SECTION

13 OF 20

APPENDIX H.

DRAINAGE GRAVEL TESTING RESULTS

Drainge Gravel Summary

Base Soil

ENVIROTECH
ENGINEERING & CONSULTING INC
2500 N. 11th Street I Enid, OK 73701
(580) 234-8780 I Fax (580) 237-4302

Test Number	Sieve Analysis									Soil Classification	Constant Head Perm. (ASTM D2434)	Passing Test
	1.5"	1"	3/4"	5/8"	3/8"	#4	#40	#100	#200			
Type A Gravel												
Specs	100	70-100	60-100	-	35-80	10-40	0-10	0-4	0-4		1.0 E-02 cm/sec	
DG-A-01	100	89	70	62	39	19	5	3	3	GP - Poorly Graded Gravel with Sand	1.6 E-02 cm/sec	Passes Specifications
DG-A-02	100	82	71	64	40	25	8	5	4	GP - Poorly Graded Gravel with Sand	2.7 E-02 cm/sec	Passes Specifications
DG-A-03	100	84	67	57	38	24	5	3	2	GP - Poorly Graded Gravel with Sand	4.7 E-02 cm/sec	Passes Specifications
DG-A-04	100	78	62	55	36	15	3	2	2	GP - Poorly Graded Gravel with Sand	3.7 E-02 cm/sec	Passes Specifications
DG-A-05	100	81	64	54	34	19	4	2	2	GP - Poorly Graded Gravel with Sand	4.1 E-02 cm/sec	Passes Specifications
DG-A-06	100	85	73	65	44	18	5	3	2	GP - Poorly Graded Gravel with Sand	4.7 E-02 cm/sec	Passes Specifications
DG-A-07	100	92	82	65	53	25	6	4	3	GP - Poorly Graded Gravel with Sand	2.6 E-02 cm/sec	Passes Specifications
DG-A-08	100	88	77	70	55	29	5	3	3	GP - Poorly Graded Gravel with Sand	4.7 E-02 cm/sec	Passes Specifications
DG-A-09	100	89	80	75	58	36	6	3	3	GP - Poorly Graded Gravel with Sand	2.8 E-02 cm/sec	Passes Specifications
DG-A-10	100	84	74	68	49	29	7	4	3	GP - Poorly Graded Gravel with Sand	2.2 E-02 cm/sec	Passes Specifications
DG-A-11	100	89	78	72	57	39	5	3	2	GP - Poorly Graded Gravel with Sand	3.0 E-02 cm/sec	Passes Specifications
DG-A-12	100	86	73	61	50	33	6	3	3	GP - Poorly Graded Gravel with Sand	3.0 E-02 cm/sec	Passes Specifications
DG-A-13	100	78	61	52	32	18	3	2	1	GP - Poorly Graded Gravel with Sand	5.4 E-02 cm/sec	Passes Specifications
DG-A-14	100	88	75	66	46	26	4	2	2	GP - Poorly Graded Gravel with Sand	5.4 E-02 cm/sec	Passes Specifications
DG-A-15	100	89	76	69	46	25	4	2	2	GP - Poorly Graded Gravel with Sand	3.6 E-02 cm/sec	Passes Specifications
DG-A-16	100	85	70	61	39	21	4	2	2	GP - Poorly Graded Gravel with Sand	5.4 E-02 cm/sec	Passes Specifications
DG-A-17	100	65	47	41	25	13	3	2	1	GP - Poorly Graded Gravel with Sand	7.8 E-02 cm/sec	Passes Specifications
DG-A-17a	100	93	84	72	62	42	7	3	2	GW - Well Graded Gravel with Sand	4.6 E-02 cm/sec	Passes Specifications
DG-A-18	100	86	73	65	45	27	4	2	2	GP - Poorly Graded Gravel with Sand	4.5 E-02 cm/sec	Passes Specifications
DG-A-19	100	83	69	63	49	32	5	2	2	GP - Poorly Graded Gravel with Sand	4.1 E-02 cm/sec	Passes Specifications
DG-A-20	100	76	56	37	28	17	3	2	1	GP - Poorly Graded Gravel with Sand	5.8 E-02 cm/sec	Passes Specifications
Type B Gravel												
Specs	-	100	80-100	-	0-40	0-4	-	-	0-2		1.0 E-02 cm/sec	
DG-B-01	-	100	86	-	33	3	1	-	1	GP - Poorly Graded Gravel with Sand	9.5 E-02 cm/sec	Passes Specifications
DG-B-02	-	100	87	-	38	4	1	-	0	GP - Poorly Graded Gravel with Sand	11.8 E-02 cm/sec	Passes Specifications

Drainge Gravel Summary

Base Soil

ENVIROTECH
ENGINEERING & CONSULTING, INC
2500 N. 11th Street I Enid, OK 73701
(580) 234-8780 I Fax (580) 237-4302

Test Number	Sieve Analysis									Soil Classification	Constant Head Perm. (ASTM D2434)	Passing Test
	1.5"	1"	3/4"	5/8"	3/8"	#4	#40	#100	#200			
Type A Gravel												
Specs	100	70-100	60-100	-	35-80	10-40	0-10	0-4	0-4		1.0 E-02 cm/sec	
DG-B-03	-	100	83	-	35	3	1	-	1	GP - Poorly Graded Gravel with Sand	10.5 E-02 cm/sec	Passes Specifications
Type C Gravel												
Specs	100	80-100	-	50-80	-	25-45	3-18	-	0-7.5		1.0 E-02 cm/sec	
DG-C-01	100	95	78	67	48	33	12	6	4	GP - Poorly Graded Gravel with Sand	2.44 E-02 cm/sec	Passes Specifications
DG-C-02	100	94	74	59	45	22	9	5	3	GP - Poorly Graded Gravel with Sand	6.2 E-02 cm/sec	Passes Specifications
DG-C-02A	100	95	79	68	47	33	10	5	3	GP - Poorly Graded Gravel with Sand	7.1 E-02 cm/sec	Passes Specifications

H.1

CONSTRUCTION TYPE A DRAINAGE GRAVEL

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73703
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-01
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/6/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/6/2010

Natural Moisture Content

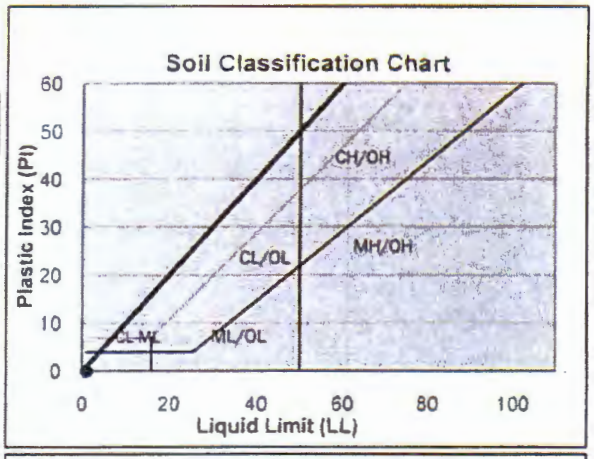
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	1.6	1.00E-02	cm/sec

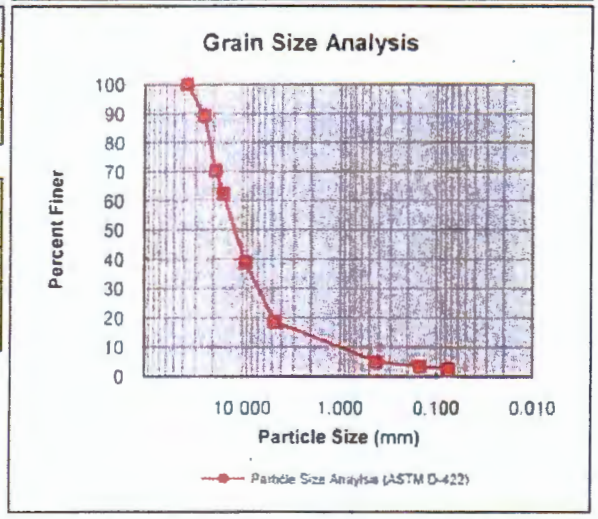
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	89	70-100
3/4 "	19.000	70	60-100
5/8 "	15.875	62	
3/8 "	9.500	39	35-80
No.4	4.750	19	10-40
No. 40	0.425	5	0-10
No. 100	0.150	3	0-4
No. 200	0.075	3	0-4



Cu	1.82
Cc	0.43

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID.	DG-A-02
Project:	S013213A00			Sample Des.	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date.	7/7/2010
Tested By:	L. Hay/M. Fortier	Date.	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date.	8/2/2010	Date Received	7/7/10

Natural Moisture Content

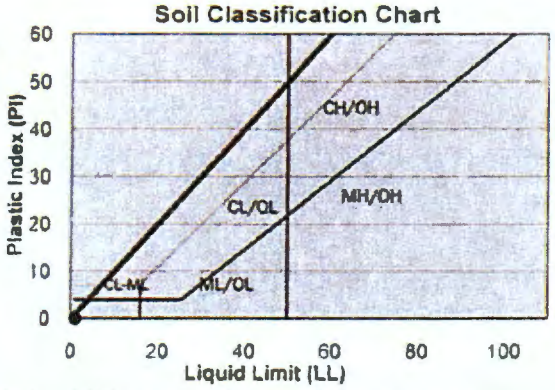
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	2.7	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

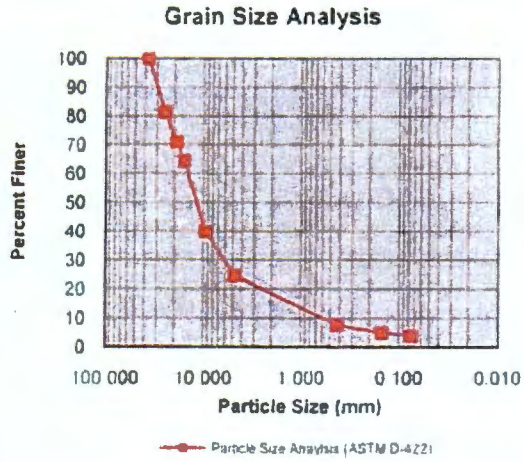
Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	82	70-100
3/4 "	19.000	71	60-100
5/8 "	15.875	64	
3/8 "	9.500	40	35-80
No.4	4.750	25	10-40
No. 40	0.425	8	0-10
No. 100	0.150	5	0-4
No. 200	0.075	4	0-4

Cu	2.41
Cc	0.46



Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

WCH approval of material for use in Cell Construction

9/1/10
WCH Project Engineer

Envirotech

9/1/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-02
Project:	S013213A00			Sample Des.	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/7/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/7/10

Natural Moisture Content

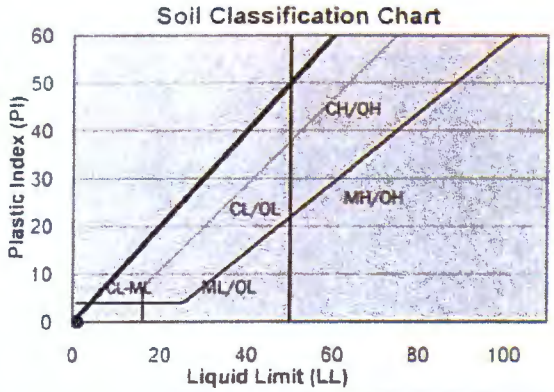
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	2.7	1.00E-02	cm/sec

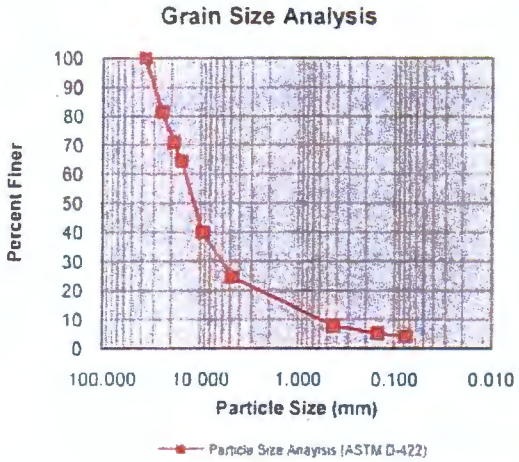
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	82	70-100
3/4 "	19.000	71	60-100
5/8 "	15.875	64	
3/8 "	9.500	40	35-80
No.4	4.750	25	10-40
No. 40	0.425	8	0-10
No. 100	0.150	5	0-4
No. 200	0.075	4	0-4



Cu	2.41
Cc	0.46

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None
Sieve No. 100 Failed to meet project specifications Will re-sample to verify rock fines.

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-03
Project:	S013213A00			Sample Des	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/8/2010
Tested By	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/8/2010

Natural Moisture Content

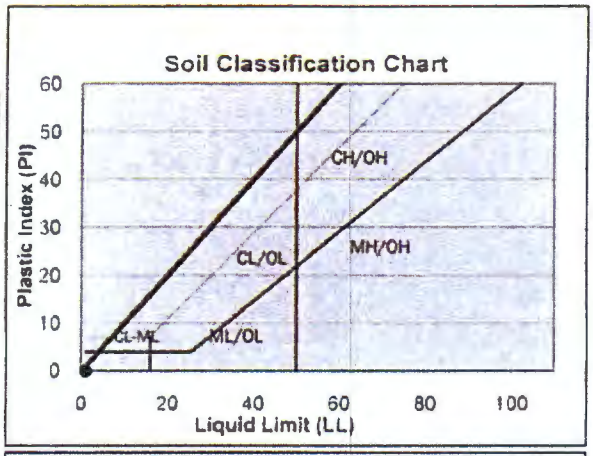
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.7	1.00E-02	cm/sec

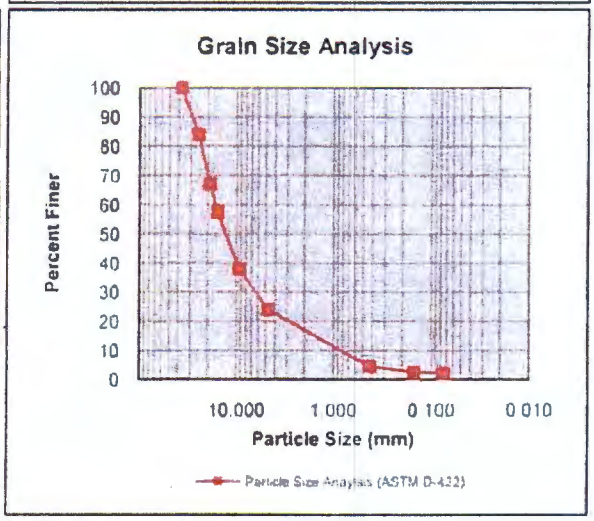
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	84	70-100
3/4 "	19.000	67	60-100
5/8 "	15.875	57	
3/8 "	9.500	38	35-80
No.4	4.750	24	10-40
No. 40	0.425	5	0-10
No. 100	0.150	3	0-4
No. 200	0.075	2	0-4



Cu	2.74
Cc	0.45

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	Washington Closure Hanford
Submittal:	05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-04
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/12/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/12/2010

Natural Moisture Content

Natural Moisture	N/A

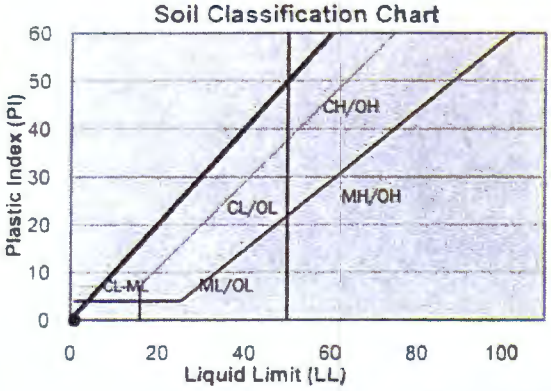
Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	3.7	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

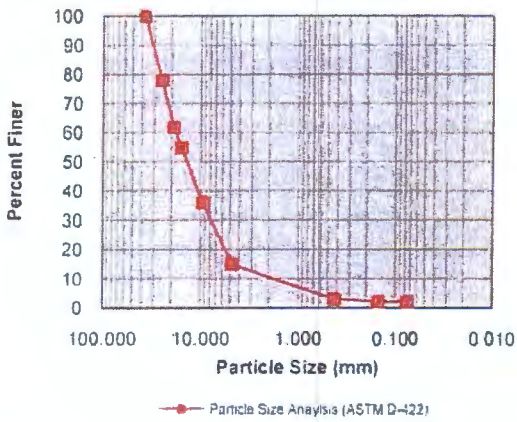
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	78	70-100
3/4 "	19.000	62	60-100
5/8 "	15.875	55	
3/8 "	9.500	36	35-80
No.4	4.750	15	10-40
No. 40	0.425	3	0-10
No. 100	0.150	2	0-4
No. 200	0.075	2	0-4

Grain Size Analysis



Cu	1.78
Cc	0.36

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-05
Project:	S013213A00			Sample Des:	Type A Gravel (North Stockpile)
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/13/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/13/2010

Natural Moisture Content

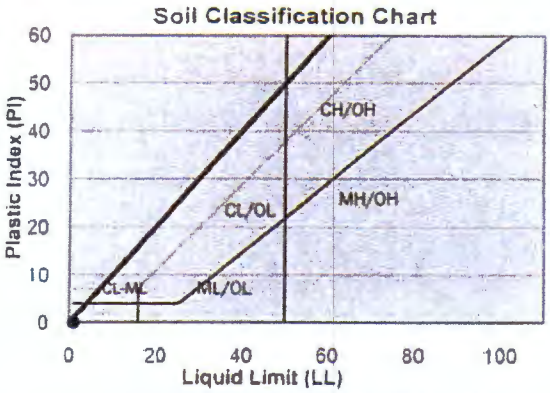
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.1	1.00E-02	cm/sec

