4991.98	4992.00	0.02	0.3
412	6795210.89	2122726.64	4991.79	4991.83	0.03	0.4
413	6795161.28	2122732.88	4990.54	4990.57	0.02	0.3
414	6795167.52	2122782.49	4990.73	4990.78	0.05	0.6
415	6795173.76	2122832.10	4990.92	4990.94	0.03	0.3
416	6795179.99	2122881.71	4991.10	4991.12	0.02	0.2
417	6795186.23	2122931.32	4991.29	4991.29	0.01	0.1
418	6795192.47	2122980.93	4991.48	4991.55	0.08	0.9
419	6795198.71	2123030.54	4991.66	4991.66	0.00	0.0
420	6795149.10	2123036.77	4990.41	4990.48	0.06	0.8
421	6795142.86	2122987.17	4990.23	4990.24	0.02	0.2
422	6795136.62	2122937.56	4990.04	4990.05	0.01	0.1
423	6795130.38	2122887.95	4989.85	4989.88	0.03	0.3
424	6795124.15	2122838.34	4989.67	4989.73	0.06	0.7

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425	6795117.91	2122788.73	4989.48	4989.51	0.03	0.3
426	6795111.67	2122739.12	4989.29	4989.36	0.07	0.8
427	6795062.06	2122745.36	4988.04	4988.08	0.04	0.5
428	6795068.30	2122794.97	4988.23	4988.27	0.04	0.5
429	6795074.54	2122844.58	4988.42	4988.49	0.07	0.9
430	6795024.93	2122850.81	4987.17	4987.21	0.04	0.5
431	6795031.17	2122900.42	4987.35	4987.45	0.09	1.1
432	6795080.78	2122894.18	4988.60	4988.64	0.03	0.4
433	6795087.01	2122943.79	4988.79	4988.82	0.04	0.4
434	6795037.40	2122950.03	4987.54	4987.55	0.01	0.1
435	6795043.64	2122999.64	4987.72	4987.77	0.04	0.5
436	6795093.25	2122993.40	4988.97	4989.04	0.07	0.8
437	6795099.49	2123043.01	4989.16	4989.28	0.12	1.4
438	6795049.88	2123049.25	4987.91	4987.97	0.06	0.8

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Top Of Waste Buyoff Survey

Lift Area Buyoff ID:			UIM01		Date:	3/16/2012
Point #	Northing	Easting	Surveyed Elevation	Design Elevation	Difference in feet	Difference in inches
8723	6796025	2122977	4988.8	4988.8	0.0	0.3
8685	6796019	2122927	4988.7	4988.6	0.0	0.6
8647	6796013	2122876	4988.5	4988.4	0.0	0.1
8609	6796007	2122828	4988.3	4988.3	0.0	0.2
8610	6795980	2122831	4988.9	4988.8	0.1	1.2
8648	6795986	2122881	4989.1	4989.0	0.1	1.2
8686	6795992	2122931	4989.2	4989.2	0.0	0.3
8724	6795999	2122980	4989.4	4989.4	0.0	0.3
8725	6795949	2122987	4990.4	4990.4	0.1	0.6
8687	6795943	2122937	4990.2	4990.2	0.1	0.6
8649	6795937	2122887	4990.0	4990.0	0.0	0.4
8611	6795930	2122838	4989.9	4989.8	0.1	0.8
8612	6795881	2122844	4990.9	4990.8	0.1	0.9
8650	6795887	2122894	4991.0	4991.0	0.0	0.2
8688	6795893	2122943	4991.2	4991.2	0.1	0.9
8726	6795899	2122993	4991.4	4991.4	0.1	0.8
8727	6795850	2122999	4992.4	4992.4	0.0	0.6
8689	6795844	2122949	4992.2	4992.2	0.0	0.3
8651	6795837	2122900	4992.1	4992.0	0.1	1.1
8613	6795831	2122850	4991.8	4991.8	0.0	0.3
8614	6795782	2122857	4992.6	4992.6	0.0	0.2
8652	6795788	2122906	4993.1	4993.0	0.1	1.1
8690	6795794	2122956	4993.2	4993.2	0.0	0.1
8691	6795744	2122962	4994.2	4994.2	0.0	0.3
8653	6795738	2122912	4994.0	4994.0	0.0	0.3
8615	6795732	2122863	4993.8	4993.8	0.0	0.1
8616	6795682	2122869	4994.9	4994.8	0.1	0.8
8654	6795689	2122919	4995.1	4995.0	0.1	1.0
8692	6795695	2122968	4995.2	4995.2	0.0	0.5
8693	6795645	2122974	4996.3	4996.2	0.1	1.2
8655	6795639	2122925	4996.0	4996.0	0.1	0.6
8617	6795633	2122875	4995.8	4995.8	0.0	0.1
8579	6795627	2122825	4995.6	4995.6	0.0	0.0
8580	6795577	2122832	4996.7	4996.6	0.1	0.7
8618	6795583	2122881	4996.8	4996.8	0.0	0.4
8656	6795589	2122931	4997.1	4997.0	0.1	1.2
8694	6795596	2122981	4997.2	4997.2	0.0	0.1
8695	6795546	2122987	4998.2	4998.2	0.0	0.5
8657	6795540	2122937	4998.0	4998.0	0.0	0.5
8619	6795534	2122888	4997.8	4997.8	0.0	0.3
8581	6795527	2122838	4997.7	4997.6	0.1	1.3
8582	6795478	2122844	4998.6	4998.6	0.0	0.1
8620	6795484	2122894	4998.8	4998.8	0.0	0.3
8658	6795490	2122944	4999.0	4999.0	0.0	0.1
8696	6795496	2122993	4999.2	4999.2	0.0	0.1
8697	6795447	2122999	4997.9	4997.9	0.0	0.2
8659	6795441	2122950	4997.7	4997.7	0.0	0.2
8621	6795434	2122900	4997.6	4997.5	0.0	0.3
8583	6795428	2122850	4997.4	4997.4	0.0	0.2
8584	6795378	2122857	4996.2	4996.1	0.1	1.3
8622	6795385	2122906	4996.4	4999.3	0.1	0.8
8660	6795391	2122956	4996.5	4996.5	0.1	0.8
8698	6795397	2123006	4996.7	4996.7	0.0	0.0
8470	6795360	2122708	4995.6	4995.5	0.1	0.6
8508	6795366	2122758	4995.8	4995.7	0.1	1.3
8546	6795372	2122807	4996.0	4995.9	0.0	0.4
8545	6795422	2122801	4997.2	4997.2	0.0	0.0
8507	6795416	2122751	4997.0	4997.0	0.0	0.0
8469	6795409	2122702	4996.9	4996.8	0.1	1.0
8468	6795459	2122695	4998.1	4998.0	0.0	0.3
8506	6795465	2122745	4998.2	4998.2	0.0	0.1
8544	6795471	2122795	4998.4	4998.4	0.0	0.1
8543	6795521	2122788	4997.5	4997.4	0.0	0.5
8505	6795515	2122739	4997.3	4997.2	0.0	0.3

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A3. Interim Cover
Buyoff Surveys

8467	6795509	2122689	4997.1	4997.1	0.1	0.9
8469	6795558	2122683	4996.1	4996.1	0.0	0.3
8504	6795564	2122733	4996.3	4996.2	0.0	0.4
8542	6795571	2122782	4996.5	4996.4	0.0	0.4
8541	6795620	2122776	4995.4	4995.4	0.0	0.1
8503	6795614	2122726	4995.3	4995.2	0.1	0.6
8465	6795608	2122677	4995.1	4995.1	0.0	0.6
8464	6795657	2122670	4994.2	4994.1	0.1	1.3
8502	6795664	2122720	4994.3	4994.2	0.1	1.2
8540	6795670	2122770	4994.5	4994.4	0.1	1.3
8578	6795676	2122819	4994.7	4994.6	0.1	1.0
8577	6795726	2122813	4993.7	4993.6	0.1	0.7
8539	6795720	2122764	4993.5	4993.4	0.1	1.4
8501	6795713	2122714	4993.3	4993.2	0.1	1.2
8500	6795763	2122708	4992.3	4992.2	0.1	1.4
8538	6795769	2122757	4992.4	4992.4	0.0	0.1
8576	6795775	2122807	4992.7	4992.6	0.1	0.7
8575	6795825	2122801	4991.6	4991.6	0.0	0.3
8537	6795819	2122751	4991.5	4991.4	0.1	0.8
8499	6795812	2122701	4991.3	4991.2	0.0	0.5
8498	6795862	2122695	4990.3	4990.2	0.1	0.9
8536	6795868	2122745	4990.5	4990.4	0.1	0.8
8574	6795875	2122794	4990.7	4990.6	0.1	1.2
8573	6795924	2122788	4989.6	4989.6	0.0	0.1
8535	6795918	2122738	4989.5	4989.4	0.1	1.1
8497	6795912	2122689	4989.3	4989.2	0.1	1.1
8534	6795968	2122732	4988.5	4988.4	0.1	1.3
8572	6795974	2122782	4988.6	4988.6	0.0	0.0
8571	6796001	2122778	4988.1	4988.1	0.1	0.8
8533	6795994	2122729	4988.0	4987.9	0.1	1.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0

Comments:	QC performed a visual inspection of the final surface with satisfactory results. Visual inspection notes: The area was free of humping, thickened edges and defects. The layer uniform thickness was satisfactory see above survey results for layer thickness.
Approval Date: 3/16/2012	Total Square Feet: 229,696
North West Corner: 6796069 N 2122774 E	
QC Signature: Beachem Bosh	Reviewed By: Mitch Hogan

EnergySolutions

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A4. Radon Barrier

CAES Test Pad Lift Approval Package

Standard Proctor Test Results Summary

Lift Approval Summary

Lift Approval Package

ENERGYSOLUTIONS

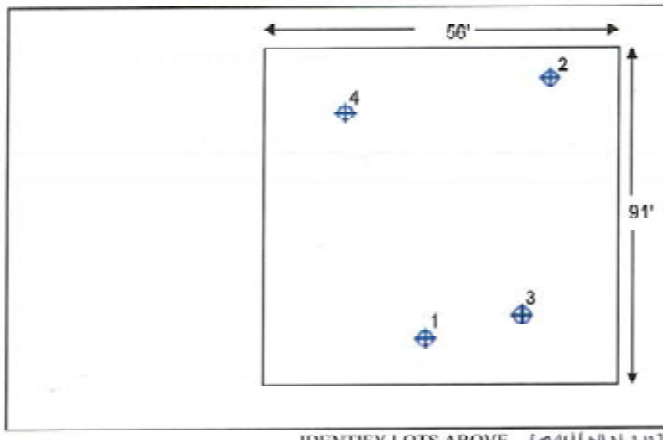
LIFT APPROVAL FORM

PROJECT: Moab UMTRA Project

OTHER

NW CORNER

DATE: 8/2/2010



P 1	6794538 N 2122471 E			
EW:	56	X	0.482	= 27
NS:	91	X	0.781	= 71
P 2	6794604 N 2122404 E			
EW:	56	X	0.862	= 48
NS:	91	X	0.053	= 5
P 3	6794537 N 2122484 E			
EW:	56	X	0.744	= 42
NS:	91	X	0.752	= 68
P 4	6794585 N 2122393 E			
EW:	56	X	0.213	= 12
NS:	91	X	0.269	= 24
P 5				
EW:		X	N	=
NS:		X	A	=