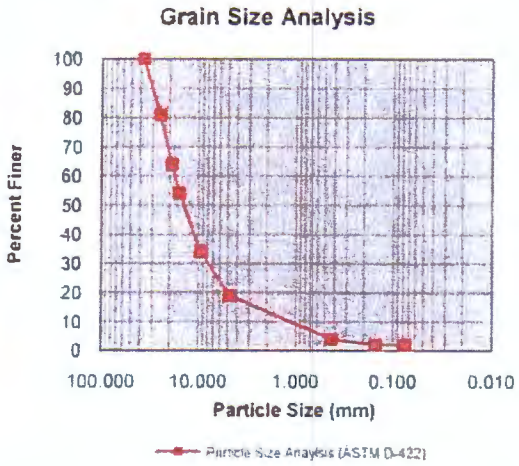
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	81	70-100
3/4 "	19.000	64	60-100
5/8 "	15.875	54	
3/8 "	9.500	34	35-80
No.4	4.750	19	10-40
No. 40	0.425	4	0-10
No. 100	0.150	2	0-4
No. 200	0.075	2	0-4



Cu	2.24
Cc	0.48

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	Washington Closure Hanford
Submittal:	05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-06
Project:	S013213A00			Sample Des:	Type A Gravel (North Stockpile)
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/13/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/13/2010

Natural Moisture Content

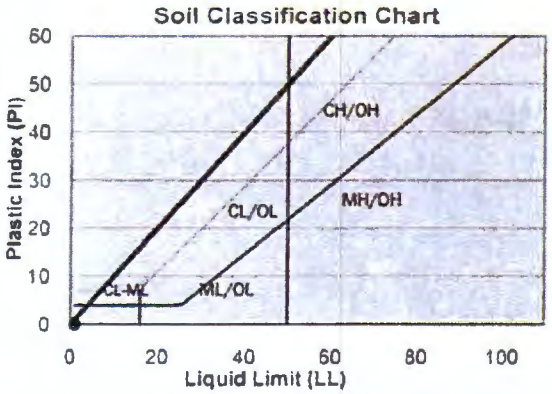
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.7	1.00E-02	cm/sec

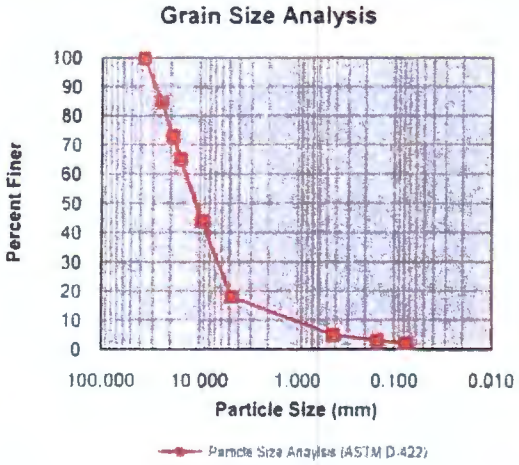
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	85	70-100
3/4 "	19.000	73	60-100
5/8 "	15.875	65	
3/8 "	9.500	44	35-80
No 4	4.750	18	10-40
No. 40	0.425	5	0-10
No. 100	0.150	3	0-4
No 200	0.075	2	0-4



Cu	1.64
Cc	0.38

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street • Enid, OK 73701
(580) 234-8780 • Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-07
Project:	S013213A00			Sample Des.	Type A Gravel (North Stockpile)
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date:	7/13/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By	J. Voss	Date:	8/2/2010	Date Received:	7/13/2010

Natural Moisture Content

Natural Moisture	N/A

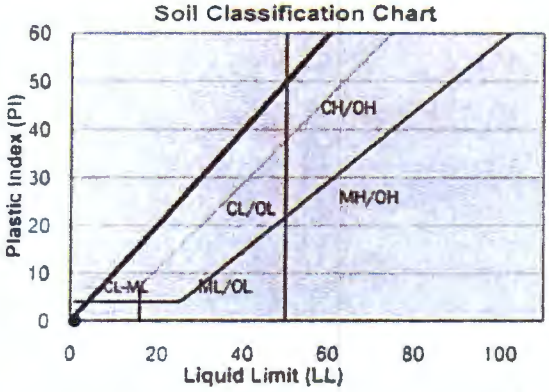
Constant Head Perm (ASTM D-2434)

Permeability	cm/sec	Spec	
k_{20} =	2.6	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

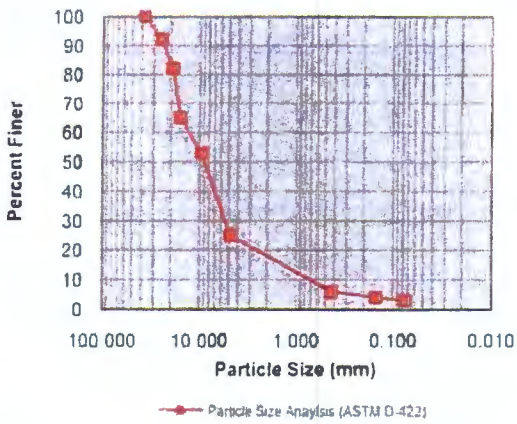
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	92	70-100
3/4 "	19.000	82	60-100
5/8 "	15.875	65	
3/8 "	9.500	53	35-80
No.4	4.750	25	10-40
No. 40	0.425	6	0-10
No. 100	0.150	4	0-4
No. 200	0.075	3	0-4

Grain Size Analysis



Cu	2.24
Cc	0.40

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-08
Project:	S013213A00			Sample Des.	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/21/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/21/2010

Natural Moisture Content

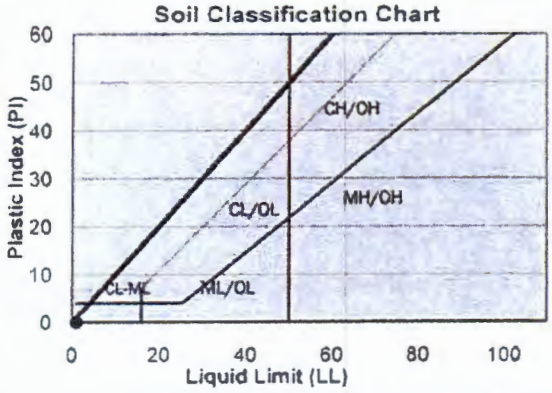
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.7	1.00E-02	cm/sec

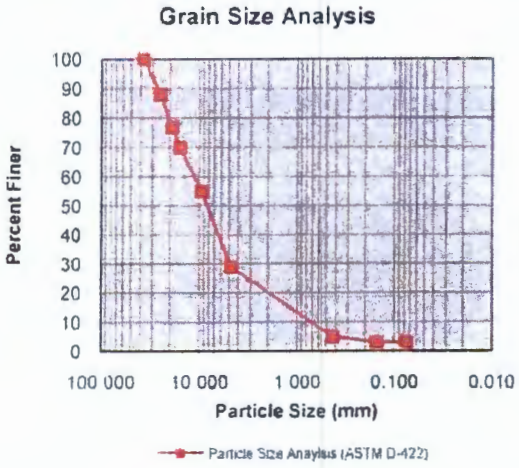
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	88	70-100
3/4 "	19.000	77	60-100
5/8 "	15.875	70	
3/8 "	9.500	55	35-80
No.4	4.750	29	10-40
No. 40	0.425	5	0-10
No. 100	0.150	3	0-4
No. 200	0.075	3	0-4



Cu	2.36
Cc	0.42

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name	Charlie Skiba			Sample ID:	DG-A-09
Project	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/21/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/21/2010

Natural Moisture Content

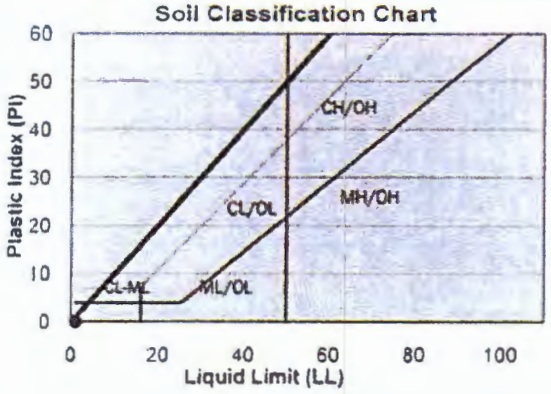
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	2.8	1.00E-02	cm/sec

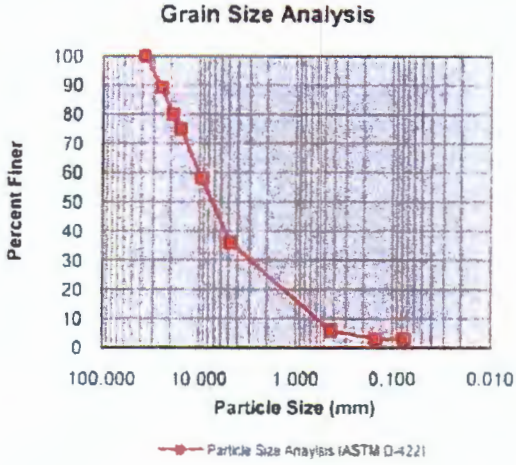
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	89	70-100
3/4 "	19.000	80	60-100
5/8 "	15.875	75	
3/8 "	9.500	58	35-80
No.4	4.750	36	10-40
No. 40	0.425	6	0-10
No. 100	0.150	3	0-4
No. 200	0.075	3	0-4



Cu	2.64
Cc	0.30

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 217-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-10
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/26/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/26/2010

Natural Moisture Content

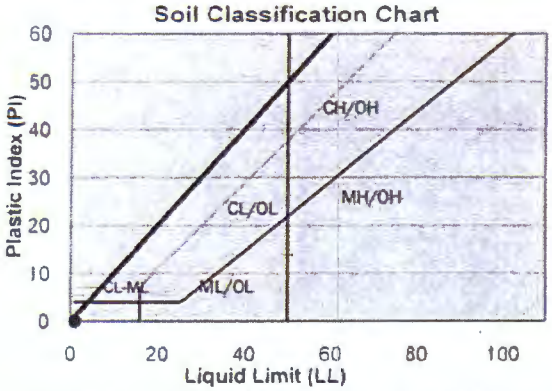
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	2.2	1.00E-02	cm/sec

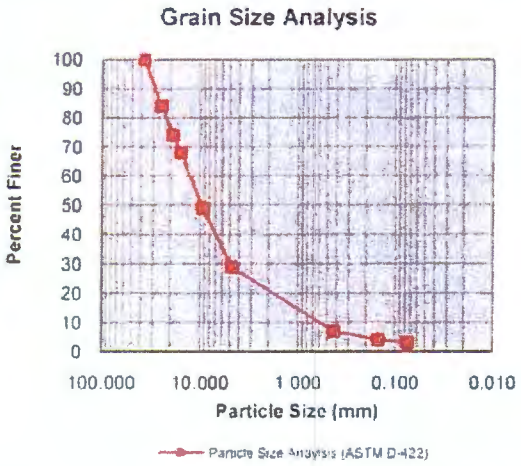
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	84	70-100
3/4 "	19.000	74	60-100
5/8 "	15.875	68	
3/8 "	9.500	49	35-80
No.4	4.750	29	10-40
No. 40	0.425	7	0-10
No. 100	0.150	4	0-4
No. 200	0.075	3	0-4



Cu	2.67
Cc	0.38

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-11
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/26/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/26/2010

Natural Moisture Content

Natural Moisture	N/A

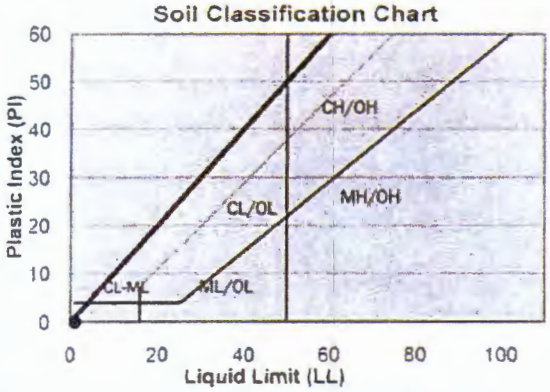
Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	3.0	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

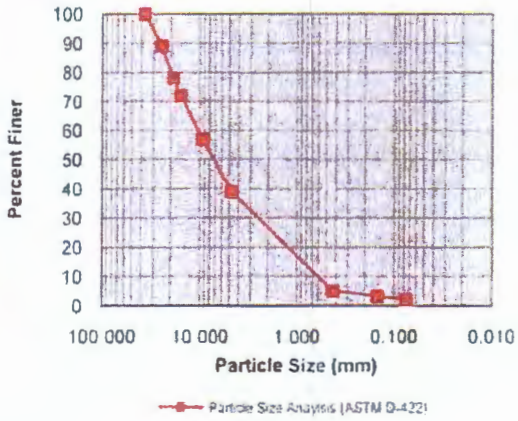
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	89	70-100
3/4 "	19.000	78	60-100
5/8 "	15.875	72	
3/8 "	9.500	57	35-80
No.4	4.750	39	10-40
No. 40	0.425	5	0-10
No. 100	0.150	3	0-4
No. 200	0.075	2	0-4

Grain Size Analysis



Cu	2.99
Cc	0.15

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	Washington Closure Hanford
Submittal:	05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID	DG-A-12
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location.	ERDF Cells 9 and 10 Const			Sampling Date:	7/26/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By	L. Hay
Reviewed By	J. Voss	Date.	8/2/2010	Date Received.	7/26/2010

Natural Moisture Content

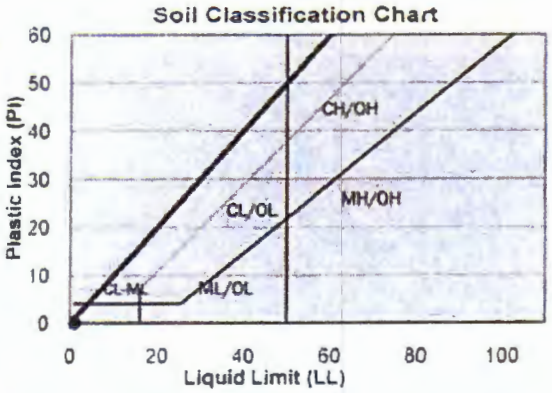
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	3.0	1.00E-02	cm/sec

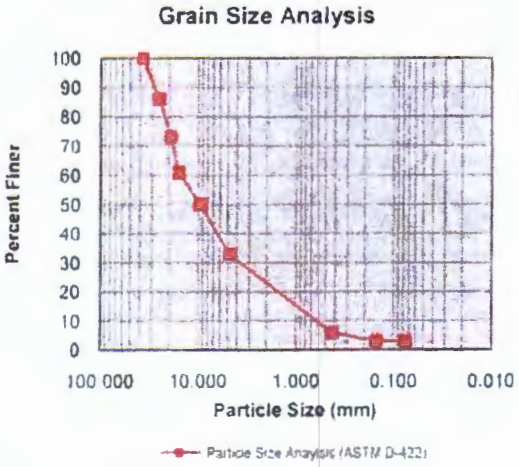
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	86	70-100
3/4 "	19.000	73	60-100
5/8 "	15.875	61	
3/8 "	9.500	50	35-80
No.4	4.750	33	10-40
No. 40	0.425	6	0-10
No. 100	0.150	3	0-4
No. 200	0.075	3	0-4



Cu	3.58
Cc	0.23

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM. None

Envirotech

8/2/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-13
Project:	S013213A00			Sample Des.	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date.	8/3/2010
Tested By:	L. Hay/M. Fortier	Date:	8/13/2010	Sampled By:	L. Hay
Reviewed By.	J. Voss	Date:	8/16/2010	Date Received.	8/3/2010

Natural Moisture Content

Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	5.4	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

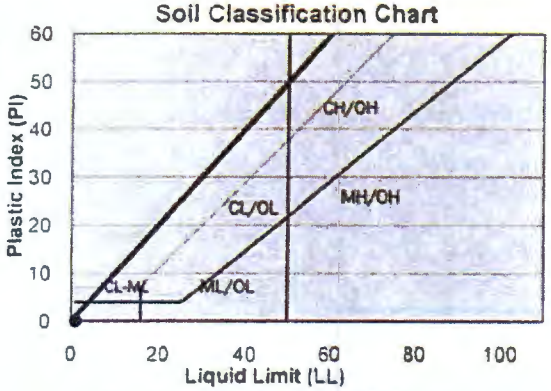
Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

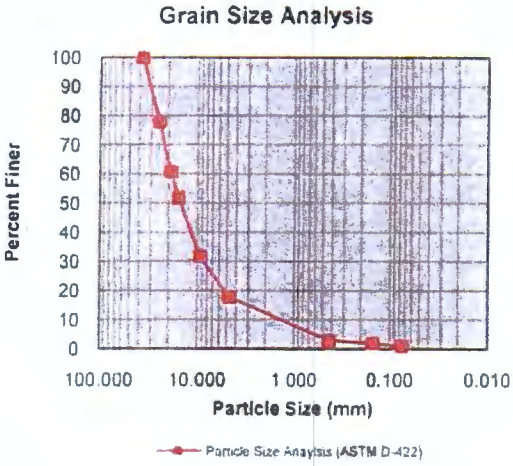
Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	78	70-100
3/4 "	19.000	61	60-100
5/8 "	15.875	52	
3/8 "	9.500	32	25-80
No.4	4.750	18	10-40
No. 40	0.425	3	0-10
No. 100	0.150	2	0-4
No. 200	0.075	1	0-4

Cu	2.24
Cc	0.51

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None





Envirotech

8/16/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-14
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	8/3/2010
Tested By:	L. Hay/M. Fortier	Date:	8/13/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/16/2010	Date Received:	8/3/2010