Page 2 attached: Y N

IDENTIFY LOTS ABOVE 6794604 N 2122356 E

LIFT ID: Radon Barrier Test pad NW CORNER: ~~6795379 N 2122084 E~~

THICKNESS: UNC: ≤ 12" COM: N/A ELEV: N/A Scarification Insp: YES Date: 7/30/10 Time: 1530

Material Inspection by: D.S. Partical Size: ≤4": X ≥4": Nesting: Y: N: X Processed Mancos Shale Material: Y: X N:

Comments: This lift is approximately ~~5,414~~ ft². This lift area was created as a test pad for establishing a compaction pattern for the Radon Barrier material. QC verified that the area was scarified and a baseline survey was performed prior to placement. QC verified with satisfactory results that the Interim Covers moisture was maintained until covered with Radon Barrier. Nielsons began placing the material as well as disking and adding moisture to the soil. Neilsons began compaction and made 3 machine passes with the caterpiller 825 compacter equiped with the CAES. QC observed compaction and performed 4 density tests over the area in correlation with the CAES with satisfactory results. QC also performed companion oven moisture tests in correlation with the nuclear density gauge.

KEYING IN NOTES: N E S W N/A DENSITY TESTS ID # (S): #1 - #4

LIFT APPROVED BY: Dave Stewart DATE: 8/5/2010 TIME: 0850

QA/QC APPROVAL DATE: 8.10.2010

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Density Testing
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ENERGYSOLUTIONS

Slope Elevation Survey

Average lift thickness=	0.8	Bounding Box	Northing	Easting	
Grid Size=	N/A	Lower Left	N		
Lift ID:	Radon Barrier Test Pad 8/2/2010	Upper Right		A	

Last Lift Elevations			Lift Approval Elevations			Lift Thickness	
Northing	Easting	Elevation	Northing	Easting	Elevation	Thickness	
6794582	2122358	4975.7	6794582	2122358	4976.4	0.7	OK
6794609	2122358	4976.4	6794609	2122358	4977.2	0.7	OK
6794527	2122361	4974.3	6794527	2122361	4975.0	0.8	OK
6794566	2122361	4975.3	6794566	2122361	4976.0	0.7	OK
6794609	2122361	4976.5	6794609	2122361	4977.2	0.7	OK
6794520	2122365	4974.1	6794520	2122365	4974.9	0.8	OK
6794566	2122365	4975.3	6794566	2122365	4976.0	0.7	OK
6794609	2122365	4976.5	6794609	2122365	4977.2	0.7	OK
6794520	2122368	4974.2	6794520	2122368	4975.0	0.8	OK
6794566	2122368	4975.4	6794566	2122368	4976.0	0.6	OK
6794609	2122368	4976.5	6794609	2122368	4977.2	0.7	OK
6794520	2122371	4974.2	6794520	2122371	4975.0	0.8	OK
6794566	2122371	4975.3	6794566	2122371	4976.1	0.8	OK
6794609	2122371	4976.5	6794609	2122371	4977.1	0.6	OK
6794520	2122375	4974.1	6794520	2122375	4975.0	0.9	OK
6794566	2122375	4975.4	6794566	2122375	4976.0	0.7	OK
6794609	2122375	4976.5	6794609	2122375	4977.3	0.8	OK
6794520	2122378	4974.1	6794520	2122378	4974.9	0.8	OK
6794566	2122378	4975.3	6794566	2122378	4976.1	0.8	OK
6794609	2122378	4976.5	6794609	2122378	4977.2	0.7	OK
6794523	2122381	4974.2	6794523	2122381	4975.1	0.9	OK
6794566	2122381	4975.3	6794566	2122381	4976.2	1.0	OK
6794612	2122381	4976.6	6794612	2122381	4977.3	0.7	OK
6794523	2122384	4974.2	6794523	2122384	4975.2	1.0	OK
6794566	2122384	4975.2	6794566	2122384	4976.2	1.0	OK
6794612	2122384	4976.6	6794612	2122384	4977.4	0.8	OK
6794523	2122388	4974.2	6794523	2122388	4975.1	0.9	OK
6794566	2122388	4975.2	6794566	2122388	4976.2	1.0	OK
6794612	2122388	4976.6	6794612	2122388	4977.4	0.8	OK
6794523	2122391	4974.2	6794523	2122391	4975.2	1.0	OK
6794566	2122391	4975.2	6794566	2122391	4976.2	1.0	OK
6794612	2122391	4976.6	6794612	2122391	4977.5	1.0	OK
6794523	2122394	4974.3	6794523	2122394	4975.2	0.9	OK
6794566	2122394	4975.3	6794566	2122394	4976.2	0.9	OK
6794612	2122394	4976.7	6794612	2122394	4977.5	0.8	OK
6794523	2122398	4974.3	6794523	2122398	4975.2	0.9	OK
6794566	2122398	4975.3	6794566	2122398	4976.2	1.0	OK
6794612	2122398	4976.8	6794612	2122398	4977.5	0.7	OK
6794523	2122401	4974.3	6794523	2122401	4975.1	0.8	OK
6794566	2122401	4975.3	6794566	2122401	4976.2	1.0	OK
6794612	2122401	4976.7	6794612	2122401	4977.5	0.7	OK
6794523	2122404	4974.3	6794523	2122404	4975.1	0.8	OK
6794566	2122404	4975.4	6794566	2122404	4976.3	0.9	OK
6794612	2122404	4976.7	6794612	2122404	4977.5	0.8	OK
6794523	2122407	4974.3	6794523	2122407	4975.1	0.8	OK
6794566	2122407	4975.4	6794566	2122407	4975.9	0.6	OK
6794612	2122407	4976.7	6794612	2122407	4977.4	0.7	OK
6794523	2122411	4974.3	6794523	2122411	4975.1	0.8	OK
6794566	2122411	4975.3	6794566	2122411	4975.9	0.6	OK
6794612	2122411	4976.7	6794612	2122411	4977.4	0.7	OK

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6794523	2122414	4974.4	6794523	2122414	4975.1	0.7	OK
6794566	2122414	4975.3	6794566	2122414	4976.1	0.8	OK
6794602	2122414	4976.5	6794602	2122414	4977.3	0.8	OK
6794527	2122417	4974.4	6794527	2122417	4975.3	0.9	OK
6794566	2122417	4975.4	6794566	2122417	4975.9	0.6	OK
6794576	2122417	4975.7	6794576	2122417	4976.3	0.6	OK
6794527	2122420	4974.5	6794527	2122420	4975.4	1.0	OK
6794530	2122420	4974.6	6794530	2122420	4975.5	0.9	OK
6794553	2122420	4975.0	6794553	2122420	4975.6	0.6	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK
						0.0	OK

N/A

% =6	95.8%
Elevation Avg	4976.2
Total =6	485
Total Lines	506

Pass

Minimum Number of Machine Passes: 3

Lift ID: Radon Barrier Test pad 8/2/10

Northing	Easting	Elevation	# of Passes	Passes =6	Count
6794582	2122358	4976.7	5		1
6794586	2122358	4976.9	5		1
6794589	2122358	4977.0	5		1
6794592	2122358	4977.2	5		1
6794595	2122358	4977.3	5		1
6794599	2122358	4977.5	5		1
6794602	2122358	4977.3	6	1	1
6794605	2122358	4977.4	6	1	1
6794609	2122358	4977.5	6	1	1
6794527	2122361	4974.8	6	1	1
6794530	2122361	4975.0	6	1	1
6794533	2122361	4975.1	6	1	1
6794536	2122361	4975.2	6	1	1
6794540	2122361	4975.3	6	1	1
6794543	2122361	4975.3	6	1	1
6794546	2122361	4975.4	6	1	1
6794550	2122361	4975.5	6	1	1
6794553	2122361	4975.5	6	1	1
6794556	2122361	4975.6	6	1	1
6794559	2122361	4975.8	6	1	1
6794563	2122361	4976.2	5		1
6794566	2122361	4976.4	5		1
6794569	2122361	4976.3	6	1	1
6794572	2122361	4976.5	6	1	1
6794576	2122361	4976.6	6	1	1
6794579	2122361	4976.7	6	1	1
6794582	2122361	4976.8	6	1	1
6794586	2122361	4976.9	5		1
6794589	2122361	4977.1	6	1	1
6794592	2122361	4977.2	6	1	1
6794595	2122361	4977.3	6	1	1
6794599	2122361	4977.5	6	1	1
6794602	2122361	4977.5	4		1
6794605	2122361	4977.6	3		1
6794609	2122361	4977.2	6	1	1
6794520	2122365	4974.9	6	1	1
6794523	2122365	4974.9	6	1	1
6794527	2122365	4975.0	6	1	1
6794530	2122365	4975.1	6	1	1
6794533	2122365	4975.2	6	1	1
6794536	2122365	4975.3	6	1	1
6794540	2122365	4975.4	6	1	1
6794543	2122365	4975.8	4		1
6794546	2122365	4975.8	6	1	1
6794550	2122365	4975.9	6	1	1

Lift Height: 1' 0"

Thick Lift Threshold: 2' 0"

Last Lift Elevation: N/A

Min. # of Wheel Passes: 6

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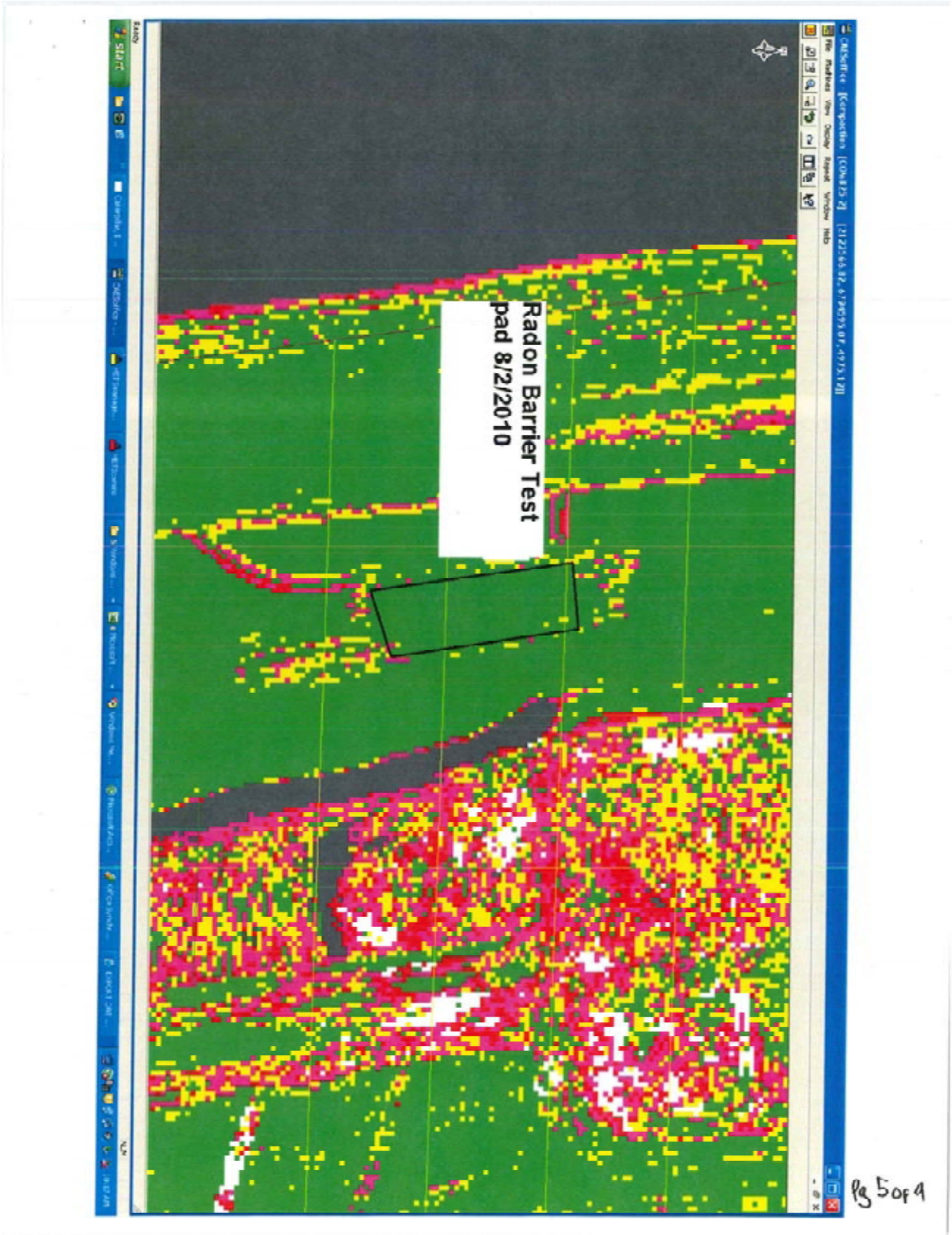
Radon Barrier Test
pad 8/2/2010
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ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER** _____

LIFT IDENTIFICATION: Radon Barrier Test Pad 8/2/2010 DATE: 8/2/2010

TEST ID NUMBER(S): 4363, RH 8/30/10 1

TEST LOCATION: 6794538 N 2122474 E TEST METHOD: ____ D1556 x D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 31674

Last Calibration Date: 3/4/10

Daily Standard Counts: *Off-Cell Standard*

Density 2495 Moisture 706

Method A (Direct Transmission)

Depth Setting 8 *(inches)* Count Time 1 *(minutes)*

Moisture Count 153 Density Count 1576

Wet Density (ρ_m) 126.1 *(lbs/ft^3)* Dry Density 114.1 *(lbs/ft^3)*

Moisture Density 12.0 *(lbs/ft^3)* Moisture Fraction 10.9 *(%)*

MOISTURE DETERMINATION

ASTM D4643

Container ID D-2

Mass of container & wet specimen (M_{cms})	400.8	g
Mass of container & dry specimen (M_{cds})	377.7	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	23.1	g
Mass of container (M_c)	163.6	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	214.1	g
Moisture content (w) $w = (M_w / M_s) \times 100$	10.8	%

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = (100 \times 126.1) / (100 + 10.8 = 113.8$ *lbs/ft^3*

Note: Wet Density from ASTM D 1556 (ρ_m) takes presidence over ASTM D 6938 (ρ_m)

Percent Compaction = $\rho_d / \gamma_d max \times 100$

113.8 / 118.4 x 100 = 96.1 %

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus ____ Calibrated Vol. *(lbs/ft^3)* ____

Bulk Density of sand (ρ_1) ____ *g/cm^3* ____ *lbs/ft^3*

Mass of Sand to Fill Cone & Plate (M_2) ____ *g*

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container	N/A	g
Mass of container		g
Mass of wet soil (M_3)		g

Test Hole Volume $V = (M_1 - M_2) / \rho_1$ ____ *cm^3*

Dry Mass of soil $M_4 = 100 M_3 / (w + 100)$ ____ *g*

Wet Denisty $\rho_m = (M_3 / V) \times 62.43$ ____ *lbs/ft^3*

Dry Denisty $\rho_d = M_4 / V$ ____ *g/cm^3*

Dry Unit Weight $\gamma_d = \rho_d \times 62.43$ ____ *lbs/ft^3*

Soil Description: **Yellowish in color and consists of mostly fines.**

Proctor ID: **Radon Barrier #3**

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 118.4 (lbs/ft^3)

Optimum Moisture (w_{opt}) 13.2 (%)

Required Moisture: 10.2 % to 16.2 %

Required Percent Compaction: 95.0 (%)

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 8/4/10

Failed Moisture

Failed Compaction Time: 0845

By: David Stewart / David Stewart
(print) *(signature)*

QA/QC APPROVAL 8/19/10 DATE

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ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project OTHER _____

LIFT IDENTIFICATION: Radon Barrier Test Pad 8/2/2010 DATE: 8/2/2010

TEST ID NUMBER(S): 2

TEST LOCATION: 6794604 N 2122404 E TEST METHOD: ____ D1556 __X__ D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 31674

Last Calibration Date: 3/4/10

Daily Standard Counts: *Off-Cell Standard*

Density 2495 Moisture 706

Method A (Direct Transmission)

Depth Setting 8 *(inches)* Count Time 1 *(minutes)*

Moisture Count 152 Density Count 1602

Wet Density (ρ_m) 125.4 *(lbs/ft³)* Dry Density 113.5 *(lbs/ft³)*

Moisture Density 11.9 *(lbs/ft³)* Moisture Fraction 10.5 *(%)*

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus ____ Calibrated Vol. *(lbs/ft³)* ____

Bulk Density of sand (ρ_1) ____ *g/cm³* ____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) ____ g

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container		g
Mass of container		g
Mass of wet soil (M_3)		g

N/A

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ ____ cm^3

Dry Mass of soil
$M_4 = 100\ M_3 / (w + 100)$ ____ g

Wet Denisty
$\rho_m = (M_4 / V) \times 62.43$ ____ lbs/ft^3

Dry Denisty
$\rho_d = M_4 / V$ ____ g/cm^3

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ ____ lbs/ft^3

MOISTURE DETERMINATION

ASTM D4643

Container ID D-3

Mass of container & wet specimen (M_{cms})	445.8	g
Mass of container & dry specimen (M_{cds})	419.2	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	26.6	g
Mass of container (M_c)	164.5	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	254.7	g
Moisture content (w) $w = (M_w / M_s) \times 100$	10.4	%

Soil Description: Yellowish in color and consists of mostly fines.

Proctor ID: Radon Barrier #3

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_{d\,max}$) 118.4 (lbs/ft³)

Optimum Moisture (w_{opt}) 13.2 (%)

Required Moisture: 10.2 % to 16.2 %

Required Percent Compaction: 95.0 (%)

Dry Density $(\rho_d = (100 \times \rho_m)/(100 + w)$

$pd = (100 \times 125.4) / (100 + 10.4) = 113.5\ lbs/ft^3$

Note: Wet Density from ASTM D 1556 (ρ_m) takes precidence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_{d\,max}$ x 100

113.5 / 118.4 x 100 = 95.9 %

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 8/4/10

Failed Moisture

Failed Compaction Time: 0900

By: David Stewart / David Stewart
(print) *(signature)*

QA/QC APPROVAL 8/4/2010 DATE

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ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: **Moab UMTRA Project** **OTHER** ______

LIFT IDENTIFICATION: **Radon Barrier Test Pad 8/2/2010** DATE: **8/2/2010**

TEST ID NUMBER(S): 3

TEST LOCATION: **6794527 N 2122424 E** TEST METHOD: D1556 **x** D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model **Troxler 3430** Gauge Serial # **31674**

Last Calibration Date: **3/4/10**

Daily Standard Counts: *Off-Cell Standard*

Density **2495** Moisture **706**

Method A (Direct Transmission)

Depth Setting **8** *(inches)* Count Time **1** *(minutes)*

Moisture Count **154** Density Count **1334**

Wet Density (ρ_m) **132.4** *(lbs/ft³)* Dry Density **120.4** *(lbs/ft³)*

Moisture Density **12.1** *(lbs/ft³)* Moisture Fraction **10.2** *(%)*

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus ______ Calibrated Vol. *(lbs/ft³)* ______

Bulk Density of sand (ρ_1) ______ g/cm³ ______ lbs/ft³

Mass of Sand to Fill Cone & Plate (M_2) ______ g

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container		g
Mass of container		g
Mass of wet soil (M_3)		g

Test Hole Volume $V = (M_1 - M_2) / \rho_1$ ______ cm³

Dry Mass of soil $M_4 = 100\ M_3 / (w + 100)$ ______ g

Wet Denisty $\rho_m = (M_3 / V) \times 62.43$ ______ lbs/ft³

Dry Denisty $\rho_d = M_4 / V$ ______ g/cm³

Dry Unit Weight $\gamma_d = \rho_d \times 62.43$ ______ lbs/ft³

N/A

MOISTURE DETERMINATION

ASTM D4643

Container ID **D-3**

Mass of container & wet specimen (M_{cms})	412.9	g
Mass of container & dry specimen (M_{cds})	388.4	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	24.5	g
Mass of container (M_c)	164.5	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	223.9	g
Moisture content (w) $w = (M_w / M_s) \times 100$	10.9	%

Soil Description: **Yellowish in color and consists of mostly fines.**

Proctor ID: **Radon Barrier #3**

Standard Proctor (ASTM D698)