Natural Moisture Content

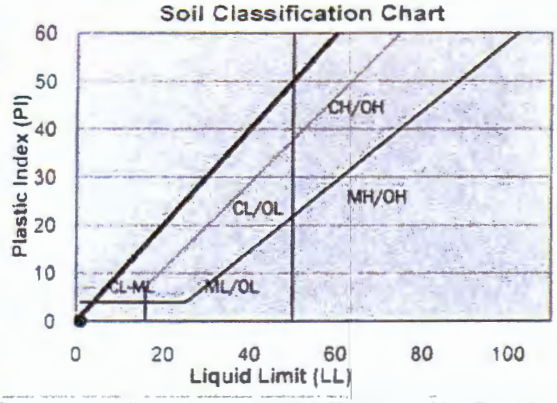
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	5.4	1.00E-02	cm/sec

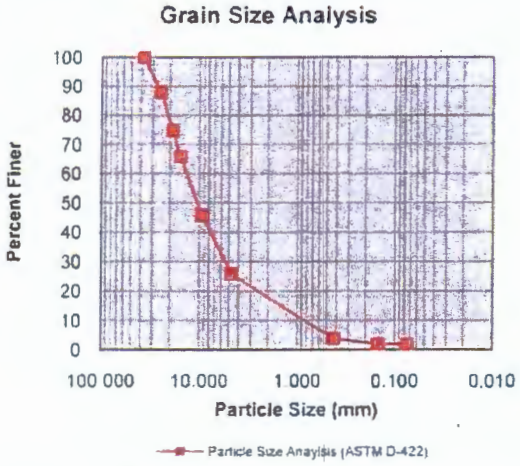
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	88	70-100
3/4 "	19.000	75	60-100
5/8 "	15.875	66	
3/8 "	9.500	46	25-80
No.4	4.750	26	10-40
No. 40	0.425	4	0-10
No. 100	0.150	2	0-4
No. 200	0.075	2	0-4



Cu	2.52
Cc	0.42

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/16/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-15
Project:	S013213A00			Sample Des	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	8/9/2010
Tested By:	L. Hay/M. Fortier	Date:	8/17/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/18/2010	Date Received:	8/9/2010

Natural Moisture Content

Natural Moisture	N/A

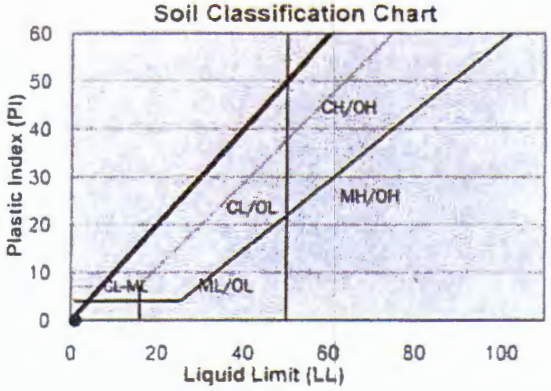
Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	3.6	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

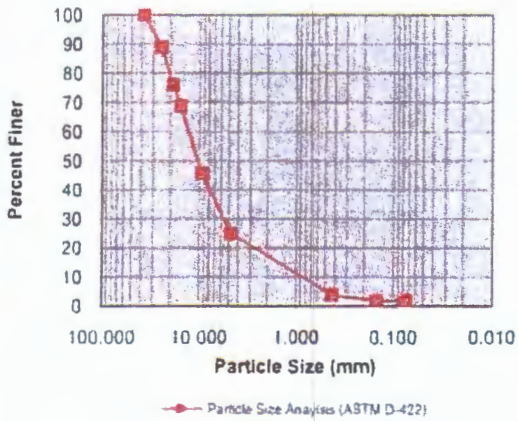
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	89	70-100
3/4 "	19.000	76	60-100
5/8 "	15.875	69	
3/8 "	9.500	46	25-80
No.4	4.750	25	10-40
No. 40	0.425	4	0-10
No. 100	0.150	2	0-4
No. 200	0.075	2	0-4

Grain Size Analysis



Cu	2.32
Cc	0.45

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/19/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580-234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-16
Project:	S013213A00			Sample Des.	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date	8/9/2010
Tested By:	L. Hay/M. Fortier	Date:	8/17/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/18/2010	Date Received:	8/9/2010

Natural Moisture Content

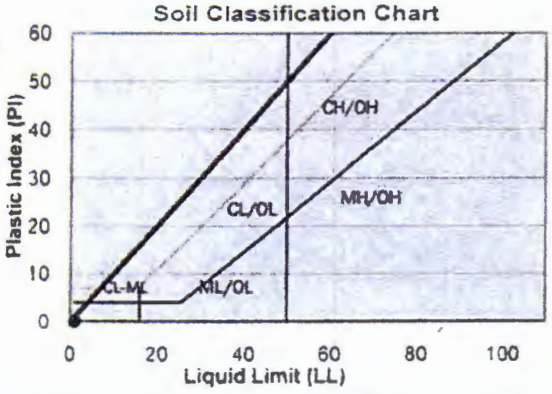
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	5.4	1.00E-02	cm/sec

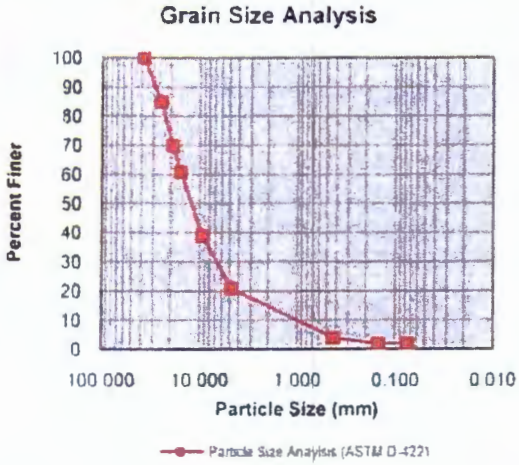
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	85	70-100
3/4 "	19.000	70	60-100
5/8 "	15.875	61	
3/8 "	9.500	39	25-80
No 4	4.750	21	10-40
No. 40	0.425	4	0-10
No. 100	0.150	2	0-4
No. 200	0.075	2	0-4



Cu	2.21
Cc	0.46

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 14th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-17
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date	8/10/2010
Tested By:	L. Hay/M. Fortier	Date:	8/17/2010	Sampled By	L. Hay
Reviewed By:	J. Voss	Date	8/18/2010	Date Received:	8/10/2010

Natural Moisture Content

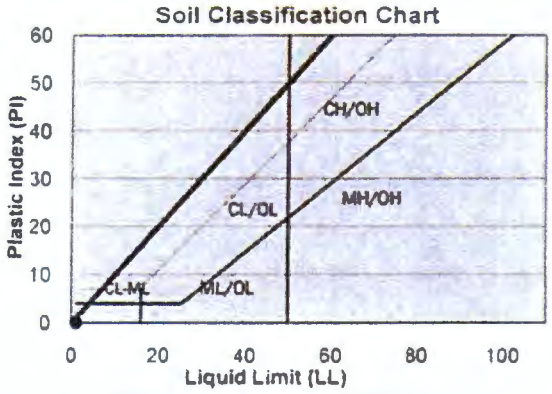
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	7.8	1.00E-02	cm/sec

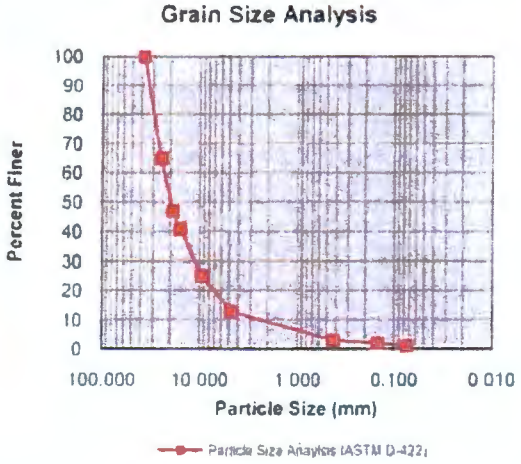
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000		70-100
3/4 "	19.000		60-100
5/8 "	15.875	41	
3/8 "	9.500	25	25-80
No.4	4.750	13	10-40
No. 40	0.425	3	0-10
No 100	0.150	2	0-4
No. 200	0.075	1	0-4



Cu	1.94
Cc	0.46

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM. None

Comments: Sample handling or technician error apprears to have occurred during testing of this sample CQA shall resample and retest

Envirotech

8/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID.	DG-A-17A
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date:	8/23/2010
Tested By:	L. Hay/M. Fortier	Date:	10/4/2010	Sampled By:	J. Voss
Reviewed By:	J. Voss	Date:	10/5/2010	Date Received:	8/23/2010

Natural Moisture Content

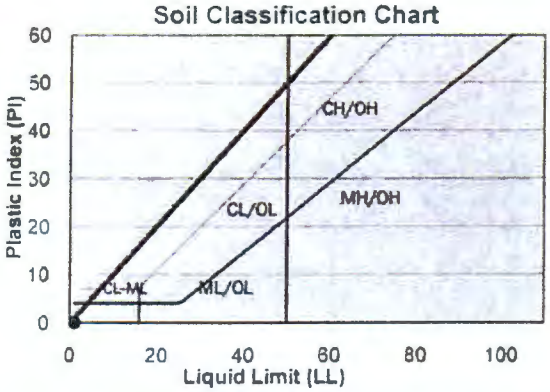
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.6	1.00E-02	cm/sec

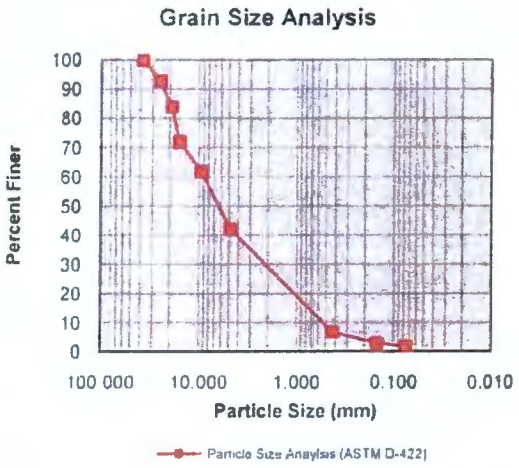
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	93	70-100
3/4 "	19.000	84	60-100
5/8 "	15.875	72	
3/8 "	9.500	62	25-80
No.4	4.750	[illegible]	10-40
No. 40	0.425	7	0-10
No. 100	0.150	3	0-4
No. 200	0.075	2	0-4



Cu	11.34
Cc	1.49

Unified Soil Classification (ASTM D-2487)
GW: Well Graded Gravel with Sand

WCH approval of material for use in Cell Construction

10/11/10
WCH Project Engineer

Envirotech

10/8/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-18
Project:	S013213A00			Sample Des.	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date:	8/11/2010
Tested By:	L. Hay/M. Fortier	Date:	8/17/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	8/18/2010	Date Received:	8/11/2010

Natural Moisture Content

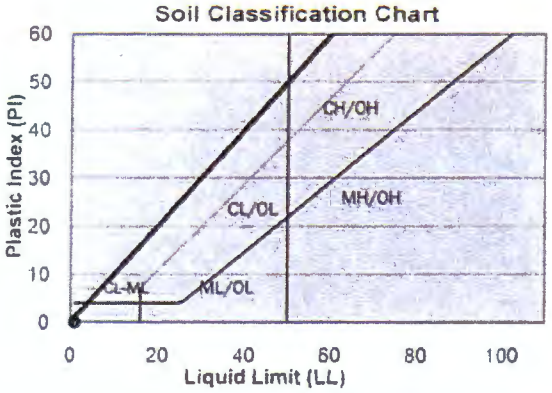
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.5	1.00E-02	cm/sec

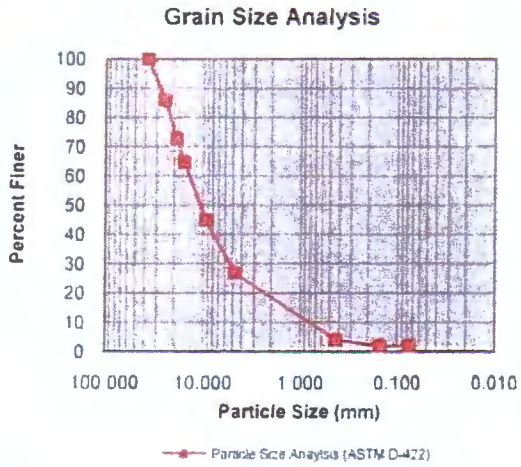
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	86	70-100
3/4 "	19.000	73	60-100
5/8 "	15.875	65	
3/8 "	9.500	45	25-80
No.4	4.750	27	10-40
No. 40	0.425	4	0-10
No 100	0.150	2	0-4
No. 200	0.075	2	0-4



Cu	2.69
Cc	0.40

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-19
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	8/12/2010
Tested By:	L. Hay/M. Fortier	Date	8/18/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date	8/19/2010	Date Received:	8/12/2010

Natural Moisture Content

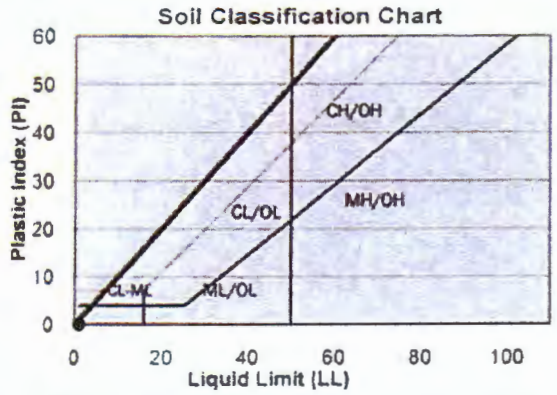
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	4.1	1.00E-02	cm/sec

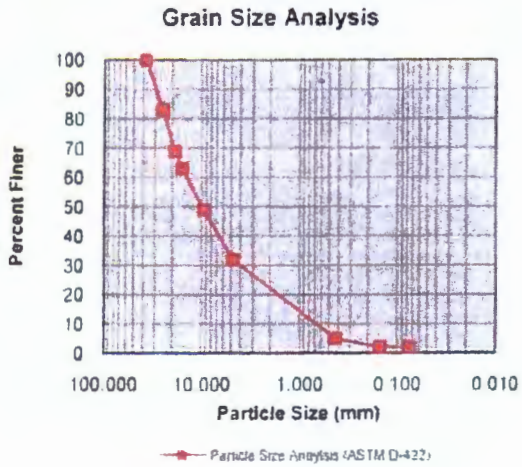
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	83	70-100
3/4 "	19.000	69	60-100
5/8 "	15.875	63	
3/8 "	9.500	49	25-80
No.4	4.750	32	10-40
No. 40	0.425	5	0-10
No. 100	0.150	2	0-4
No. 200	0.075	2	0-4



Cu	3.28
Cc	0.27

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/20/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: **Washington Closure Hanford**
Submittal: **05-18K Drainage Gravel Lab Data**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-A-20
Project:	S013213A00			Sample Des:	Type A Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date:	8/17/2010
Tested By	L. Hay/M. Fortier	Date:	8/23/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	8/24/2010	Date Received	8/17/2010

Natural Moisture Content

Natural Moisture	N/A

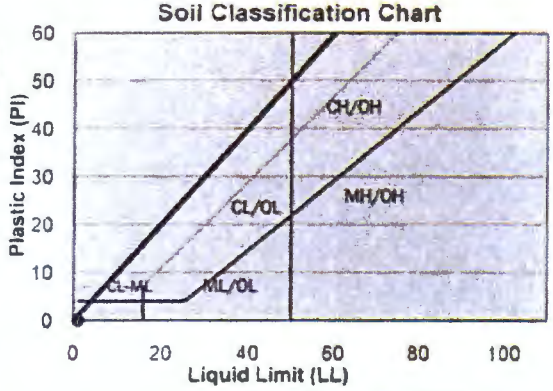
Constant Head Perm (ASTM D-2434)

Permeability	cm/sec	Spec	
k_{20} =	5.8	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

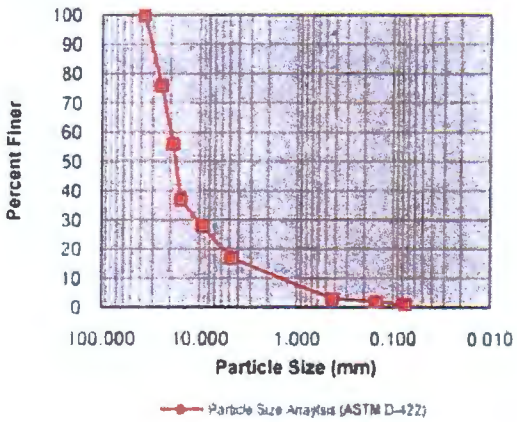
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	[illegible]	70-100
3/4 "	19.000	[illegible]	60-100
5/8 "	15.875	37	
3/8 "	9.500	28	25-80
No.4	4.750	17	10-40
No. 40	0.425	3	0-10
No. 100	0.150	2	0-4
No. 200	0.075	1	0-4

Grain Size Analysis



Cu	3.67
Cc	0.38

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

WCH approval of material for use in Cell Construction

9/1/10
WCH Project Engineer

Envirotech

9/1/10
Date

H.2

CONSTRUCTION TYPE B DRAINAGE GRAVEL

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-B-01
Project:	S013213A00			Sample Des.	Type B Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/15/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/15/2010