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = ($ *100* $\times$ *132.4* $) / (100 +$ *10.9* $) =$ **119.3** lbs/ft³

Note: Wet Density from ASTM D 1556 (ρ_m) takes presidence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max \times 100$

119.3 / *118.4* x *100* = **100.8** %

Maximum Dry Density ($\gamma_d max$) **118.4** (lbs/ft³)

Optimum Moisture (w_{opt}) **13.2** (%)

Required Moisture: **10.2** % to **16.2** %

Required Percent Compaction: **95.0** (%)

Comments:
Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

- **X** Pass Date: **8/4/10**
- Failed Moisture
- Failed Compaction Time: **0915**

By: **David Stewart** *(print)* / David Stewart *(signature)*

[signature] 8.19.10
QA/QC APPROVAL DATE

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FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER**

LIFT IDENTIFICATION: Radon Barrier Test Pad 8/2/2010 DATE: 8/2/2010

TEST ID NUMBER(S): 4

TEST LOCATION: 6794585 N 2122397 E TEST METHOD: D1556 x D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 31674

Last Calibration Date: 3/4/10

Daily Standard Counts: *Off Cell Standard*

Density 2495 Moisture 706

Method A (Direct Transmission)

Depth Setting 8 *(inches)* Count Time 1 *(minutes)*

Moisture Count 181 Density Count 1424

Wet Density (ρ_m) 129.8 *(lbs/ft³)* Dry Density 115.3 *(lbs/ft³)*

Moisture Density 14.5 *(lbs/ft³)* Moisture Fraction 12.6 *(%)*

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus _____ Calibrated Vol. *(lbs/ft³)* _____

Bulk Density of sand (ρ_1) _____ *g/cm³* _____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) _____ *g*

Mass of bottle & cone **before** filling cone, plate & hole		*g*
Mass of bottle & cone **after** filling cone, plate & hole		*g*
Mass of sand to fill cone, plate, & hole (M_1)		*g*
Mass of sand to fill hole		*g*
Mass of wet soil & container	N/A	*g*
Mass of container		*g*
Mass of wet soil (M_3)		*g*

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ _____ *cm³*

Dry Mass of soil
$M_4 = 100\ M_3 / (w + 100)$ _____ *g*

Wet Density
$\rho_m = (M_3 / V) \times 62.43$ _____ *lbs/ft³*

Dry Density
$\rho_d = M_4 / V$ _____ *g/cm³*

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ _____ *lbs/ft³*

MOISTURE DETERMINATION

ASTM D4643

Container ID D-2

Mass of container & wet specimen (M_{cws})	412.8	*g*
Mass of container & dry specimen (M_{cds})	385.0	*g*
Mass of water (M_w) $M_w = M_{cws} - M_{cds}$	27.8	*g*
Mass of container (M_c)	164.5	*g*
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	220.5	*g*
Moisture content (w) $w = (M_w / M_s) \times 100$	12.6	%

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho_d = (\ 100\ \times$ 129.8 $)\ /\ (100 +$ 12.6 $) =$ 115.3 *lbs/ft³*

Note: Wet Density from ASTM D 1556 (ρ_m) takes precedence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max$ x 100

115.3 / 118.4 x 100 = 97.4 %

Soil Description: Yellowish in color and consists of mostly fines.

Proctor ID: Radon Barrier #3

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 118.4 (lbs/ft³)

Optimum Moisture (w_{opt}) 13.2 (%)

Required Moisture: 10.2 % to 16.2 %

Required Percent Compaction: 95.0 (%)

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 8/4/10

Failed Moisture

Failed Compaction Time: 0930

By: David Stewart / David Stewart
(print) *(signature)*

QA/QC APPROVAL DATE: 8/4/2010

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A4. Radon Barrier
Standard Proctor Test Results Summary

Set	Proctor ID #	Date Sampled	Date Approved	Maximum Dry Density (lb/ft^3)	Optimum Moisture Content (%)	Soils Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
	Radon Barrier #1	05/28/10	05/28/10	113.1	14.0	Gray in color some shale*	33.0	17.0	16.0
Set #1	Radon Barrier #2(A)	08/02/10	08/02/10	119.9	11.5	Yellowish in color and consists of mostly fines	33.4	15.0	18.4
	Radon Barrier #3(A)	08/02/10	08/02/10	118.4	13.2	Yellowish in color and consists of mostly fines	30.6	14.7	15.9
	Radon Barrier #4(A)	08/02/10	08/03/10	119.7	11.8	Yellowish in color and consists of mostly fines	33.2	16.6	16.6
Set #2	Radon Barrier #5(B)	08/04/10	08/04/10	116.2	13.2	Gray in color and consists of mostly fines	32.1	13.3	18.8
	Radon Barrier #6(B)	08/04/10	08/04/10	117.5	13.1	Gray in color and consists of mostly fines	30.8	13.9	16.9
	Radon Barrier #7(B)	08/04/10	08/04/10	118.6	12.7	Gray in color and consists of mostly fines	32.2	14.4	17.8
Set #3	Radon Barrier #8(C)	08/12/10	08/12/10	118.2	13.3	Gray in color and consists of mostly fines	32.1	15.9	16.2
	Radon Barrier #9(C)	08/12/10	08/12/10	118.4	12.5	Gray in color and consists of mostly fines	33.0	16.8	16.2
	Radon Barrier #10(C)	08/12/10	08/12/10	116.8	12.0	Gray in color and consists of mostly fines	32.6	15.7	17.0
	Radon Barrier #11(D)	08/17/10	08/17/10	118.8	12.6	Gray in color and consists of mostly fines	33.0	16.0	17.0
	Radon Barrier #12(E)	08/24/10	10/05/10	119.2	11.4	Gray in color and consists of mostly fines	33.0	18.0	15.0
	Radon Barrier #13(F)	08/27/10	10/05/10	119.8	11.0	Gray in color and consists of mostly fines	33.0	17.0	16.0
N/A	Radon Barrier #14(G)	Proctor set rejected due to proctor curves.							
	Radon Barrier #15(G)								
	Radon Barrier #16(G)								
Set #4	Radon Barrier #17(H)	09/10/10	10/05/10	120.0	11.1	Gray in color and consists of mostly fines	30.0	16.0	14.0
	Radon Barrier #18(H)	09/10/10	10/05/10	119.8	11.3	Gray in color and consists of mostly fines	30.0	16.0	14.0
	Radon Barrier #19(H)	09/10/10	10/05/10	119.4	11.7	Gray in color and consists of mostly fines	31.0	15.0	16.0
Set #5	Radon Barrier #20(I)	09/10/10	10/05/10	120.8	11.4	Gray in color and consists of mostly fines	31.0	13.0	18.0
	Radon Barrier #21(I)	09/10/10	10/05/10	119.5	11.6	Gray in color and consists of mostly fines	31.0	16.0	16.0
	Radon Barrier #22(I)	09/10/10	10/05/10	118.7	11.7	Gray in color and consists of mostly fines	31.0	14.0	17.0
	Radon Barrier #23(J)	09/16/10	10/05/10	120.3	11.4	Gray in color and consists of mostly fines	32.0	16.0	16.0
Set #6	Radon Barrier #1 (2011)	03/30/11	04/04/11	120.2	11.8	Gray in color and consist of mostly fines	33.0	16.0	17.0
	Radon Barrier #2 (2011)	03/30/11	04/04/11	120.9	11.1	Gray in color and consist of mostly fines	31.0	17.0	14.0
	Radon Barrier #3 (2011)	03/30/11	04/04/11	122.0	11.3	Gray in color and consist of mostly fines	31.0	16.0	15.0
	Radon Barrier #4 (2011)	04/04/11	04/06/11	121.0	11.0	Gray in color and consist of mostly fines	32.0	15.0	17.0
	Radon Barrier #5 (2011)	04/05/11	04/14/11	122.2	11.0	Gray in color and consist of mostly fines	30.0	17.0	13.0
	Radon Barrier #6 (2011)	04/12/11	04/18/11	122.0	10.8	Gray in color and consist of mostly fines	31.0	14.0	17.0
	Radon Barrier #7 (2011)	04/14/11	04/28/11	118.8	12.6	Gray in color and consists of mostly fines	32.0	15.0	17.0
	Radon Barrier #8 (2011)	04/20/11	04/28/11	120.5	11.5	Gray in color and consists of mostly fines	30.0	15.0	15.0

A4. Radon Barrier
Standard Proctor Test Results Summary

Set	Proctor ID #	Date Sampled	Date Approved	Maximum Dry Density (lb/ft^3)	Optimum Moisture Content (%)	Soils Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
	Radon Barrier #9 (2011)	04/21/11	05/11/11	116.6	13.6	Gray in color and consists of mostly fines	35.0	19.0	16.0
	Radon Barrier #10 (2011)	04/27/11	05/11/11	118.2	12.4	Gray in color and consist of mostly fines	33.0	17.0	16.0
	Radon Barrier #11 (2011)	05/03/11	05/16/11	118.3	11.9	Gray in color and consists of mostly fines	35.0	17.0	18.0
	Radon Barrier #12 (2011)	05/09/11	05/16/11	115.7	14.7	Gray in color and consists of mostly fines	35.0	20.0	15.0
	Radon Barrier #13 (2011)	05/09/11	05/16/11	114.0	14.2	Gray in color and consists of mostly fines	35.0	19.0	16.0
	Radon Barrrier #14 (2011)	05/09/11	05/16/11	115.0	13.8	Gray in color and consists of mostly fines	34.0	17.0	17.0
	Radon Barrier #15 (2011)	05/16/11	05/27/11	115.9	14.4	Gray in color and consists of mostly fines	35.0	17.0	18.0
	Radon Barrier #16 (2011)	05/25/11	06/06/11	118.6	13.2	Tannish in color and consists mostly of fines	31.0	17.0	14.0
	Radon Barrier #17 (2011)	05/25/11	06/06/11	117.0	13.7	Tannish in color and consists mostly of fines	32.0	17.0	15.0
	Radon Barrier #18 (2011)	05/25/11	06/06/11	116.6	14.1	Tannish in color and consists mostly of fines	31.0	17.0	14.0
	Radon Barrier #19 (2011)	08/11/11	10/03/11	117.1	14.0	Grayish in color and consists mostly of fines	33.0	16.0	17.0
	Radon Barrier #20 (2011)	08/11/11	10/03/11	115.7	14.3	Grayish in color and consists mostly of fines	33.0	16.0	17.0
	Radon Barrier #21 (2011)	08/11/11	10/03/11	116.2	13.8	Grayish in color and consists mostly of fines	32.0	17.0	15.0
	Radon Barrier #22 (2011)	08/25/11	09/07/11	114.4	14.7	Tannish in color and consists mostly of fines	30.0	16.0	14.0
	Radon Barrier #23 (2011)	08/31/11	09/13/11	115.0	14.5	Tannish in color and consists mostly of fines	32.0	16.0	16.0
	Radon Barrier #24 (2011)	09/07/11	09/29/11	115.2	15.0	Tannish in color and consists mostly of fines	32.0	17.0	15.0
	Radon Barrier #25 (2011)	09/28/11	10/03/11	115.8	14.5	Tannish in color and consists mostly of fines	32.0	16.0	16.0
	Radon Barrier #26 (2011)	10/04/11	10/25/11	114.5	15.0	Tannish in color and consists mostly of fines	33.0	16.0	17.0
	Radon Barrier #27 (2011)	10/12/11	10/25/11	116.3	14.4	Tannish in color and consists mostly of fines	33.0	16.0	17.0

*All shale breaks down when exposed to water. Approximately 97% of material passes the #200 sieve.