Natural Moisture Content

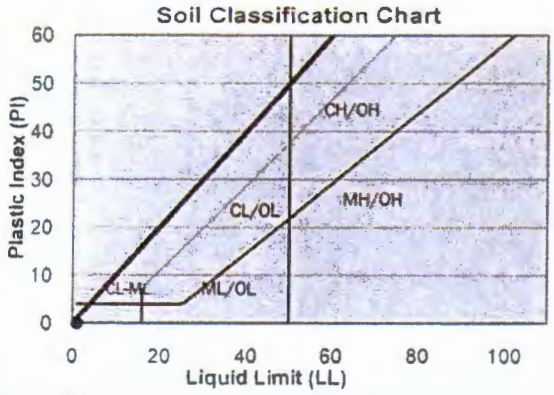
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	9.5	1.00E-02	cm/sec

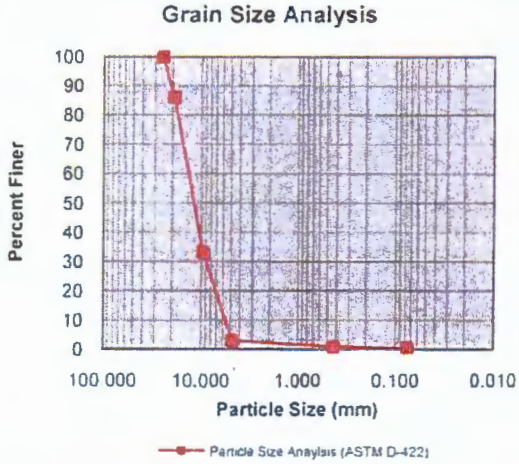
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 "	25.000	100	100
3/4 "	19.000	86	80-100
3/8 "	9.500	33	0-40
No.4	4.750	3	0-4
No. 40	0.425	1	
No. 200	0.075	1	0-2



Cu	1.59
Cc	0.63

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-B-02
Project:	S013213A00			Sample Des:	Type B Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/16/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/16/2010

Natural Moisture Content

Natural Moisture	N/A

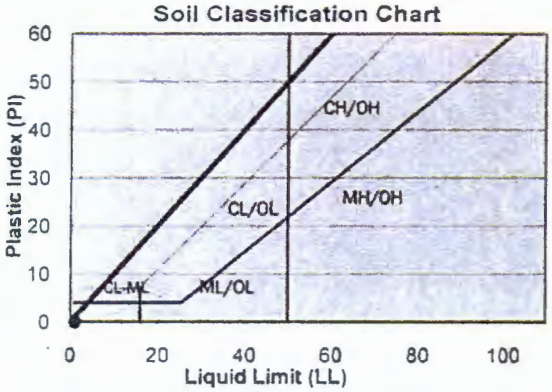
Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	11.8	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

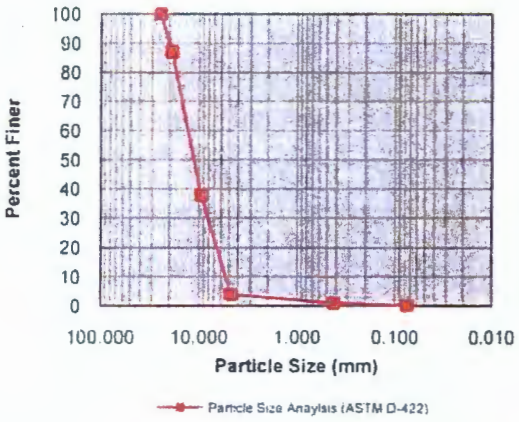
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 "	25.000	100	100
3/4 "	19.000	87	80-100
3/8 "	9.500	38	0-40
No.4	4.750	4	0-4
No. 40	0.425	1	
No. 200	0.075	0	0-2

Grain Size Analysis



Cu	1.64
Cc	0.61

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-B-03
Project:	S013213A00			Sample Des:	Type B Drainage Gravel
Project Location:	ERDF Cells 9 and 10 Const.			Sampling Date:	7/20/2010
Tested By:	L. Hay/M. Fortier	Date:	8/1/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	8/2/2010	Date Received:	7/20/2010

Natural Moisture Content

Natural Moisture	N/A

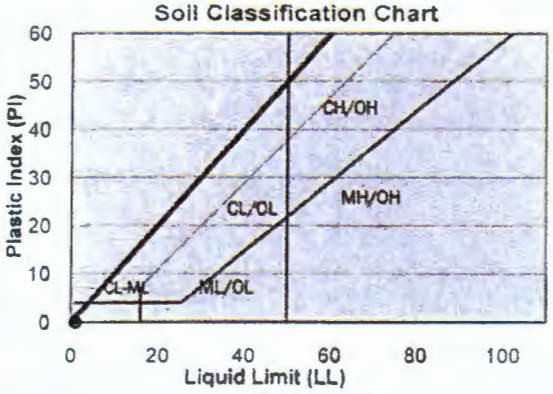
Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	10.5	1.00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

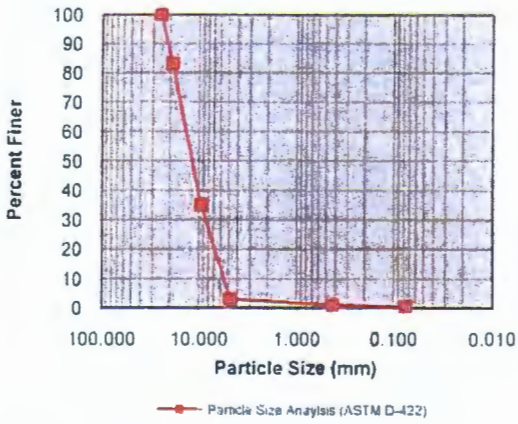
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 "	25.000	100	100
3/4 "	19.000	83	80-100
3/8 "	9.500	35	0-40
No.4	4.750	3	0-4
No. 40	0.425	1	
No. 200	0.075	1	0-2

Grain Size Analysis



Cu	1.65
Cc	0.61

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

8/2/10

Date

H.3

CONSTRUCTION TYPE C DRAINAGE GRAVEL

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID	DG-C-01
Project.	S013213A00			Sample Des.	WSDOT Base Course
Project Location:	ERDF Cells 9 and 10 Const			Sampling Date:	5/19/2010
Tested By:	M. Fortier	Date.	5/20/2010	Sampled By.	D Sterly
Reviewed By:	J Voss	Date	5/24/2010	Date Received.	5/19/2010

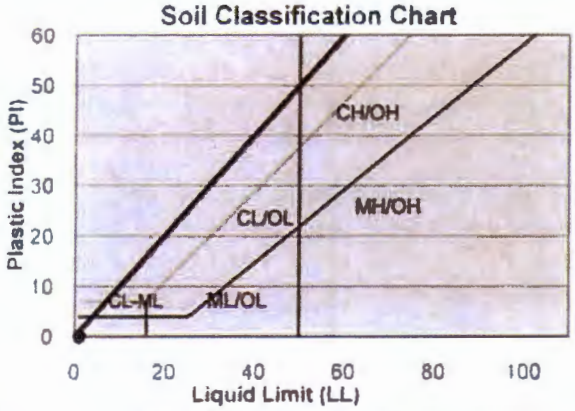
Natural Moisture Content

Natural Moisture	N/A

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

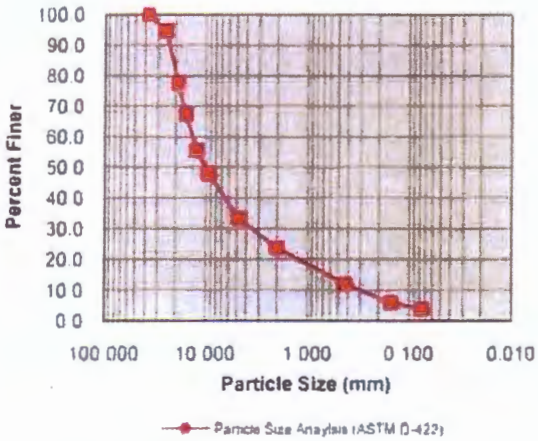
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37 500	100 0	100
1 "	25.000	94.6	80-100
3/4 "	19.000	77 6	
5/8 "	15 875	67.3	50-80
1/2 "	12 500	55.6	
3/8 "	9.500	48.0	
No.4	4 750	33.2	25-45
No. 10	2.000	23.6	
No. 40	0.425	12	3-18
No. 100	0 150	6	
No. 200	0.075	4	0-7.5
Cu	11 02		
Cc	0 85		

Grain Size Analysis



Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM: None

Envirotech

5/24/10
Date

Modified Proctor (ASTM D1557 and D4718)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Submittal: 5-18K DG-C-01 Proctor

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-C-01
Project:	S013213A00			Sample Des	Base Course
Project Location:	ERDF Cell 9-10			Sampling Date:	5/25/2010
Tested By:	QISI	Date	6/1/2010	Sampled By:	J. Voss
Reviewed By:	J. Voss	Date:	6/9/2010	Date Received:	5/25/2010
Comments	Method C - (ASTM D4718)			Report No.	5-18-81

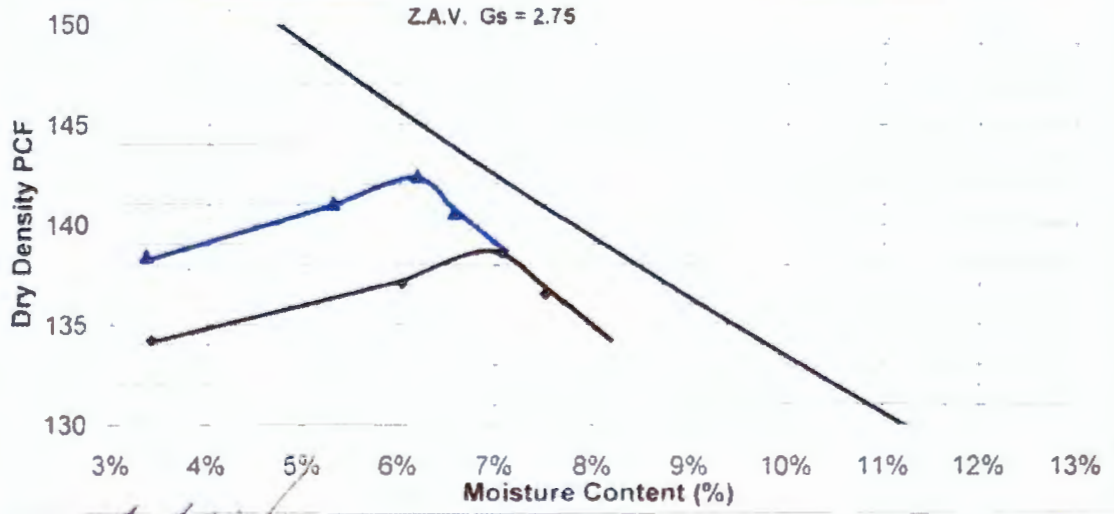
DENSITY DATA (lbs)

Mold + Wet Soil	25.3200	25.5500	25.4300	24.8300	
Mold Wt	14.4200	14.4200	14.4200	14.4200	
Wet Soil	10.90	11.13	11.01	10.41	
lbs/cu. ft. (wet)	145.3	148.4	146.8	138.8	
lbs/cu. ft. (dry)	137.1	138.6	136.5	134.2	

MOISTURE DATA (grams)

Tin No.					
Wet Soil + Tin	4112.50	3912.40	5079.00	4715.70	
Dry Soil + Tin	3878.80	3654.50	4724.00	4560.00	
Tin Wt	0.00	0.00	0.00	0.00	
Dry Soil	3878.80	3654.50	4724.00	4560.00	
% Moisture	6.0%	7.1%	7.5%	3.4%	
% Saturation	71.0%	88.4%	86.7%	36.1%	

	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)
	139.0	6.8%
Corrected	142.7	5.7%



Envirotech

Date 6/9/10

Constant Head Permeability Test

ASTM D 2434 (10-in Permeameter)

ENVIROTECH

2300 N. 11th Street | Enid OK 73701

Client:	Washington Closure-Hanford
Submittal:	05-18K Drainage Gravel Perm

Sample Information

Contact Name	Charlie Skiba			Sample ID	DG-C-01
Project	S013213A00			Sample Desc	WSDOT Base Course
Project Location	ERDF Cells 9 and 10 Const			Sampling Date	5/25/2010
Tested By	J. Voss	Date	5/26/2010	Sampled By	J Voss
Reviewed By	T Williams	Date	5/26/2010	Date Received	5/25/2010

Test Conditions

Temp (deg C)	20 4	R_t	0 99

Sample Data

Run Number	1	2	3	4	5
Diameter of Soil Specimen, **D** (cm)	25 00	25 00	25 00		
Length of Soil Specimen, **L** (cm)	30 48	30 48	30 48		
Area of Specimen, **A** (cm^2)	491 07	491 07	491 07		

Aparatus Data

Diameter of Stand Pipe, **Dp** (cm)	25 00	25 00	25 00		
Area of Stand Pipe **Ap** (cm^2)	470 79	470 79	470 79		
Head Difference initial, **ho** (cm)	66 50	66 50	66 50		
Head Difference final, **hf** (cm)	62 00	60 00	58 00		

Readings

Water Column Height, Initial (cm)	52 9	52 5	49 9		
Water Column Height, Final (cm)	23 2	23.0	21 0		
Time Elapsed, (sec)	63 6	56 2	49 8		

Coefficient of Permiabillity, K

k (cm/sec) =	3 032E+00	2 360E+00	1 995E+00		
k_{20} (cm/sec) =	3 006E+00	2 339E+00	1 978E+00		
h/l =	0 15	0 21	0 28		
	Ave. k_{20} (cm/sec) =		**2.441E+00**		

Project Manager

5/26/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name	Charlie Skiba			Sample ID	DG-C-2
Project	S013213A00			Sample Des	Type C Drainage Gravel
Project Location	ERDF Cells 9 and 10 Const			Sampling Date	7/29/2010
Tested By	L. Hay/M. Fortier	Date	8/13/2010	Sampled By	L. Hay
Reviewed By	J. Voss	Date	8/16/2010	Date Received	7/29/2010

Natural Moisture Content

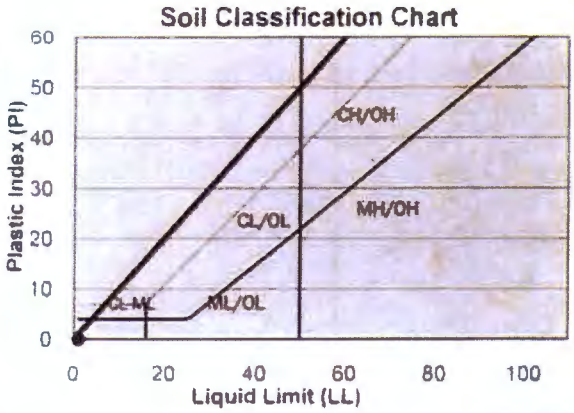
Natural Moisture	N/A

Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	6.2	1.00E-02	cm/sec

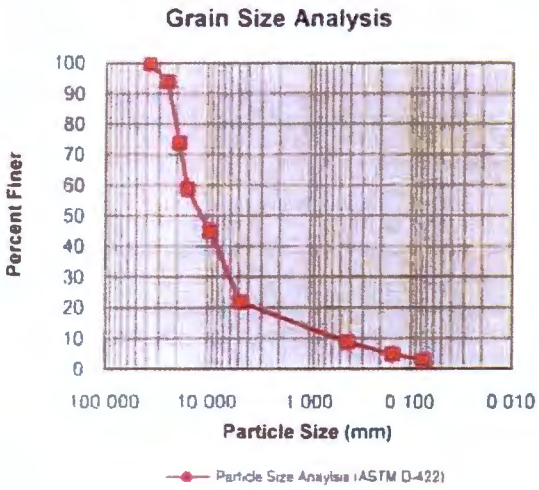
Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25.000	94	70-100
3/4 "	19.000	74	60-100
5/8 "	15.875	59	
3/8 "	9.500	45	25-80
No 4	4.750	22	10-40
No. 40	0.425	9	0-10
No. 100	0.150	[illegible]	0-4
No. 200	0.075	3	0-4



Cu	2.20
Cc	0.34

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

WCH approval of material for use in Cell Construction

9/1/10
WCH Project Engineer

Envirotech

9/1/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18K Drainage Gravel Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	DG-C-2A
Project:	S013213A00			Sample Des	Type C Drainage Gravel
Project Location.	ERDF Cells 9 and 10 Const			Sampling Date.	8/19/2010
Tested By:	L. Hay/M. Fortier	Date	8/23/2010	Sampled By	L. Hay
Reviewed By:	J. Voss	Date.	8/23/2010	Date Received:	8/19/2010

Natural Moisture Content

Natural Moisture	N/A

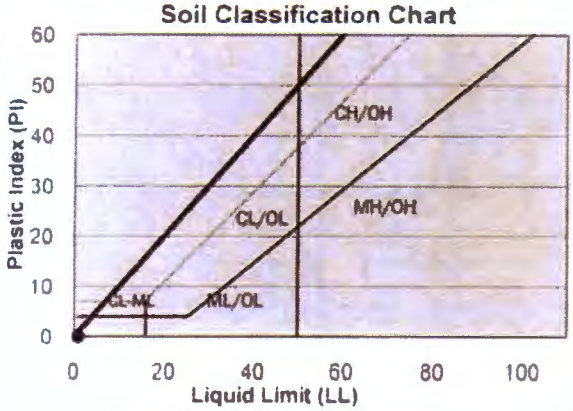
Constant Head Perm (ASTM D-2434)

Permeabilty	cm/sec	Spec	
k_{20} =	7 1	1 00E-02	cm/sec

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	Non-Plastic	Spec
Liquid Limit	Non-Plastic	
Plastic Limit	Non-Plastic	
Plasticity Index	Non-Plastic	

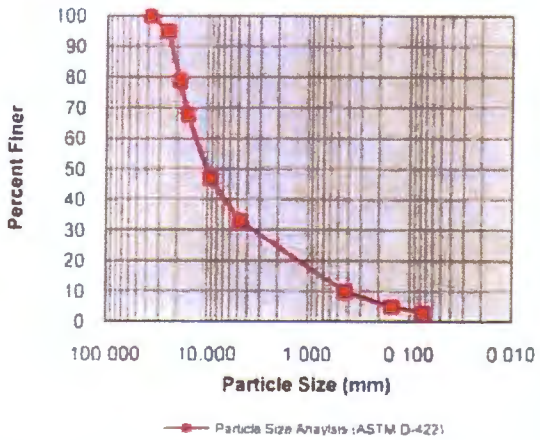
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100	100
1 "	25 000	95	80-100
3/4 "	19 000	79	
5/8 "	15 875	68	50-80
3/8 "	9.500	47	
No 4	4 750	33	25-45
No. 40	0 425	10	3-18
No. 100	0 150	5	
No. 200	0 075	3	0-7.5

Grain Size Analysis



Cu	3.21
Cc	0 25

Unified Soil Classification (ASTM D-2487)
GP: Pooly Graded Gravel with Sand

Deviations from ASTM. None

Envirotech

8/24/10
Date

APPENDIX I.

GROUND-PENETRATING RADAR (GPR) REPORT

GEOPHYSICAL SITE INVESTIGATION REPORTS

Ground Penetrating Radar (GPR) surveys of the haul roads across the floors of Cell 9 and Cell 10. Surveys performed by Mark Villa for WCH between August 24th, 2010 and November 5th, 2010.

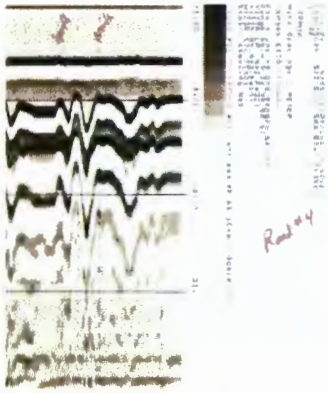
Signature		Date
EPA:		19 Nov 2010
DOE:	11/10/10	
WCH:		11/8/10

GEOPHYSICAL SITE INVESTIGATION SUMMARY

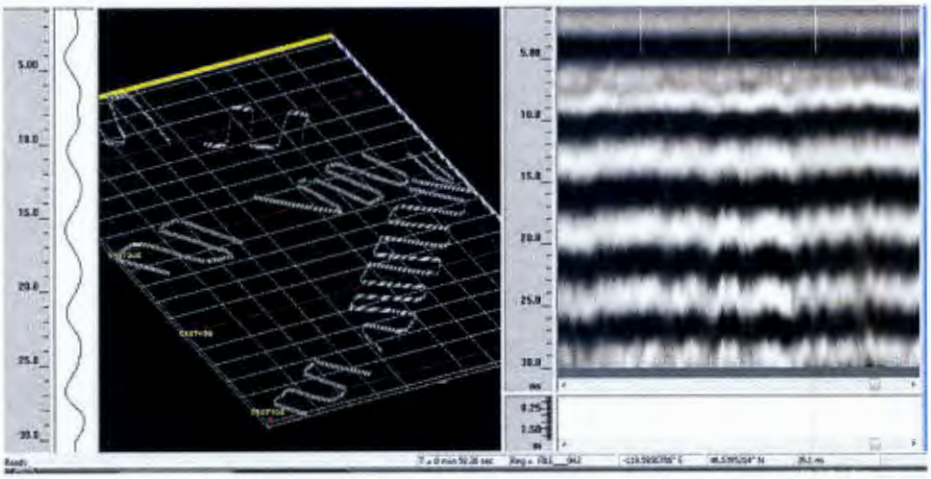
Site:	ERDF	**Project No:**		**Date:**	08/25/10
Project/Contact:	Jack Howard				
Location:	Cells 9 & 10				
Objectives:	Detect and delineate depth variations in the cell liner				

Summary of Results

The scope of the geophysical investigation was to detect depth variations in the cell liner on haul roads at the bottom of the cell. The picture below is of GPR data collected in August 2008 depicting a series of depth variations in a cell liner.



No measurable depth variations were noted in GPR survey conducted 08/25/2010. Minor undulations in the data were consistent with the surface of the survey area. Pictured below is GPR data from the 2010 survey. The left half of the frame are the GPR tracks, with GPS navigation, perpendicular to the haul roads. The right half of the frame is a typical GPR record. The record length was 30 nanoseconds (depth of approximately 5.5 feet) and the liner is at approximately 10 nanoseconds.



GPR data coverage extents are described in Figure 1.

Contact Information

Name:	Kevin Bergstrom/Mark Villa	**Company**	Washington Closure Hanford
Phone:	(509)378-0942 /(509)222-0933	**E-Mail**	kabergst@wch-rcc.com/mjvilla@wch-rcc.com

Site:	ERDF	Project No:		Date:	08/25/10
Project/Contact:	Jack Howard				

Site Description

Cultural Resource Setting:	N/A, site is disturbed by construction and/or operation of Hanford facilities
Terrain:	Flat
Vegetation	none
Soil	gravel
Hydro properties:	Dry
Depth of investigation	5.5 feet

Equipment

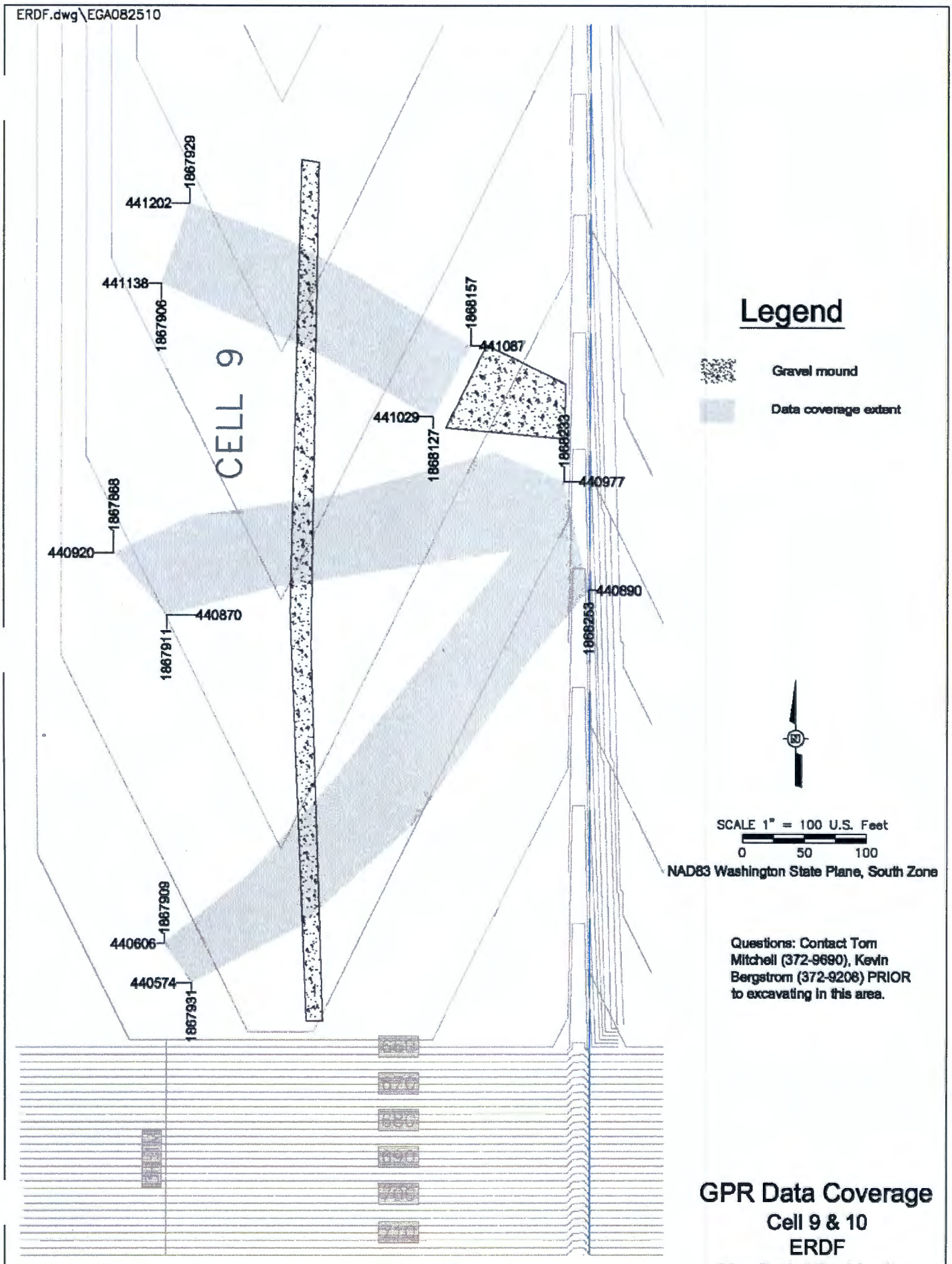
Type/Model:	Ground Penetrating Radar (GPR): Geophysical Survey Systems, Inc., (GSSI) SIR3000; 270 MHz antenna with SDR Data Bridge
Data Format:	Electronic ☒ Hardcopy ☒

Data Collection/Processing Parameters

Navigation Control Parameters: Trimble Ag132 DGPS: Differential Global Positioning System (Sub-meter accuracy), 5Hz NMEA output

Data Collection Parameters: GPR : 30 nanosecond window with wheel encoder (40 scans/meter) Filters (LP75MHz/HP700MHz), gain set to local conditions

Data Processing Parameters: Radar data processed in Radan V6.6 I3D by GSSI



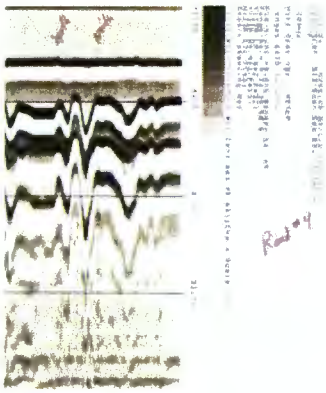
GPR Data Coverage
Cell 9 & 10
ERDF
Hanford, Washington

GEOPHYSICAL SITE INVESTIGATION SUMMARY

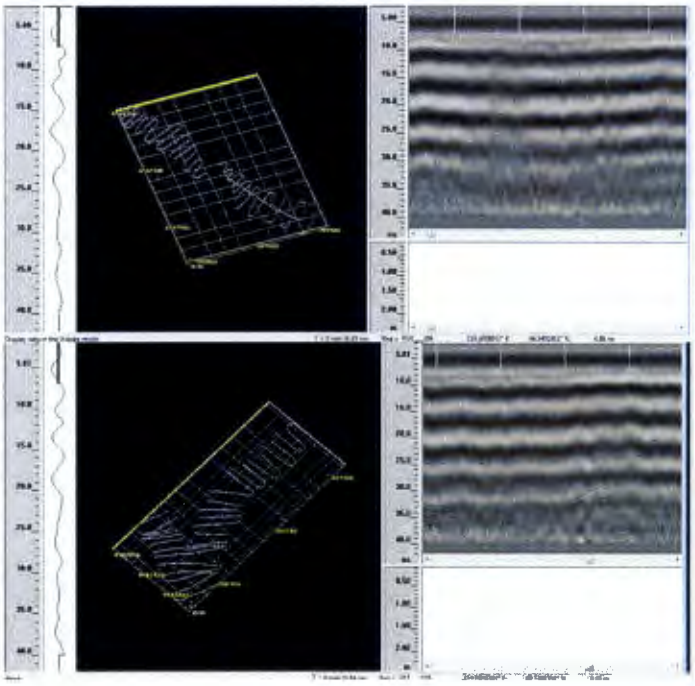
Site:	ERDF	**Project No:**		**Date:**	09/24/10
Project/Contact:	Jack Howard				
Location:	Cells 9 & 10				
Objectives:	Detect and delineate depth variations in the cell liner				

Summary of Results

The scope of the geophysical investigation was to detect depth variations in the cell liner on haul roads at the bottom of the cell. The picture below is of GPR data collected in August 2008 depicting a series of depth variations in a cell liner.



No measurable depth variations were noted in GPR surveys conducted 09/24/2010 09/27/10. Minor undulations in the data were consistent with the surface of the survey area. Pictured below is GPR data from the 09/24/10 and 09/27/10 surveys. The left half of the frame are the GPR tracks, with GPS navigation, perpendicular to the haul roads. The right half of the frame is a typical GPR record. The liner is at approximately 10 nanoseconds.



GPR data coverage extents are described in Figure 1.

Site:	ERDF	Project No:		Date:	09/24/10
Project/Contact:	Jack Howard				

Contact Information

Name:	Mark Villa	**Company**	Washington Closure Hanford
Phone:	509)222-0933	**E-Mail**	kabergst@wch-rcc.com/mjvilla@wch-rcc.com

Site Description

Cultural Resource Setting:	N/A, site is disturbed by construction and/or operation of Hanford facilities
Terrain:	Flat
Vegetation	none
Soil	gravel
Hydro properties:	Dry
Depth of investigation	5.5 feet

Equipment

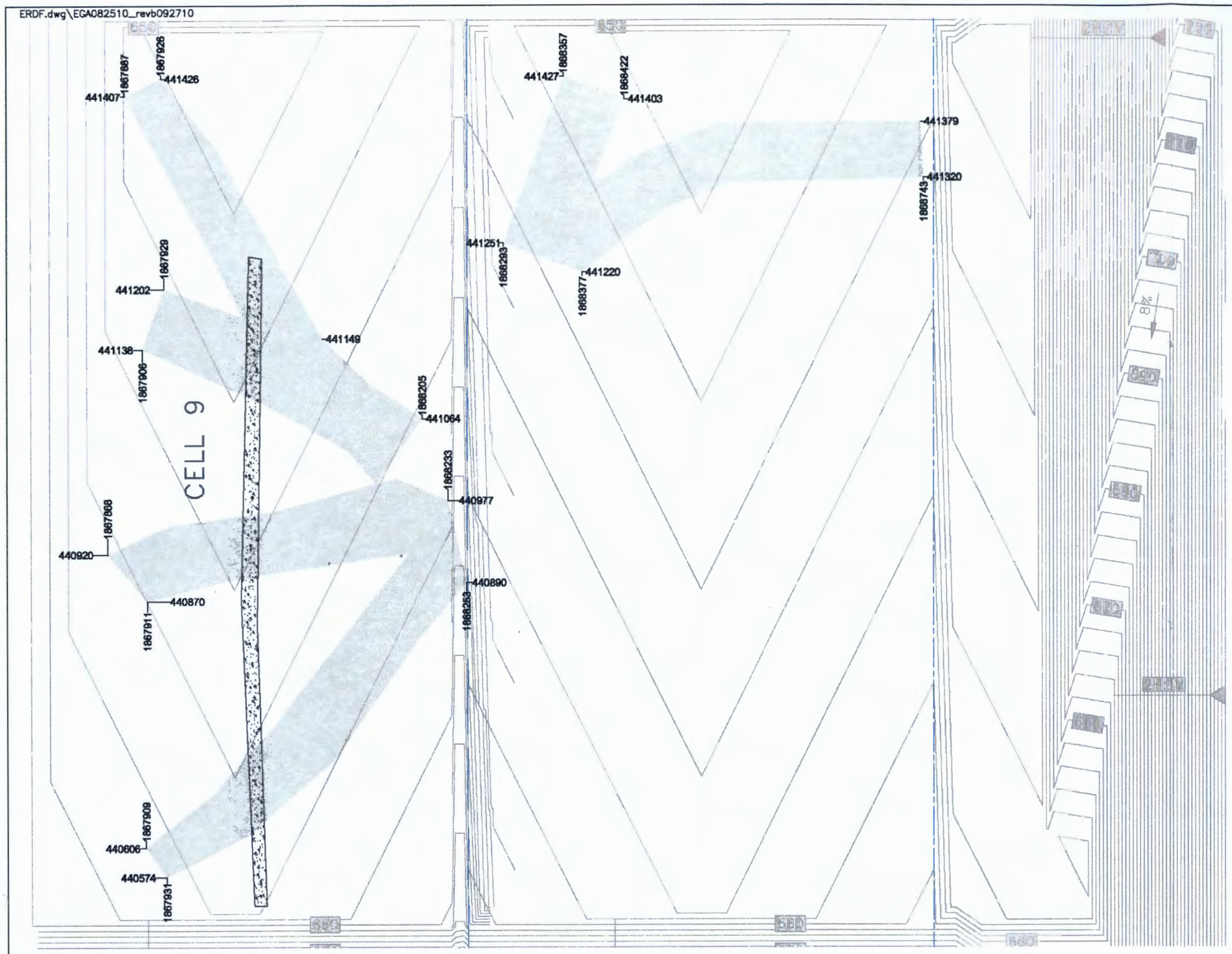
Type/Model:	Ground Penetrating Radar (GPR): Geophysical Survey Systems, Inc., (GSSI) SIR3000; 270 MHz antenna with SDR Data Bridge
Data Format:	**Electronic** ☒ **Hardcopy** ☒

Data Collection/Processing Parameters

Navigation Control Parameters: Trimble Ag132 DGPS: Differential Global Positioning System (Sub-meter accuracy), 5Hz NMEA output

Data Collection Parameters: GPR : 30 nanosecond window with wheel encoder (40 scans/meter) Filters (LP75MHz/HP700MHz), gain set to local conditions

Data Processing Parameters: Radar data processed in Radan V6.6 I3D by GSSI



Legend

Data coverage extent

SCALE 1" = 100 U.S. Feet

0 50 100

NAD83 Washington State Plane, South Zone

Questions: Contact Tom Mitchell (372-9690), Kevin Bergstrom (372-9208) PRIOR to excavating in this area.