A4. Radon Barrier
Lift Approval Summary

Date	Lift ID #	# of Passing Moisture Tests	Quantity Approved (yd^3)	Cumulative Quantity Approved (yd^3)	CAES Screen Passing Pixels (%)	Average Thickness (ft)	Proctor ID #	# of Nuclear Density Gauge Verifications	# of Sandcone Verifications	Verified Compaction (%)	Notes
08/02/10	Test Pad	4	N/A	0	95.8	0.8	RB-3	4	0	97.4	1,2
08/10/10	URB27100810-00	2	2,711	2,711	98.2	0.6	RB-3	2	1	97.9	
08/10/10	URA11100810-00	3	5,237	7,948	98.1	0.7	RB-3	3	1	100.1	
08/16/10	URA11100811-00	3	3,192	11,140	95.6	0.5	RB-8C	3	0	97.1	
08/17/10	URC11100811-00	6	3,293	14,433	98.9	0.6	RB-3 RB-8	0	0	N/A	
08/18/10	URC11100817-00	3	2,939	17,372	98.1	0.6	RB-8	0	0	N/A	
08/17/10	URA11100817-00	3	3,712	21,084	94.2	0.6	RB-8C	1	0	98.4	
08/20/10	URA11100819-00	6	4,328	25,412	92.9	0.7	RB-8	0	0	N/A	
08/24/10	URC11100823-00	6	2,002	27,414	93.7	0.4	RB-8 RB-11D	0	0	N/A	
08/25/10	URA11100824-00	3	4,328	31,742	92.4	0.7	RB-11D	0	0	N/A	
08/26/10	URC11100824-00	6	3,504	35,246	90.0	0.7	RB-11D	0	0	N/A	
09/07/10	URA01100907-00	5	2,340	37,586	96.2	0.4	RB-12E	0	0	N/A	
09/13/10	URA01100909-00	3	4,093	41,679	95.6	0.7	RB-18H	0	0	N/A	
09/14/10	URA01100914-00	3	3,938	45,617	97.9	0.7	RB-23I	0	0	N/A	
09/15/10	URA01100915-00	3	3,910	49,527	96.9	0.7	RB-23I	0	0	N/A	
09/20/10	URA01100916-00	3	3,910	53,437	95.3	0.7	RB-22I	0	0	N/A	
09/29/10	URA01100924-00	3	1,552	54,989	95.0	0.3	RB-12E	0	0	N/A	
09/29/10	URC11100827-00	3	1,478	56,467	99.1	0.3	RB-12E	0	0	N/A	
09/29/10	URA11100827-00	3	1,039	57,506	99.1	0.2	RB-12E	0	0	N/A	
03/31/11	URF15110331-00	2	2,671	60,177	99.8	0.5	RB-3(2011)	0	0	N/A	
03/31/11	URH01110330-00	4	3,053	63,230	99.5	0.7	RB-3(2011)	2	0	98.4	
03/31/11	URH01110331-00	2	3,391	66,621	98.9	0.7	RB-3(2011)	1	0	96.4	
04/04/11	URI35110404-00	1	49	66,670	N/A	0.8	RB-3(2011)	1	0	97.0	
04/04/11	URI35110404-01	1	52	66,722	N/A	0.8	RB-3(2011)	1	0	98.4	
04/06/11	URF01110406-00	2	2,617	69,339	97.9	0.6	RB-3(2011)	0	0	N/A	
04/07/11	URH01110407-00	4	3,118	72,457	97.7	0.7	RB-4(2011)	0	0	N/A	
04/11/11	URJ35110411-00	1	59	72,516	N/A	0.8	RB-4(2011)	1	0	96.3	
04/12/11	URF1510412-00	4	3,847	76,363	99.4	0.6	RB-4(2011)	0	0	N/A	
04/13/11	URJ12110413-00	3	3,998	80,361	99.1	0.6	RB-4(2011)	0	0	N/A	
04/14/11	URF01110414-00	4	3,475	83,836	98.9	0.7	RB-6(2011)	0	0	N/A	
04/18/11	URJ12110418-00	4	3,998	87,834	99.4	0.6	RB-6(2011)	0	0	N/A	
04/21/11	URE14110421-00	3	4,278	92,112	99.3	0.7	RB-6(2011)	0	0	N/A	
04/25/11	URH01110425-00	5	3,582	95,694	99.2	0.7	RB-7(2011)	0	0	N/A	
04/26/11	URH14110426-00	5	3,479	99,173	97.5	0.6	RB-7(2011)	0	0	N/A	
04/28/11	URE01110428-00	4	3,038	102,211	99.2	0.6	RB-8(2011)	0	0	N/A	

A4. Radon Barrier
Lift Approval Summary

Date	Lift ID #	# of Passing Moisture Tests	Quantity Approved (yd^3)	Cumulative Quantity Approved (yd^3)	CAES Screen Passing Pixels (%)	Average Thickness (ft)	Proctor ID #	# of Nuclear Density Gauge Verifications	# of Sandcone Verifications	Verified Compaction (%)	Notes
05/02/11	URE14110502-00	4	3,802	106,013	98.3	0.6	RB-8(2011)	0	0	N/A	
05/03/11	URH01110503-00	4	2,450	108,463	98.9	0.5	RB-9(2011)	0	0	N/A	
05/04/11	URH14110504-00	6	3,291	111,754	98.1	0.6	RB-9(2011)	0	0	N/A	
05/05/11	URE01110505-00	5	3,751	115,505	99.0	0.7	RB-9(2011)	0	0	N/A	
05/11/11	URE14110511-00	5	4,811	120,316	98.4	0.7	RB-10(2011)	0	0	N/A	
05/16/11	URH01110516-00	4	3,191	123,507	98.0	0.7	RB-12(2011)	0	0	N/A	
05/17/11	URH14110517-00	5	2,989	126,496	97.5	0.6	RB-12(2011)	0	0	N/A	
05/23/11	URE01110523-00	6	2,680	129,176	98.5	0.5	RB-12(2011)	0	0	N/A	
05/26/11	URE14110526-00	4	3,548	132,724	99.6	0.5	RB-17(2011)	0	0	N/A	
06/01/11	URH01110601-00	4	2,396	135,120	97.9	0.5	RB-17(2011)	0	0	N/A	
06/01/11	URH14110601-00	2	3,060	138,180	97.5	0.6	RB-17(2011)	0	0	N/A	
08/24/11	URM18110822-00	5	2,338	140,518	N/A	0.6	RB-21(2011)	2	0	97.1	
08/25/11	URO19110824-00	2	1,956	142,474	N/A	0.6	RN-21(2011)	2	0	98.6	
08/26/11	URM18110825-00	2	3,117	145,591	N/A	0.8	RB-21(2011)	2	0	97.3	
08/29/11	URO19110826-00	2	2,224	147,815	N/A	0.7	RB-21(2011)	2	0	95.7	
08/30/11	URM19110830.00	2	3,162	150,977	N/A	0.8	RB-21(2011)	2	0	96.4	
08/31/11	URO19110831-00	1	2,397	153,374	N/A	0.8	RB-22(2011)	2	0	98.6	
09/02/11	URO1910901-00	2	2,320	155,694	N/A	0.8	RB-22(2011)	2	0	99.0	
09/07/11	URM18110902-00	3	3,232	158,926	N/A	0.8	RB-22(2011)	2	1	100.4	
09/28/11	URQ23110928-00	1	1,826	160,752	N/A	0.7	RB-24(2011)	2	0	95.5	
09/29/11	URQ29110929-00	2	1,757	162,509	N/A	0.6	RB-24(2011)	2	1	100.8	
10/03/11	URQ231110929-00	1	2,095	164,604	N/A	0.8	RB-24(2011)	2	0	98.1	
10/03/11	URQ29111003-00	1	2,320	166,924	N/A	0.8	RB-24(2011)	2	0	97.1	
10/05/11	URQ23111004-00	2	2,105	169,029	N/A	0.8	RB-24(2011)	2	0	98.7	
10/10/11	URQ29111005-00	2	2,025	171,054	N/A	0.7	RB-25(2011)	2	0	99.5	
10/10/11	URQ23111007-00	2	1,588	172,642	N/A	0.6	RB-25(2011)	2	0	99.4	
10/11/11	URQ29111011-00	1	2,323	174,965	N/A	0.8	RB-25(2011)	2	0	100.1	
10/19/11	URQ18111019-00	1	948	175,913	N/A	0.6	RB-25(2011)	2	0	98.6	
10/20/11	URQ18111020-00	1	1,322	177,235	N/A	0.8	RB-25(2011)	2	0	97.7	
10/21/11	URQ18111021-00	1	1,169	178,404	N/A	0.7	RB-27(2011)	2	0	98.6	
10/24/11	URQ18111024-00	1	1,153	179,557	N/A	0.7	RB-27(2011)	2	0	97.5	
10/24/11	URQ18111024-01	1	1,267	180,824	N/A	0.8	RB-27(2011)	1	0	99.5	
10/31/11	URM18110909-00	3	3,396	184,220	N/A	0.8	RB-23(2011)	2	0	99.9	
10/31/11	URO19110907-00	3	2,267	186,487	N/A	0.8	RB-23(2011)	2	0	99.1	
10/31/11	URQ18111025-00	1	158	186,645	N/A	0.1	RB-27(2011)	2	0	99.1	
10/31/11	URQ23111012-00	2	2,080	188,725	N/A	0.8	RB-25(2011)	3	0	99.5	

A4. Radon Barrier
Lift Approval Summary

Date	Lift ID #	# of Passing Moisture Tests	Quantity Approved (yd^3)	Cumulative Quantity Approved (yd^3)	CAES Screen Passing Pixels (%)	Average Thickness (ft)	Proctor ID #	# of Nuclear Density Gauge Verifications	# of Sandcone Verifications	Verified Compaction (%)	Notes
10/31/11	URQ29111013-00	1	1,671	190,396	N/A	0.6	RB-25(2011)	2	0	100.0	

Average CAES Screen Passing Pixels (%) = 97.45

Total Quantity Approved (yd^3) = 190,396

Total # of Nuclear Density Gauge Tests = 71

Total # of Moisture Tests = 215

Quantity per Moisture Test (yd^3) = 886

Total Average Thickness (ft.) = 0.6

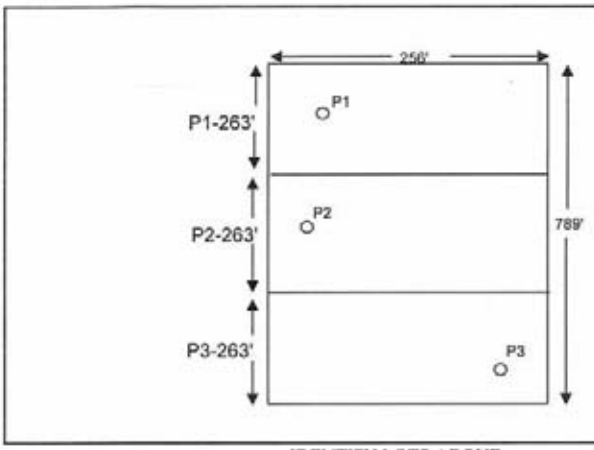
1. Lift was created as a test pad to establish a compaction pattern for the Radon Barrier material.
2. Three passes were made with a Caterpillar 825 compacter equipped with the CAES; four density tests were performed to establish proof of compaction.

ENERGYSOLUTIONS

LIFT APPROVAL FORM

PROJECT: Moab UMTRA Project **OTHER**

NW CORNER **DATE:** 8/10/2010



P 1	6795258 N, 2122149 E.				
EW:	256	X	0.254	=	65
NS:	263	X	0.459	=	121
P 2	6794968 N, 2122124 E.				
EW:	256	X	0.156	=	40
NS:	263	X	0.563	=	148
P 3	6794646 N, 2122292 E.				
EW:	256	X	0.811	=	208
NS:	263	X	0.786	=	207
P 4					
EW:		X		=	
NS:		X		=	
P 5					
EW:		X		=	
NS:		X		=	

N/A

Page 2 attached: Y N

IDENTIFY LOTS ABOVE

LIFT ID: URA11100810-00 NW CORNER: 6795379 N 2122084 E

THICKNESS: UNC: ≤ 12" COM: N/A ELEV: N/A Scarification Insp: YES Date: 8/2/10 Time: 1000

Material Inspection by: D.S. Partical Size: ≤4": X ≥4": ___ Nesting: Y: ___ N: X Processed Mancos Shale Material: Y: X N: ___

Comments: This lift is approximately 201,984 ft². There is approximately 5,237 yds³ of Radon material on this lift. This is the first lift of Radon Barrier material in this area. QC took pictures during processing, conditioning, and compaction of this lift area, see attached. QC performed a survey to identify the boundary line for the lift area. QC verified that the area was scarified and a baseline survey was performed prior to placement. QC verified with satisfactory results that the Interim Cover moisture was maintained until covered with Radon Barrier. Nielsons began placing the material as well as disking and adding moisture to the soil. QC performed a visual inspection on the material and found some material with particle size exceeding 4". QC performed multiple visual inspections during processing of material. material was reworked and some was removed form this lift area. A final inspection was performed on 8/10/2010 with satisfactory results. QC observed compaction and performed 3 density tests in correlation with the CAES with satisfactory results. QC also performed companion moisture tests and a companion sandcone test in correlation with the nuclear density gauge. Test #1 had high compaction results, due to test location was in a haul route for material placement.

KEYING IN NOTES: N E S W N/A DENSITY TESTS ID # (S): 1, 2 and 3

LIFT APPROVED BY: Dave Stewart DATE: 8/10/2010 TIME: 1830

QA/QC APPROVAL 8-25-10 DATE 8-11-10

Density Testing
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ENERGYSOLUTIONS

Slope Elevation Survey

	Average lift thickness=	0.7	Bounding Box	Northing	Easting
	Grid Size=	50'	Lower Left	N	
Lift ID:	URA11100810-00		Upper Right		A

Last Lift Elevations			Lift Approval Elevations			Lift Thickness	
Northing	Easting	Elevation	Northing	Easting	Elevation	Thickness	
6794794	2122165	4980.7	6794794	2122165	4981.7	1.0	OK
6794844	2122165	4982.1	6794844	2122165	4983.1	1.0	OK
6794894	2122165	4983.5	6794894	2122165	4984.5	1.0	OK
6794944	2122165	4984.9	6794944	2122165	4985.8	0.9	OK
6794994	2122165	4986.2	6794994	2122165	4987.0	0.9	OK
6795044	2122165	4987.2	6795044	2122165	4988.1	1.0	OK
6794644	2122215	4977.3	6794644	2122215	4978.2	0.9	OK
6794694	2122215	4978.6	6794694	2122215	4979.5	0.9	OK
6794744	2122215	4979.8	6794744	2122215	4980.8	0.9	OK
6794794	2122215	4981.1	6794794	2122215	4982.1	1.0	OK
6794844	2122215	4982.3	6794844	2122215	4983.3	1.0	OK
6794894	2122215	4983.6	6794894	2122215	4984.3	0.8	OK
6794944	2122215	4985.0	6794944	2122215	4985.7	0.7	OK
6794994	2122215	4986.1	6794994	2122215	4987.0	0.9	OK
6795044	2122215	4987.3	6795044	2122215	4988.2	0.9	OK
6794644	2122265	4977.4	6794644	2122265	4978.2	0.8	OK
6794694	2122265	4978.5	6794694	2122265	4979.5	0.9	OK
6794744	2122265	4979.9	6794744	2122265	4980.8	0.9	OK
6794794	2122265	4981.3	6794794	2122265	4982.1	0.9	OK
6794844	2122265	4982.3	6794844	2122265	4983.4	1.0	OK
6794894	2122265	4983.5	6794894	2122265	4984.4	1.0	OK
6794944	2122265	4984.7	6794944	2122265	4985.7	1.0	OK
6794994	2122265	4986.1	6794994	2122265	4987.0	1.0	OK
6795044	2122265	4987.3	6795044	2122265	4988.3	1.0	OK
6794644	2122315	4977.3	6794644	2122315	4978.2	1.0	OK
6794694	2122315	4978.5	6794694	2122315	4979.4	0.9	OK
6794744	2122315	4979.9	6794744	2122315	4980.7	0.8	OK
6794794	2122315	4981.4	6794794	2122315	4982.1	0.8	OK
6794844	2122315	4982.5	6794844	2122315	4983.4	0.9	OK
6794894	2122315	4983.6	6794894	2122315	4984.7	1.0	OK
6794944	2122315	4984.9	6794944	2122315	4985.9	1.0	OK
6794994	2122315	4986.3	6794994	2122315	4987.2	0.9	OK
6795044	2122315	4987.6	6795044	2122315	4988.5	0.9	OK
6794644	2122365	4977.4	6794644	2122365	4978.0	0.7	OK
6794694	2122365	4978.7	6794694	2122365	4979.3	0.7	OK
6794744	2122365	4980.0	6794744	2122365	4980.9	0.9	OK
6794794	2122365	4981.4	6794794	2122365	4982.2	0.9	OK
6794844	2122365	4982.6	6794844	2122365	4983.4	0.8	OK
6794894	2122365	4983.7	6794894	2122365	4984.6	0.9	OK
6794944	2122365	4985.1	6794944	2122365	4985.9	0.8	OK
6794994	2122365	4986.4	6794994	2122365	4987.0	0.6	OK
6795044	2122365	4987.5	6795044	2122365	4988.0	0.6	OK
6794644	2122415	4977.5	6794644	2122415	4977.8	0.3	OK
6794694	2122415	4978.6	6794694	2122415	4978.9	0.3	OK
6794744	2122415	4980.0	6794744	2122415	4980.2	0.2	OK
6794794	2122415	4981.3	6794794	2122415	4981.4	0.1	OK
6794844	2122415	4982.4	6794844	2122415	4982.4	0.0	OK
6794894	2122415	4983.4	6794894	2122415	4983.4	0.0	OK
6794944	2122415	4984.7	6794944	2122415	4984.7	0.0	OK
6795052	2122119	4987.6	6795052	2122119	4988.1	0.5	OK

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6795102	2122119	4988.7	6795102	2122119	4989.4	0.6	OK
6795152	2122119	4989.8	6795152	2122119	4990.5	0.7	OK
6795202	2122119	4991.1	6795202	2122119	4991.7	0.6	OK
6795252	2122119	4992.5	6795252	2122119	4993.1	0.6	OK
6795302	2122119	4993.7	6795302	2122119	4994.4	0.8	OK
6795352	2122119	4994.9	6795352	2122119	4995.6	0.7	OK
6795402	2122119	4995.4	6795402	2122119	4995.8	0.5	OK
6795052	2122169	4987.4	6795052	2122169	4988.3	1.0	OK
6795102	2122169	4988.7	6795102	2122169	4989.6	0.9	OK
6795152	2122169	4990.1	6795152	2122169	4990.9	0.8	OK
6795202	2122169	4991.3	6795202	2122169	4992.0	0.7	OK
6795252	2122169	4992.6	6795252	2122169	4993.2	0.7	OK
6795302	2122169	4993.8	6795302	2122169	4994.4	0.7	OK
6795352	2122169	4994.9	6795352	2122169	4995.5	0.5	OK
6795402	2122169	4995.6	6795402	2122169	4996.1	0.4	OK
6795452	2122169	4995.0	6795452	2122169	4995.1	0.1	OK
6795102	2122219	4988.8	6795102	2122219	4989.7	0.9	OK
6795152	2122219	4990.1	6795152	2122219	4990.9	0.8	OK
6795202	2122219	4991.3	6795202	2122219	4992.0	0.8	OK
6795252	2122219	4992.6	6795252	2122219	4993.4	0.8	OK
6795302	2122219	4993.9	6795302	2122219	4994.6	0.7	OK
6795352	2122219	4995.0	6795352	2122219	4995.6	0.6	OK
6795402	2122219	4995.8	6795402	2122219	4996.2	0.4	OK
6795452	2122219	4995.4	6795452	2122219	4995.6	0.2	OK
6795152	2122269	4990.1	6795152	2122269	4990.7	0.6	OK
6795202	2122269	4991.3	6795202	2122269	4992.0	0.6	OK
6795252	2122269	4992.6	6795252	2122269	4993.4	0.7	OK
6795302	2122269	4993.8	6795302	2122269	4994.6	0.8	OK
6795352	2122269	4995.0	6795352	2122269	4995.6	0.6	OK
6795402	2122269	4995.8	6795402	2122269	4996.4	0.6	OK
6795452	2122269	4995.3	6795452	2122269	4995.6	0.3	OK
6795152	2122319	4990.1	6795152	2122319	4991.0	0.8	OK
6795202	2122319	4991.4	6795202	2122319	4992.2	0.9	OK
6795252	2122319	4992.6	6795252	2122319	4993.4	0.8	OK
6795302	2122319	4993.8	6795302	2122319	4994.6	0.8	OK
6795352	2122319	4995.1	6795352	2122319	4995.8	0.7	OK
6795402	2122319	4995.8	6795402	2122319	4996.3	0.5	OK
6795452	2122319	4995.7	6795452	2122319	4995.9	0.2	OK
6795152	2122369	4990.0	6795152	2122369	4990.3	0.3	OK
6795202	2122369	4991.2	6795202	2122369	4991.4	0.2	OK
6795252	2122369	4992.2	6795252	2122369	4992.3	0.1	OK
						0.0	OK