GPR Data Coverage

Cell 9 & 10

ERDF

Hanford, Washington

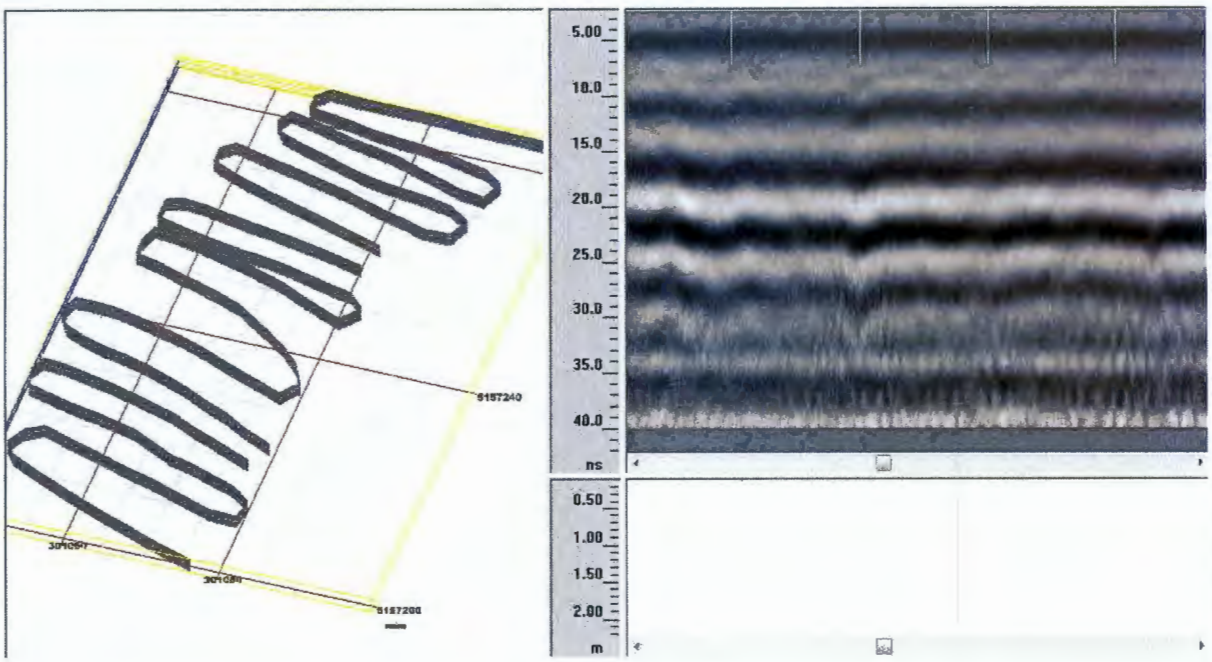
GEOPHYSICAL SITE INVESTIGATION SUMMARY

Site:	ERDF	**Project No:**		**Date:**	10/25/10
Project/Contact:	Jack Howard				
Location:	Cells 9 & 10				
Objectives:	Detect and delineate depth variations in the cell liner				

Summary of Results

The scope of the geophysical investigation was to detect depth variations in the cell liner on haul roads at the bottom of the cell.

No measurable depth variations were noted in the GPR survey conducted 10/25/10. Minor undulations in the data were consistent with the surface of the survey area. Pictured below is GPR data from the 10/25/10 survey. The left half of the frame are the GPR tracks, with GPS navigation, perpendicular to the haul roads. The right half of the frame is a typical GPR record. The liner is at approximately 10 nanoseconds.



GPR data coverage extents are described in Figure 1.

Contact Information

Name:	Mark Villa	**Company**	Washington Closure Hanford
Phone:	509)222-0933	**E-Mail**	kabergst@wch-rcc.com/mjvilla@wch-rcc.com

Site Description

Cultural Resource Setting:	N/A, site is disturbed by construction and/or operation of Hanford facilities
Terrain:	Flat

Site:	ERDF	**Project No:**		**Date:**	10/25/10
Project/Contact:	Jack Howard				
Vegetation	none				
Soil	gravel				
Hydro properties:	Dry				
Depth of investigation	5.5 feet				

Equipment

Type/Model:	Ground Penetrating Radar (GPR): Geophysical Survey Systems, Inc., (GSSI) SIR3000; 270 MHz antenna with SDR Data Bridge
Data Format:	**Electronic** ☒ **Hardcopy** ☒

Data Collection/Processing Parameters

Navigation Control Parameters: Trimble Ag132 DGPS: Differential Global Positioning System (Sub-meter accuracy), 5Hz NMEA output

Data Collection Parameters: GPR : 40 nanosecond window with wheel encoder (40 scans/meter) Filters (LP75MHz/HP700MHz), gain set to local conditions

Data Processing Parameters: Radar data processed in Radan V6.6 I3D by GSSI

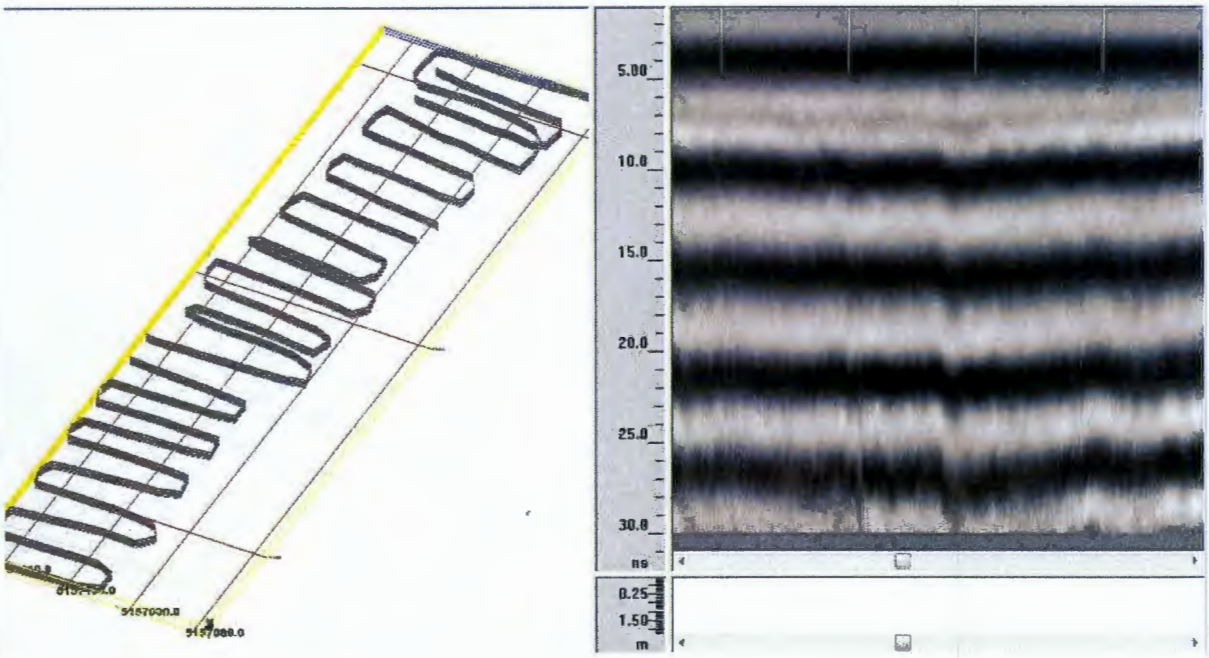
GEOPHYSICAL SITE INVESTIGATION SUMMARY

Site:	ERDF	**Project No:**		**Date:**	11/05/10
Project/Contact:	Jack Howard				
Location:	Cells 9 & 10				
Objectives:	Detect and delineate depth variations in the cell liner				

Summary of Results

The scope of the geophysical investigation was to detect depth variations in the cell liner on haul roads at the bottom of the cell.

No depth variations were noted in the GPR survey conducted 11/05/10. Minor undulations in the data were consistent with the surface of the survey area. Pictured below is GPR data from the 11/05/10 survey. The left half of the frame are the GPR tracks, with GPS navigation, perpendicular to the haul roads. The right half of the frame is a typical GPR record. The liner is at approximately 10 nanoseconds.



GPR data coverage extents are described in Figure 1.

Contact Information

Name:	Mark Villa	**Company**	Washington Closure Hanford
Phone:	509)222-0933	**E-Mail**	kabergst@wch-rcc.com/mjvilla@wch-rcc.com

Site Description

Cultural Resource Setting:	N/A, site is disturbed by construction and/or operation of Hanford facilities
Terrain:	Flat
Vegetation	none

Site:	ERDF	**Project No:**		**Date:**	11/05/10
Project/Contact:	Jack Howard				
Soil	gravel				
Hydro properties:	Dry				
Depth of investigation	5.5 feet				

Equipment

Type/Model:	Ground Penetrating Radar (GPR): Geophysical Survey Systems, Inc., (GSSI) SIR3000; 270 MHz antenna with SDR Data Bridge
Data Format:	**Electronic** ☒ **Hardcopy** ☒

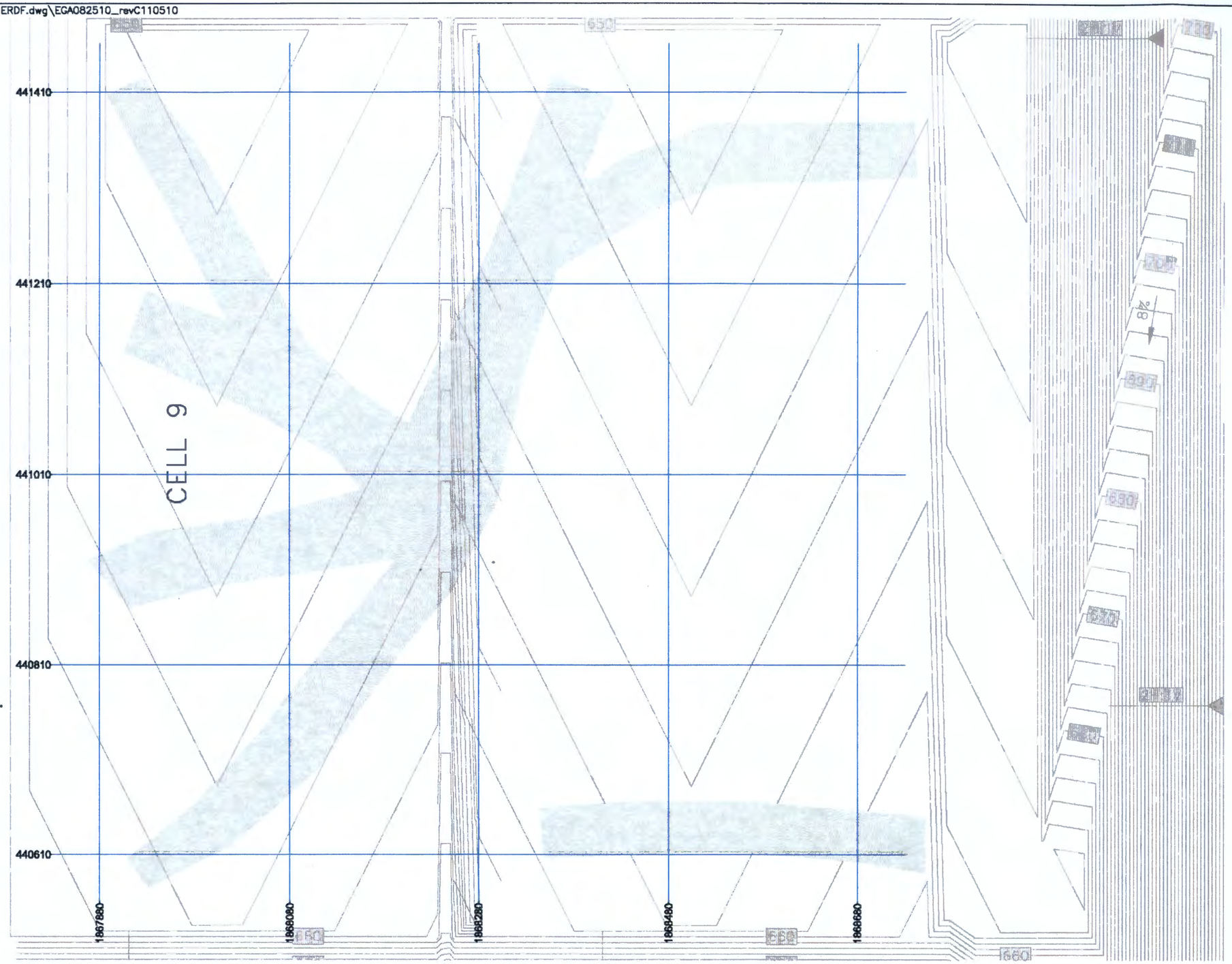
Data Collection/Processing Parameters

Navigation Control Parameters: Trimble Ag132 DGPS: Differential Global Positioning System (Sub-meter accuracy), 5Hz NMEA output

Data Collection Parameters: GPR : 40 nanosecond window with wheel encoder (40 scans/meter) Filters (LP75MHz/HP700MHz), gain set to local conditions

Data Processing Parameters: Radar data processed in Radan V6.6 I3D by GSSI

ERDF.dwg\EGA082510_revC110510



Legend

Data coverage extent

SCALE 1" = 100 U.S. Feet

0 50 100

NAD83 Washington State Plane, South Zone

Questions: Contact Tom Mitchell (372-9690), Kevin Bergstrom (372-9208) PRIOR to excavating in this area.

GPR Data Coverage

Cell 9 & 10

ERDF

Hanford, Washington

APPENDIX J.

OPERATIONS TESTING DOCUMENTATION

Operation Soils Summary

ENVIROTECH
ENGINEERING & CONSULTING, INC

Test Number	Description	Proctor		Sieve		Classification	
		Dry Density	Moisture %	Passing 4-in	Passing -200%		
OP-01	Operations Soil	106.2	19.0%	100	8.4	SW-SM	Well Graded Sand w/ Silt
OP-02	Operations Soil	-	-	100	13.1	SM	Silty Sand
OP-03	Operations Soil	-	-	100	8.4	SP-SM	Poorly Graded Sand w/ Silt
OP-04	Operations Soil	-	-	100	10.7	SW-SM	Well Graded Sand w/ Silt
OP-05	Operations Soil	110.0	16.0%	100	12.4	SM	Silty Sand
OP-06	Operations Soil	-	-	100	11.3	SW-SM	Well Graded Sand w/ Silt
OP-07	Operations Soil	-	-	100	10.5	SP-SM	Poorly Graded Sand w/ Silt
OP-08	Operations Soil	-	-	100	6.6	SP-SM	Poorly Graded Sand w/ Silt
OP-09	Operations Soil	-	-	100	10.5	SW-SM	Well Graded Sand w/ Silt
OP-10	Operations Soil	111.1	16.4%	100	8.0	SW-SM	Well Graded Sand w/ Silt
OP-11	Operations Soil	-	-	100	12.0	SW-SM	Well Graded Sand w/ Silt
OP-12	Operations Soil	-	-	100	7.9	SW-SM	Well Graded Sand w/ Silt
OP-13	Operations Soil	-	-	100	9.1	SW-SM	Well Graded Sand w/ Silt
OP-14	Operations Soil	-	-	100	6.9	SW-SM	Well Graded Sand w/ Silt
OP-15	Operations Soil	110.0	16.3%	100	8.2	SW-SM	Well Graded Sand w/ Silt
OP-16	Operations Soil	-	-	100	10.8	SW-SM	Well Graded Sand w/ Silt
OP-17	Operations Soil	-	-	100	6.7	SP-SM	Poorly Graded Sand w/ Silt
OP-18	Operations Soil	-	-	100	6.2	SP-SM	Poorly Graded Sand w/ Silt
OP-19	Operations Soil	-	-	100	7.3	SP-SM	Poorly Graded Sand w/ Silt
OP-20	Operations Soil	111.7	13.6%	100	7.6	SW-SM	Well Graded Sand w/ Silt
OP-21	Operations Soil	-	-	100	7.4	SP-SM	Poorly Graded Sand w/ Silt
OP-22	Operations Soil	-	-	100	8.0	SW-SM	Well Graded Sand w/ Silt
OP-23	Operations Soil	-	-	100	5.5	SP-SM	Poorly Graded Sand w/ Silt
OP-24	Operations Soil	-	-	100	9.7	SW-SM	Well Graded Sand w/ Silt
OP-25	Operations Soil	113.5	16.2%	100	8.1	SP-SM	Poorly Graded Sand w/ Silt
OP-26	Operations Soil	-	-	100	7.7	SP-SM	Poorly Graded Sand w/ Silt
OP-27	Operations Soil	-	-	100	8.4	SW-SM	Well Graded Sand w/ Silt
OP-28	Operations Soil	-	-	100	9.6	SW-SM	Well Graded Sand w/ Silt
OP-29	Operations Soil	-	-	100	10.7	SW-SM	Well Graded Sand w/ Silt
OP-30	Operations Soil	114.0	13.5%	100	9.1	SW-SM	Well Graded Sand w/ Silt
OP-31	Operations Soil	-	-	100	9.3	SW-SM	Well Graded Sand w/ Silt
OP-32	Operations Soil	-	-	100	13.1	SM	Silty Sand
OP-33	Operations Soil	-	-	100	9.8	SP-SM	Poorly Graded Sand w/ Silt
OP-34	Operations Soil	-	-	100	6.2	SP-SM	Poorly Graded Sand w/ Silt
OP-35	Operations Soil	112.6	15.2%	100	10.1	SW-SM	Well Graded Sand w/ Silt
OP-36	Operations Soil	-	-	100	9.4	SW-SM	Well Graded Sand w/ Silt
OP-37	Operations Soil	-	-	100	9.6	SW-SM	Well Graded Sand w/ Silt
OP-38	Operations Soil	-	-	100	8.0	SW-SM	Well Graded Sand w/ Silt
OP-39	Operations Soil	-	-	100	7.1	SP-SM	Poorly Graded Sand w/ Silt
OP-40	Operations Soil	111.5	17.3%	100	6.9	SP-SM	Poorly Graded Sand w/ Silt
OP-41	Operations Soil	-	-	100	6.0	SP-SM	Poorly Graded Sand w/ Silt
OP-42	Operations Soil	-	-	100	7.6	SP-SM	Poorly Graded Sand w/ Silt
OP-43	Operations Soil	-	-	100	5.9	SP-SM	Poorly Graded Sand w/ Silt
OP-44	Operations Soil	-	-	100	6.7	SP-SM	Poorly Graded Sand w/ Silt
OP-45	Operations Soil	110.0	16.2%	100	4.1	SP	Poorly Graded Sand
OP-46	Operations Soil	-	-	100	4.3	SP	Poorly Graded Sand
OP-47	Operations Soil	-	-	100	5.5	SP-SM	Poorly Graded Sand w/ Silt

Operation Soils Summary

ENVIROTECH
ENGINEERING & CONSULTING, INC.