Number of Data Points	Sum of Point Thickness
91	62.827956

# of Thick Points
0.0

% =6	98.1%
Elevation Avg	5987.5
Total =6	14714
Total Lines	14995

Pass

Minimum Number of Machine Passes: 3

Lift ID: URA11100810-00

Northing	Easting	Elevation	# of Passes	Passes =6	Count
6795366	2122087	4995.1	6	1	1
6795370	2122087	4995.1	6	1	1
6795373	2122087	4995.2	6	1	1
6795376	2122087	4995.2	6	1	1
6795337	2122090	4994.6	6	1	1
6795340	2122090	4994.8	6	1	1
6795343	2122090	4994.9	6	1	1
6795347	2122090	4995.0	6	1	1
6795350	2122090	4995.1	6	1	1
6795353	2122090	4995.2	6	1	1
6795357	2122090	4995.3	6	1	1
6795360	2122090	4995.4	6	1	1
6795363	2122090	4995.4	6	1	1
6795366	2122090	4995.4	6	1	1
6795370	2122090	4995.5	6	1	1
6795373	2122090	4995.6	6	1	1
6795376	2122090	4995.6	6	1	1
6795380	2122090	4995.7	6	1	1
6795298	2122093	4993.7	6	1	1
6795301	2122093	4993.8	6	1	1
6795304	2122093	4993.9	6	1	1
6795307	2122093	4994.1	6	1	1
6795311	2122093	4994.2	6	1	1
6795314	2122093	4994.3	6	1	1
6795317	2122093	4994.4	6	1	1
6795320	2122093	4994.5	6	1	1
6795324	2122093	4994.6	6	1	1
6795327	2122093	4994.6	6	1	1
6795330	2122093	4994.7	6	1	1
6795334	2122093	4994.8	6	1	1
6795337	2122093	4994.9	6	1	1
6795340	2122093	4995.0	6	1	1
6795343	2122093	4995.1	6	1	1
6795347	2122093	4995.1	6	1	1
6795350	2122093	4995.3	6	1	1
6795353	2122093	4995.4	6	1	1
6795357	2122093	4995.5	6	1	1
6795360	2122093	4995.6	6	1	1
6795363	2122093	4995.6	6	1	1
6795366	2122093	4995.6	6	1	1
6795370	2122093	4995.7	6	1	1
6795373	2122093	4995.8	6	1	1
6795376	2122093	4995.8	6	1	1
6795380	2122093	4996.3	4		1

Lift Height: 1' 0"

Thick Lift Threshold: 2' 0"

Last Lift Elevation: N/A

Min. # of Wheel Passes: 6

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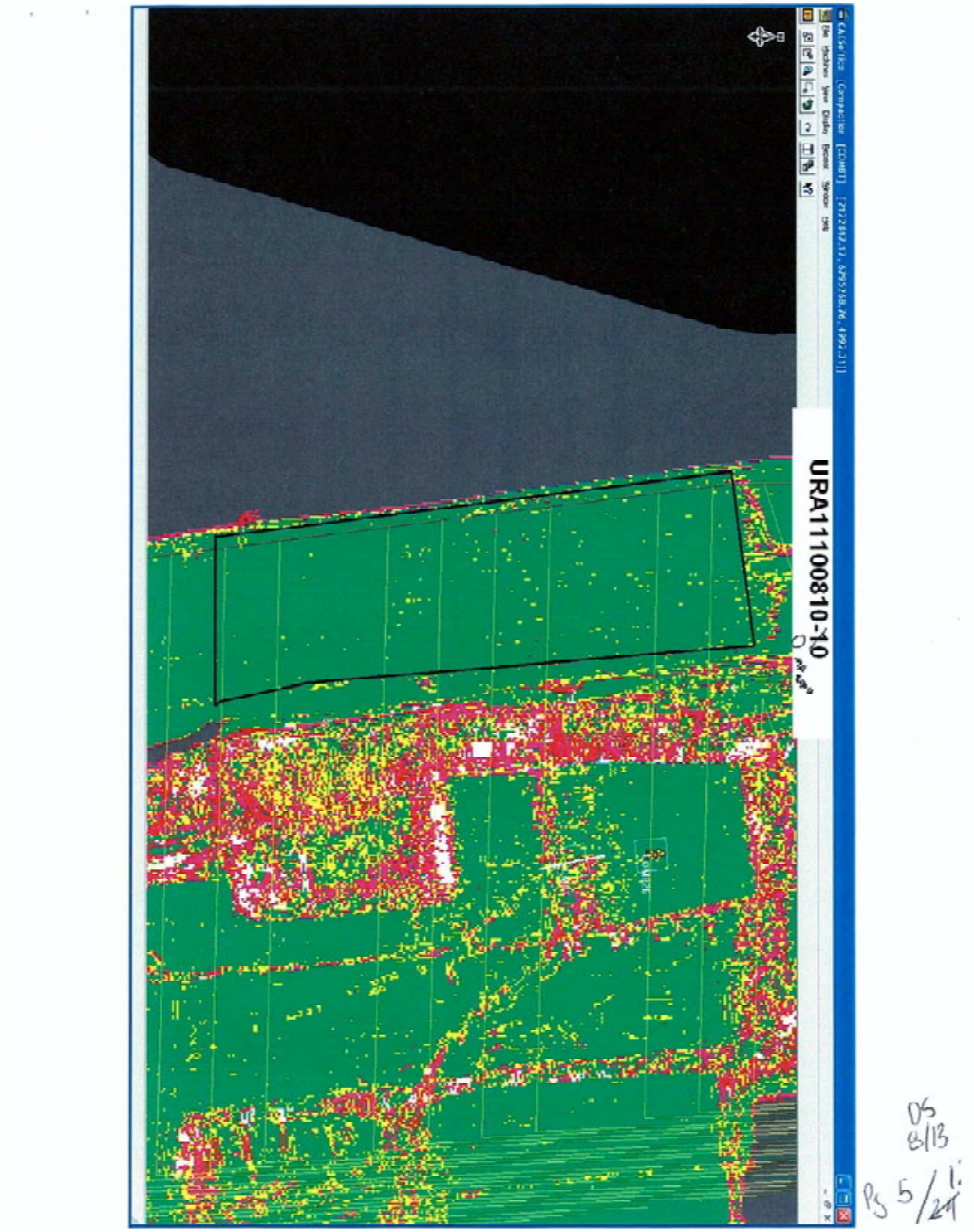
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ENERGYSOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER** _____

LIFT IDENTIFICATION: URA11100810-00 DATE: 8/10/2010

TEST ID NUMBER(S): # 1

TEST LOCATION: 6795258 N, 2122149 E. TEST METHOD: ____ D1556 X D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model 3430 Gauge Serial # 27523

Last Calibration Date: 8/21/09

Daily Standard Counts: *Off-Cell Standard*

Density 2217 Moisture 666

Method A (Direct Transmission)

Depth Setting 8 *(inches)* Count Time 1 *(minutes)*

Moisture Count 171 Density Count 935

Wet Density (ρ_m) 137.8 *(lbs/ft³)* Dry Density 123.2 *(lbs/ft³)*

Moisture Density 14.7 *(lbs/ft³)* Moisture Fraction 11.9 *(%)*

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus ____ Calibrated Vol. *(lbs/ft³)* ____

Bulk Density of sand (ρ_1) ____ *g/cm³* ____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) ____ g

N/A

Mass of bottle & cone **before** filling cone, plate & hole		g
Mass of bottle & cone **after** filling cone, plate & hole		g
Mass of sand to fill cone, plate, & hole (M_1)		g
Mass of sand to fill hole		g
Mass of wet soil & container		g
Mass of container		g
Mass of wet soil (M_3)		g

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ ____ cm^3

Dry Mass of soil
$M_4 = 100\ M_3 / (w + 100)$ ____ g

Wet Denisty
$\rho_m = (M_3 / V) \times 62.43$ ____ lbs/ft^3

Dry Denisty
$\rho_d = M_4 / V$ ____ g/cm^3

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ ____ lbs/ft^3

MOISTURE DETERMINATION

ASTM D4643

Container ID D3

Mass of container & wet specimen (M_{cms})	384.0	g
Mass of container & dry specimen (M_{cds})	358.3	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	25.7	g
Mass of container (M_c)	164.4	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	193.9	g
Moisture content (w) $w = (M_w / M_s) \times 100$	13.3	%

Soil Description: **Yellowish in color, mostly consists of fines.**

Proctor ID: **Radon Barrier # 3**

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 118.4 (lbs/ft³)

Optimum Moisture (w_{opt}) 13.2 (%)

Required Moisture: 10.2 % to 16.2 %

Required Percent Compaction: 95.0 (%)

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = (100 \times 137.8) / (100 + 13.3) = 121.7$ *lbs/ft³*

Note: Wet Density from ASTM D 1556 (ρ_m) takes precidence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max$ x 100

121.7 / 118.4 x 100 = 102.8 %

Comments:

This test area had higher compaction results because it was used as a haul route during placement. Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 8/10/10

Failed Moisture

Failed Compaction Time: 1410

By: Kyler Edgehouse / *(print)* *(signature)*

QA/QC APPROVAL 8/17/2010 DATE

Density Testing
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ENERGY SOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER**

LIFT IDENTIFICATION: URA11100810-00 DATE: 8/10/2010

TEST ID NUMBER(S): # 2

TEST LOCATION: 6794968 N. 2122124 E. TEST METHOD: x D1556 X D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 27523