Test Number	Description	Proctor		Sieve		Classification	
		Dry Density	Moisture %	Passing 4-in	Passing -200%		
OP-48	Operations Soil	-	-	100	5.4	SP-SM	Poorly Graded Sand w/ Silt
OP-49	Operations Soil	-	-	100	11.3	SW-SM	Well Graded Sand w/ Silt
OP-50	Operations Soil	112.0	13.2%	100	6.2	SP-SM	Poorly Graded Sand w/ Silt
OP-51	Operations Soil	-	-	100	4.0	SP	Poorly Graded Sand
OP-52	Operations Soil	-	-	100	4.3	SP	Poorly Graded Sand
OP-53	Operations Soil	-	-	100	4.7	SP	Poorly Graded Sand
OP-54	Operations Soil	-	-	100	5.1	SP-SM	Poorly Graded Sand w/ Silt
OP-55	Operations Soil	109.2	18.1%	100	8.0	SW-SM	Well Graded Sand w/ Silt
OP-56	Operations Soil	-	-	100	8.4	SW-SM	Well Graded Sand w/ Silt
OP-57	Operations Soil	-	-	100	6.3	SP-SM	Poorly Graded Sand w/ Silt
OP-58	Operations Soil	-	-	100	7.4	SP-SM	Poorly Graded Sand w/ Silt
OP-59	Operations Soil	-	-	100	8.2	SW-SM	Well Graded Sand w/ Silt
OP-60	Operations Soil	112.5	15.5%	100	7.0	SP-SM	Poorly Graded Sand w/ Silt
OP-61	Operations Soil	-	-	100	8.3	SW-SM	Well Graded Sand w/ Silt
OP-62	Operations Soil	-	-	100	11.0	SW-SM	Well Graded Sand w/ Silt
OP-63	Operations Soil	-	-	100	9.7	SW-SM	Well Graded Sand w/ Silt
OP-64	Operations Soil	-	-	100	7.9	SW-SM	Well Graded Sand w/ Silt
OP-65	Operations Soil	111.7	14.4%	100	7.9	SW-SM	Well Graded Sand w/ Silt
OP-66	Operations Soil	-	-	100	10.4	SP-SM	Poorly Graded Sand w/ Silt
OP-67	Operations Soil	-	-	100	9.8	SP-SM	Poorly Graded Sand w/ Silt
OP-68	Operations Soil	-	-	100	8.8	SP-SM	Poorly Graded Sand w/ Silt
OP-69	Operations Soil	-	-	100	7.8	SP-SM	Poorly Graded Sand w/ Silt
OP-70	Operations Soil	115.8	13	100	14.5	SM	Silty Sand
OP-71	Operations Soil	-	-	100	10.4	SP-SM	Poorly Graded Sand w/ Silt
OP-72	Operations Soil	-	-	100	11.0	SP-SM	Poorly Graded Sand w/ Silt
OP-73	Operations Soil	-	-	100	10.2	SP-SM	Poorly Graded Sand w/ Silt
OP-74	Operations Soil	-	-	100	10.3	SP-SM	Poorly Graded Sand w/ Silt
OP-75	Operations Soil	113.7	13.3	100	10.6	SP-SM	Poorly Graded Sand w/ Silt
OP-76	Operations Soil	-	-	100	11.0	SP-SM	Poorly Graded Sand w/ Silt

J.1

PRE-CONSTRUCTION SOIL CLASSIFICATION

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax 580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18D Admix Lab Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-01
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	4/28/2010
Tested By:	L. Hay	Date:	5/5/2010	Sampled By:	L. Hay
Reviewed By:	T. Williams	Date:	5/6/2010	Date Received:	4/28/2010

Natural Moisture Content

Natural Moisture	6.5%

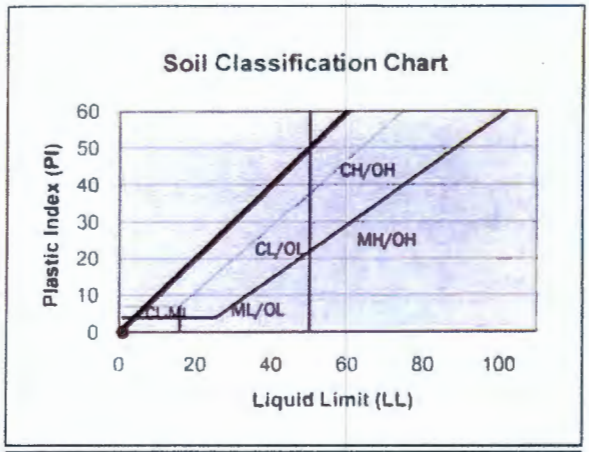
Atterberg Limits Test Results (ASTM D-4318)

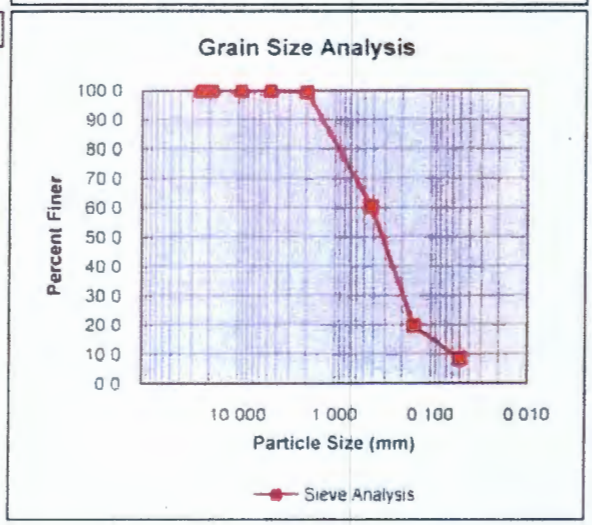
Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	99.4	
No. 40	0.425	60.4	
No. 100	0.150	19.8	
No. 200	0.050	8.4	

Cu	6.60
Cc	1.48





Unified Soil Classification (ASTM D-2487)
SW-SM: Well Graded Sand with Silt

Deviations from ASTM: None

Envirotech

5/6/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-02
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	R. Swenson	Date:	10/5/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/6/2010	Date Received:	10/4/2010

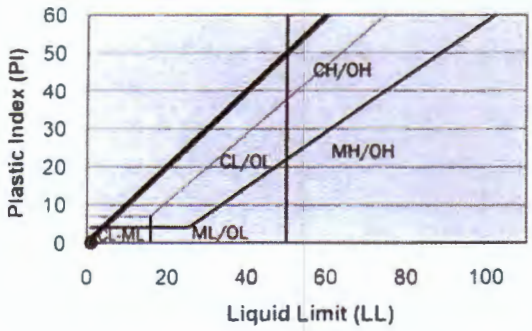
Natural Moisture Content

Natural Moisture	4 1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

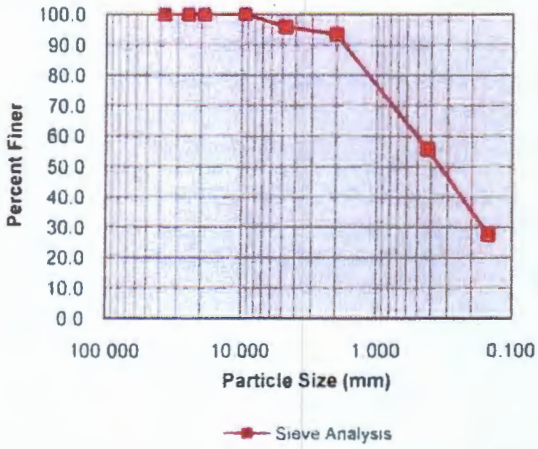
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100.0	
3/4 "	19.000	100 0	
3/8 "	9.500	100.0	
No.4	4.750	95 8	
No. 10	2 000	93 5	
No. 40	0.425	55 9	
No. 100	0.150	27.8	
No. 200	0.075	13.1	

Grain Size Analysis



Cu	N/A
Cc	N/A

Unified Soil Classification (ASTM D-2487)
SM: Silty Sand

Deviations from ASTM: None

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10/9/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-03
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	R. Swenson	Date:	10/5/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/6/2010	Date Received:	10/4/2010

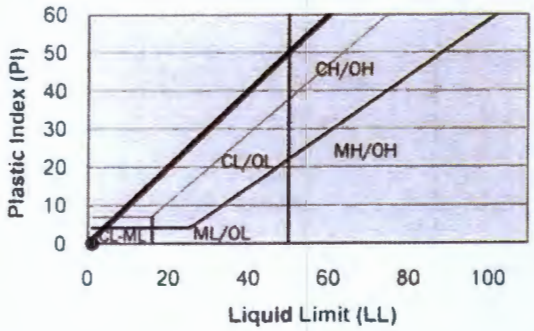
Natural Moisture Content

Natural Moisture	5.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

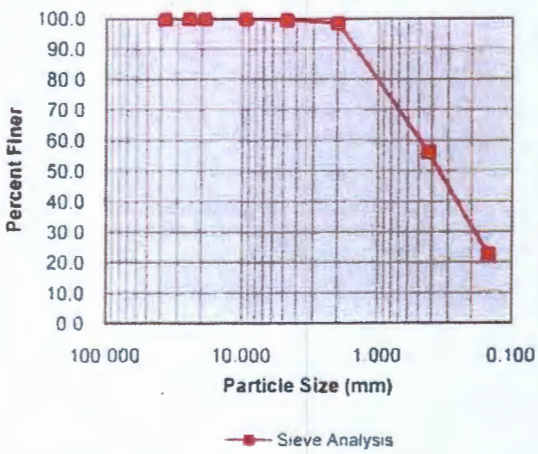
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.6	
No. 10	2.000	98.5	
No. 40	0.425	56.3	
No. 100	0.150	22.6	
No. 200	0.075	8.4	

Grain Size Analysis



Cu	6.8
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/8/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-04
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	L. Hay	Date:	10/7/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/8/2010	Date Received:	10/4/2010

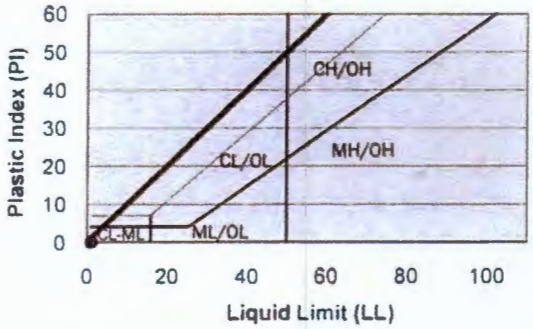
Natural Moisture Content

Natural Moisture	4.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

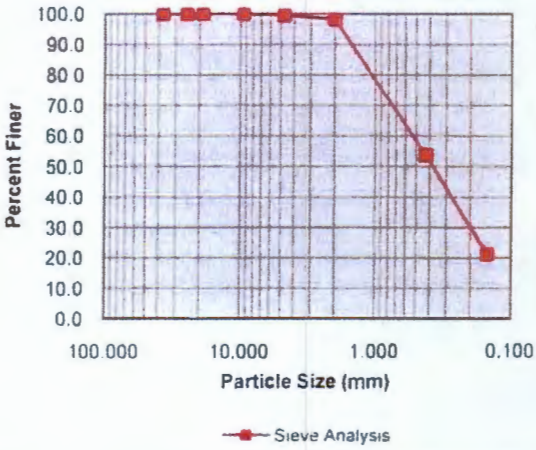
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.5	
No. 10	2.000	98.2	
No. 40	0.425	53.9	
No. 100	0.150	21.3	
No. 200	0.075	10.7	

Grain Size Analysis



Cu	9.1
Cc	1.1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-Graded Sand with Silt

Deviations from ASTM: None

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14 Oct 10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 71701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-05
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	L. Hay	Date	10/5/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date	10/12/2010	Date Received:	10/4/2010

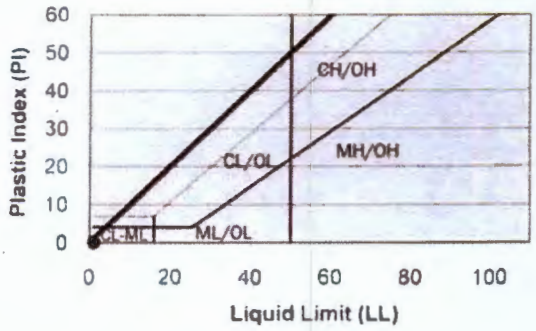
Natural Moisture Content

Natural Moisture	6.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

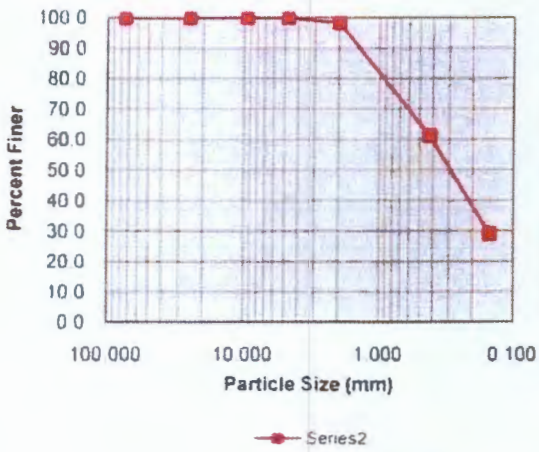
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	61.4	
No. 100	0.150	29.3	
No. 200	0.075	12.4	

Grain Size Analysis



Cu	6.4
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SM: Silty Sand

Deviations from ASTM: None

Envirotech

10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID.	OP-06
Project.	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	L. Hay	Date	10/5/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date	10/6/2010	Date Received.	10/4/2010

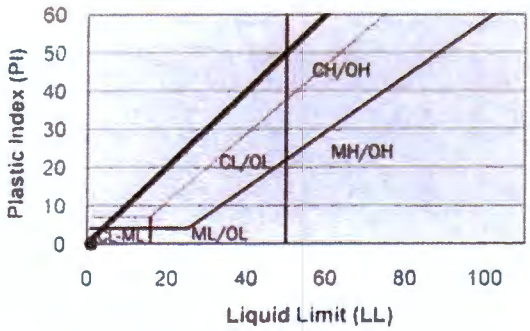
Natural Moisture Content

Natural Moisture	2.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

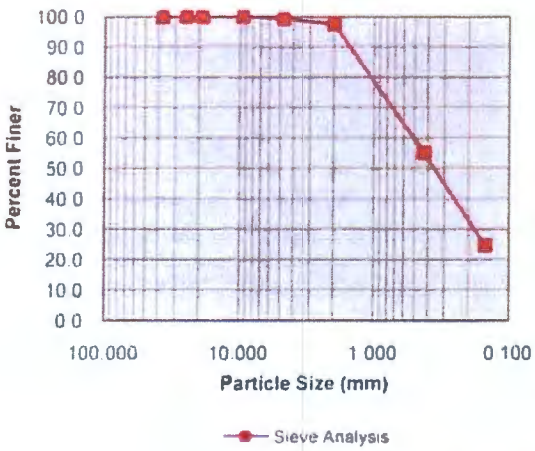
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100 0	
3/4 "	19.000	100 0	
3/8 "	9 500	100 0	
No.4	4 750	99 4	
No. 10	2 000	97 5	
No. 40	0 425	55 3	
No. 100	0 150	24 8	
No. 200	0.075	11 3	

Grain Size Analysis



Cu	8.9
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-Graded Sand with Silt

Deviations from ASTM: None

Envirotech

10/11/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-07
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	L. Hay	Date:	10/5/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/6/2010	Date Received:	10/4/2010

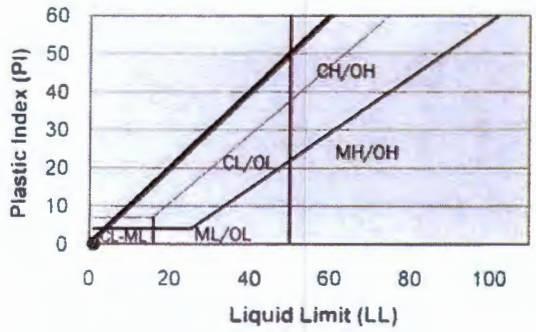
Natural Moisture Content

Natural Moisture	4.4%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

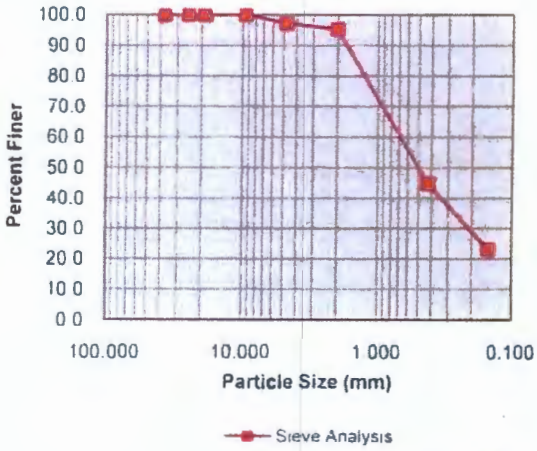
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	97.3	
No. 10	2.000	95.4	
No. 40	0.425	44.9	
No. 100	0.150	23.2	
No. 200	0.075	10.5	