Last Calibration Date: 8/21/09

Daily Standard Counts: *Off-Cell Standard*

Density 2217 Moisture 666

Method A (Direct Transmission)

Depth Setting 8 *(inches)* Count Time 1 *(minutes)*

Moisture Count 187 Density Count 1102

Wet Density (ρ_w) 131.3 *(lbs/ft³)* Dry Density 115.1 *(lbs/ft³)*

Moisture Density 16.2 *(lbs/ft³)* Moisture Fraction 14.1 *(%)*

MOISTURE DETERMINATION

ASTM D4643

Container ID D-3

Mass of container & wet specimen (M_{cms})	418.3	g
Mass of container & dry specimen (M_{cds})	390.2	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	28.1	g
Mass of container (M_c)	164.3	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	225.9	g
Moisture content (w) $w = (M_w / M_s) \times 100$	12.4	%

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = (100 \times 129.8) / (100 + 12.4) = 115.5$ *lbs/ft³*

Note: Wet Density from ASTM D 1556 (ρ_m) takes precidence over ASTM D 6938 (ρ_w)

Percent Compaction = ρ_d / $\gamma_d max$ x 100

115.5 / 118.4 x 100 = 97.5 %

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus Ω Calibrated Vol. *(lbs/ft³)* 0.04113

Bulk Density of sand (ρ_1) 1.57 *g/cm³* 97.8 *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) 1824.6 g

Mass of bottle & cone **before** filling cone, plate & hole	6114.6	g
Mass of bottle & cone **after** filling cone, plate & hole	2418.7	g
Mass of sand to fill cone, plate, & hole (M_1)	3695.9	g
Mass of sand to fill hole	1871.3	g
Mass of wet soil & container	2500.0	g
Mass of container	16.2	g
Mass of wet soil (M_3)	2483.8	g

Test Hole Volume $V = (M_1 - M_2) / \rho_1$ 1195 cm^3

Dry Mass of soil $M_4 = 100\ M_3 / (w + 100)$ 2209.0 g

Wet Denisty $\rho_m = (M_3 / V) \times 62.43$ 129.8 *lbs/ft³*

Dry Denisty $\rho_d = M_4 / V$ 1.8 *g/cm³*

Dry Unit Weight $\gamma_d = \rho_d \times 62.43$ 115.5 *lbs/ft³*

Soil Description: Yellowish is color , mostly consists of fines.

Proctor ID: Radon Barrier # 3

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 118.4 (lbs/ft³)

Optimum Moisture (w_{opt}) 13.2 (%)

Required Moisture: 10.2 % to 16.2 %

Required Percent Compaction: ~~90.0~~ 95.0 (%)

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 8/10/10

Failed Moisture

Failed Compaction Time: 1425

By: Kyler Edgehouse / *(print)* *(signature)*

QA/QC APPROVAL 8-17-2010 DATE

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ENERGY SOLUTIONS

FIELD DENSITY TEST

PROJECT: Moab UMTRA Project **OTHER** _____

LIFT IDENTIFICATION: URA11100810-00 DATE: 8/10/2010

TEST ID NUMBER(S): # 3

TEST LOCATION: 6794646 N. 2122292 E. TEST METHOD: _____ D1556 X D6938

ASTM D6938 (DENSITY DETERMINATION)

Make/Model Troxler 3430 Gauge Serial # 27523

Last Calibration Date: 8/21/10

Daily Standard Counts: *Off-Cell Standard*

Density 2217 Moisture 666

Method A (Direct Transmission)

Depth Setting 8 *(inches)* Count Time 1 *(minutes)*

Moisture Count 190 Density Count 1062

Wet Density (ρ_m) 132.8 *(lbs/ft³)* Dry Density 116.3 *(lbs/ft³)*

Moisture Density 16.5 *(lbs/ft³)* Moisture Fraction 14.2 *(%)*

MOISTURE DETERMINATION

ASTM D4643

Container ID D-1

Mass of container & wet specimen (M_{cms})	380.0	g
Mass of container & dry specimen (M_{cds})	356.7	g
Mass of water (M_w) $M_w = M_{cms} - M_{cds}$	23.3	g
Mass of container (M_c)	164.4	g
Mass of dry specimen (M_s) $M_s = M_{cds} - M_c$	192.3	g
Moisture content (w) $w = (M_w / M_s) \times 100$	12.1	%

Dry Density $(\rho_d) = (100 \times \rho_m)/(100 + w)$

$\rho d = (100 \times 132.8) / (100 + 12.1 = 118.4$ *lbs/ft³*

Note: Wet Density from ASTM D 1556 (ρ_m) takes precedence over ASTM D 6938 (ρ_m)

Percent Compaction = ρ_d / $\gamma_d max$ x 100

118.4 / 118.4 x 100 = 100.0 %

ASTM D1556 (DENSITY DETERMINATION)

Testing Apparatus _____ Calibrated Vol. *(lbs/ft³)* _____

Bulk Density of sand (ρ_1) _____ *g/cm³* _____ *lbs/ft³*

Mass of Sand to Fill Cone & Plate (M_2) _____ g

Mass of bottle & cone **before** filling cone, plate & hole	g
Mass of bottle & cone **after** filling cone, plate & hole	g
Mass of sand to fill cone, plate, & hole (M_1)	g
Mass of sand to fill hole	g
Mass of wet soil & container	g
Mass of container	g
Mass of wet soil (M_3)	g

N/A

Test Hole Volume
$V = (M_1 - M_2) / \rho_1$ _____ cm^3

Dry Mass of soil
$M_d = 100\ M_3 / (w + 100)$ _____ g

Wet Denisty
$\rho_m = (M_3 / V) \times 62.43$ _____ *lbs/ft³*

Dry Denisty
$\rho_d = M_d / V$ _____ *g/cm³*

Dry Unit Weight
$\gamma_d = \rho_d \times 62.43$ _____ *lbs/ft³*

Soil Description: **Yellowish in color, mostly consists of fines.**

Proctor ID: **Radon Barrier # 3**

Standard Proctor (ASTM D698)

Maximum Dry Density ($\gamma_d max$) 118.4 (lbs/ft³)

Optimum Moisture (w_{opt}) 13.2 (%)

Required Moisture: 10.2 % to 16.2 %

Required Percent Compaction: 95.0 (%)

Comments:

Microwave oven power setting on HIGH. Initial time setting of 3 minutes and subsequent incremental drying periods of 1 minute until a change of 0.1 % or less of the initial wet mass of the soil.

TEST RESULTS:

X Pass Date: 8/10/10

Failed Moisture

Failed Compaction Time: 1450

By: Kyler Edgehouse / _____
(print) *(signature)*

_____ 8/17/2010
QA/QC APPROVAL DATE

Density Testing
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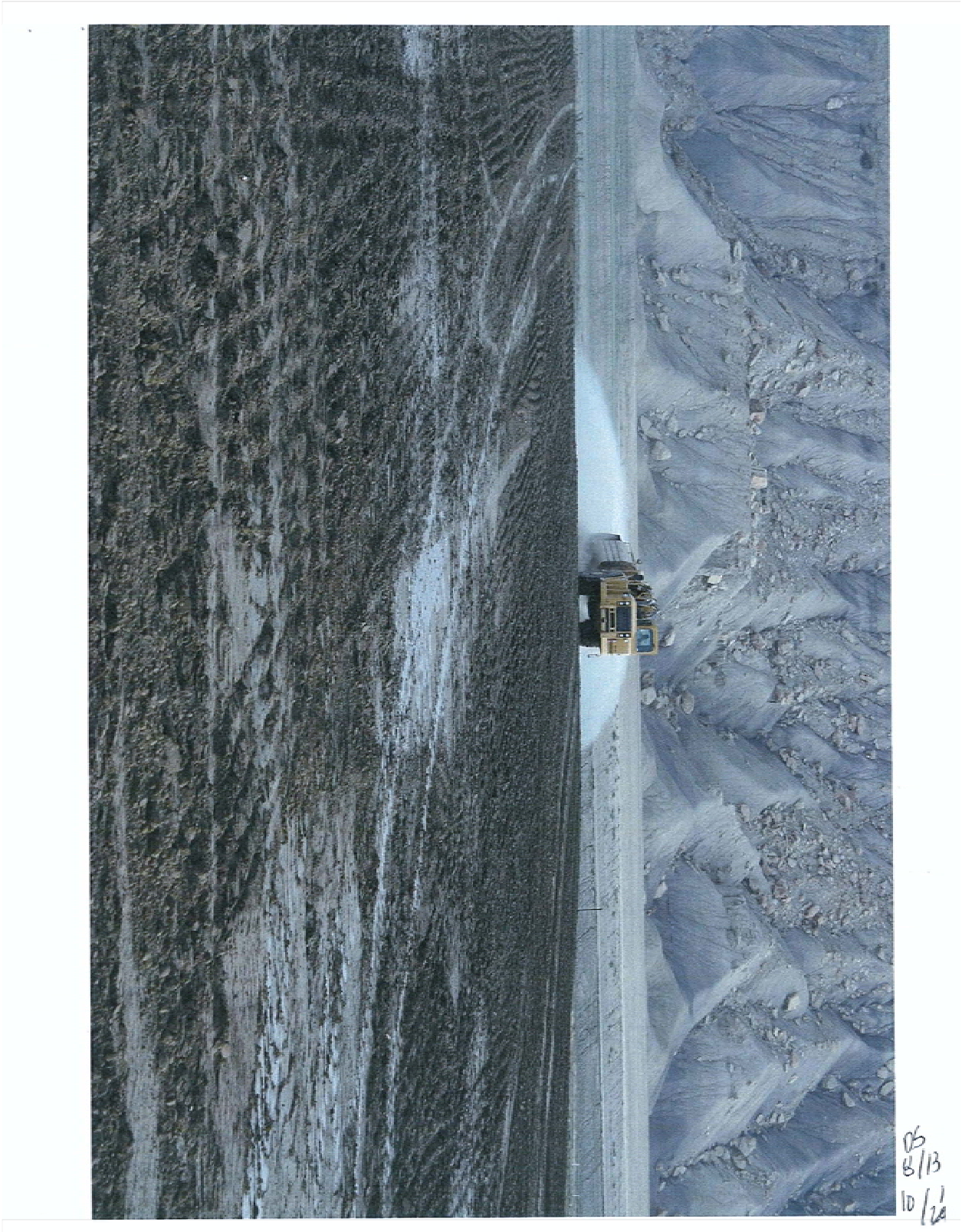

A4. Radon Barrier
Lift Approval Package

A4. Radon Barrier
Lift Approval Package