Grain Size Analysis



Cu	12.48
Cc	0.87

Unified Soil Classification (ASTM D-2487)
SP-SM: Pooly graded sand with silt

Deviations from ASTM: None

Envirotech

10/11/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-08
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/5/2010
Tested By:	L. Hay	Date:	10/7/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/8/2010	Date Received:	10/5/2010

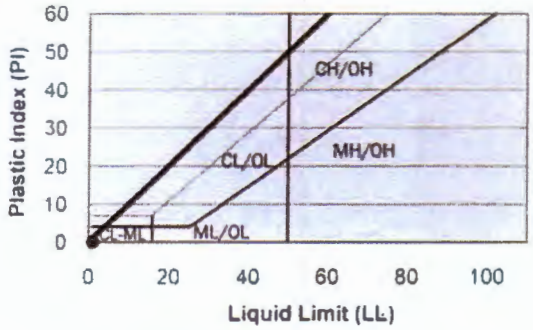
Natural Moisture Content

Natural Moisture	6.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

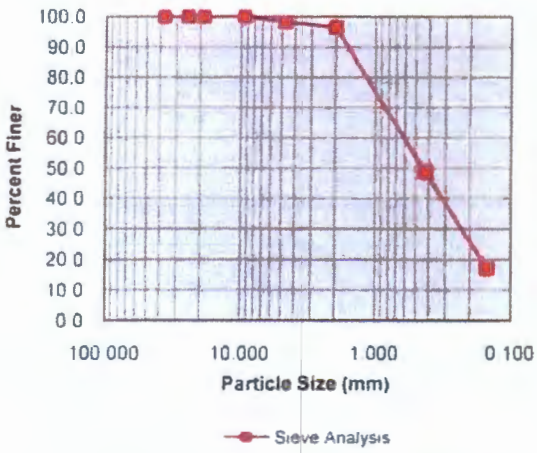
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100 0	
1 "	25.000	100 0	
3/4 "	19.000	100 0	
3/8 "	9 500	100.0	
No.4	4 750	98 1	
No. 10	2.000	96 5	
No. 40	0 425	48.8	
No. 100	0 150	17 2	
No. 200	0.075	6 6	

Grain Size Analysis



Cu	8 02
Cc	0.87

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/11/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-09
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/5/2010
Tested By:	L. Hay	Date	10/7/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/8/2010	Date Received:	10/5/2010

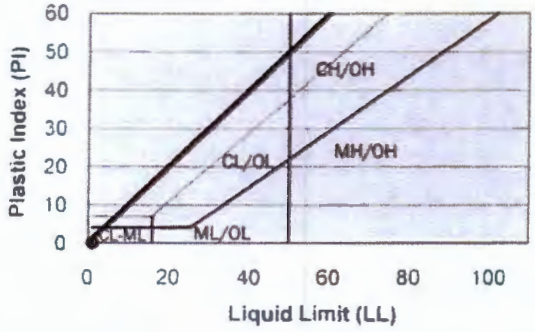
Natural Moisture Content

Natural Moisture	4.0%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

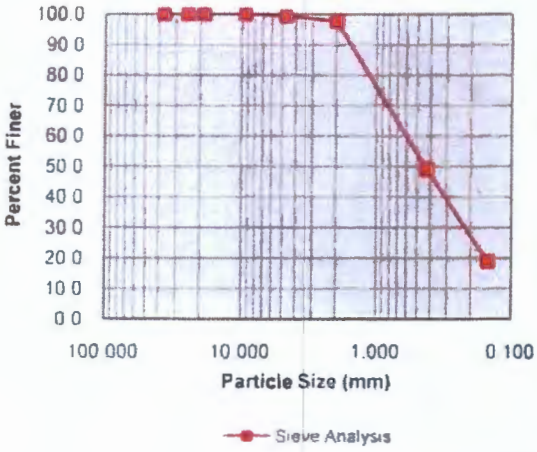
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2"	37.500	100.0	
1"	25.000	100.0	
3/4"	19.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	99.3	
No. 10	2.000	97.7	
No. 40	0.425	49.3	
No. 100	0.150	19.0	
No. 200	0.075	10.1	

Grain Size Analysis



Cu	10.37
Cc	1.08

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/11/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-10
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/5/2010
Tested By:	L. Hay	Date:	10/8/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/11/2010	Date Received:	10/5/2010

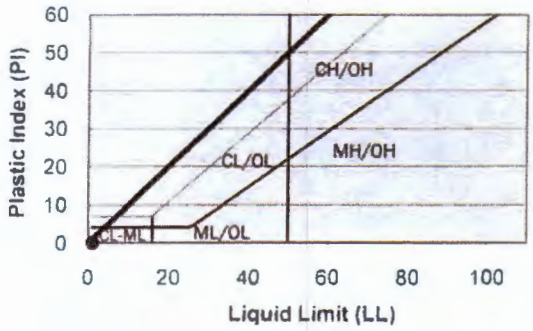
Natural Moisture Content

Natural Moisture	2.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

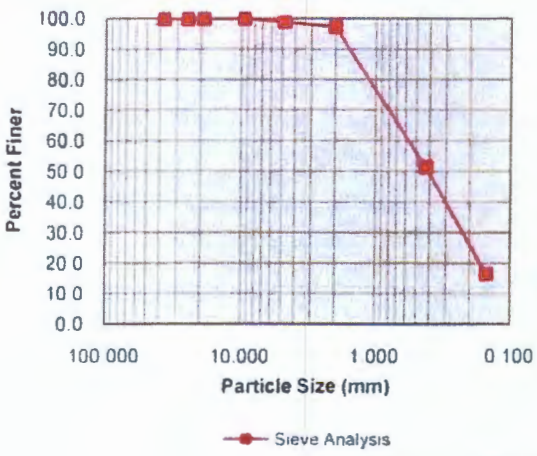
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100 0	
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99 0	
No. 10	2.000	97.4	
No. 40	0.425	51 7	
No. 100	0 150	16 7	
No. 200	0.075	8 0	

Grain Size Analysis



Cu	7.7
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-Graded Sand with Silt

Deviations from ASTM: None

Envirotech

10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok. 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-11
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/5/2010
Tested By:	L. Hay	Date:	10/7/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/8/2010	Date Received:	10/5/2010

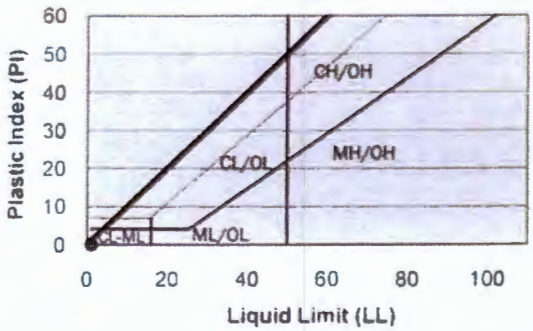
Natural Moisture Content

Natural Moisture	4.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

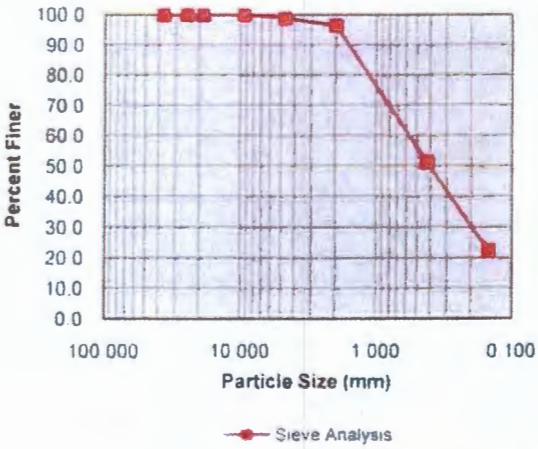
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	98.9	
No. 10	2.000	96.4	
No. 40	0.425	51.4	
No. 100	0.150	22.4	
No. 200	0.075	12.0	

Grain Size Analysis



Cu	11.90
Cc	1.12

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/11/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-12
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/5/2010
Tested By:	L.Hay	Date:	10/8/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/11/2010	Date Received	10/5/2010

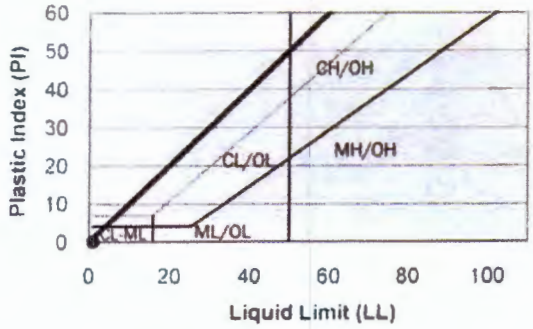
Natural Moisture Content

Natural Moisture	4.4%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

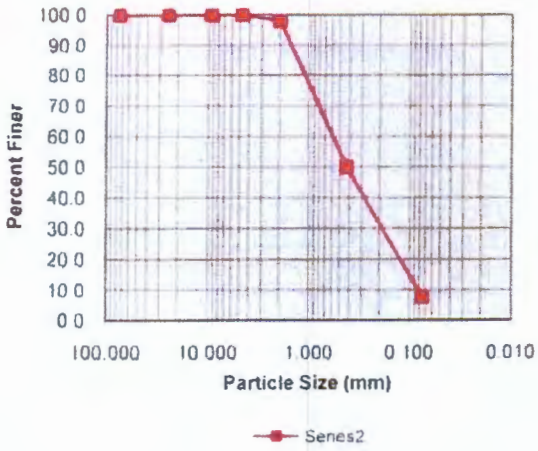
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.0	
No. 40	0.425	50.1	
No. 200	0.075	7.9	

Grain Size Analysis



Cu	8.1
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/12/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-13
Project:	S013213A00			Sample Description.	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/6/2010
Tested By:	L. Hay	Date	10/8/2010	Sampled By:	L. Hay
Reviewed By.	J. Voss	Date:	10/11/2010	Date Received	10/6/2010

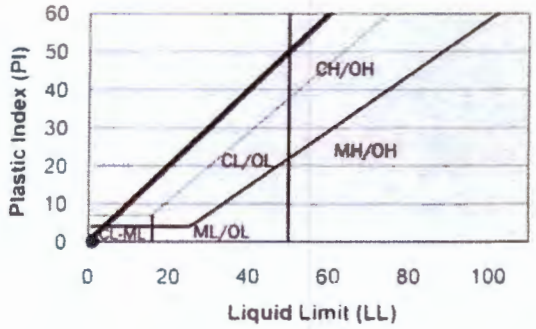
Natural Moisture Content

Natural Moisture	4.6%

Atterberg Limits Test Results (ASTM D-4318)

		Spec
Flow Index	N/A	
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

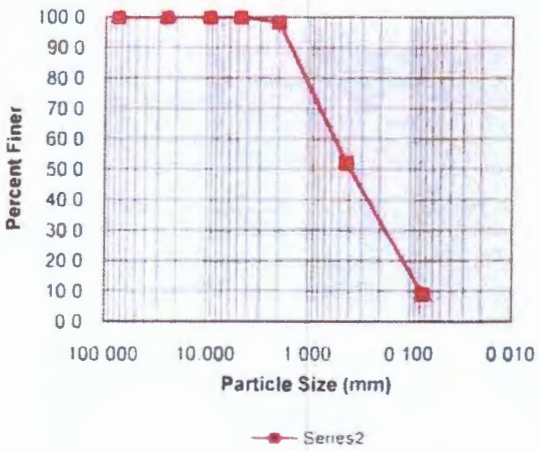
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	52.3	
No. 200	0.075	9.1	

Grain Size Analysis



Cu	8.4
Cc	1.1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-14
Project.	S013213A00			Sample Description:	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date	10/6/2010
Tested By.	L. Hay	Date:	10/8/2010	Sampled By.	L. Hay
Reviewed By.	J Voss	Date	10/11/2010	Date Received.	10/6/2010

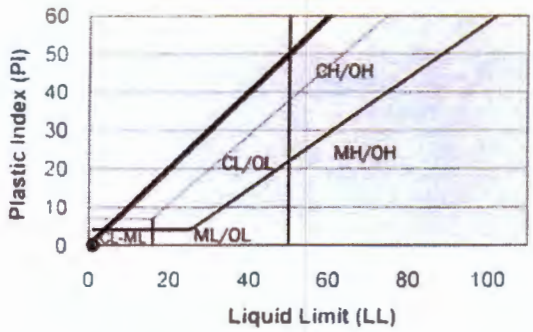
Natural Moisture Content

Natural Moisture	4 5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

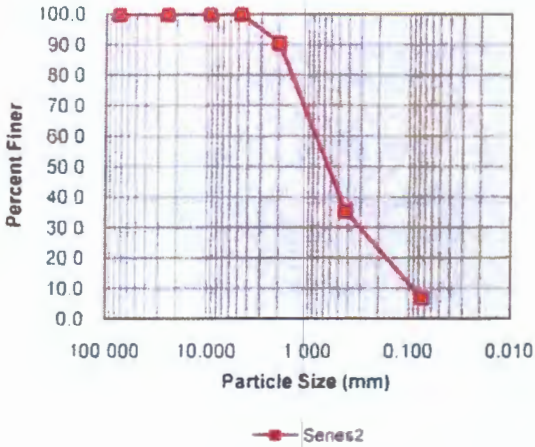
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100 0	
3/8 "	9.500	100 0	
No.4	4 750	100 0	
No. 10	2 000	90 4	
No. 40	0.425	35 5	
No. 200	0 075	6 9	

Grain Size Analysis



Cu	10.0
Cc	1 0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM None

Envirotech

10/12/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID.	OP-15
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/6/2010
Tested By:	L. Hay	Date.	10/8/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	10/11/2010	Date Received:	10/6/2010

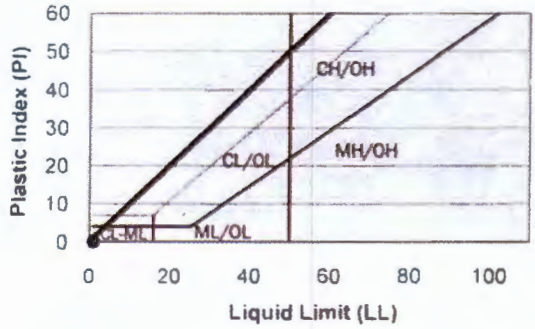
Natural Moisture Content

Natural Moisture	3.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

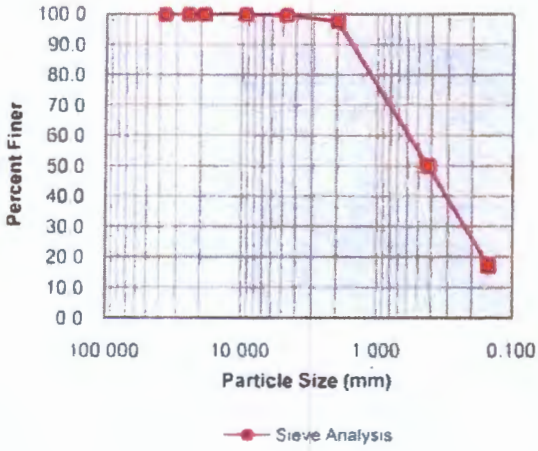
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
1 1/2 "	37.500	100.0	
1 "	25.000	100.0	
3/4 "	19.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.8	
No. 10	2.000	97.7	
No. 40	0.425	50.1	
No. 100	0.150	17.1	
No. 200	0.075	8.2	

Grain Size Analysis



Cu	8.32
Cc	0.97

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/12/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-16
Project:	S013213A00			Sample Description	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/7/2001
Tested By:	L. Hay	Date.	10/8/2010	Sampled By.	R Swenson
Reviewed By	J. Voss	Date.	10/11/2010	Date Received.	10/7/2010

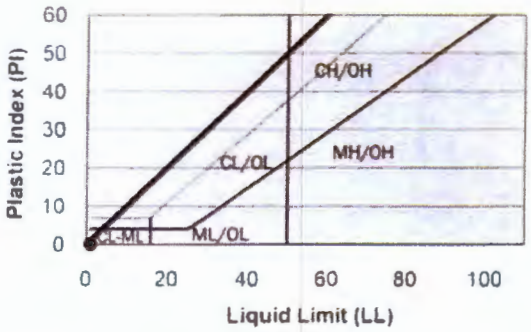
Natural Moisture Content

Natural Moisture	4 7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

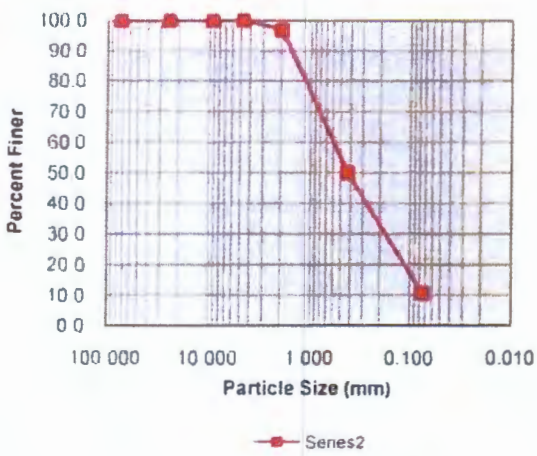
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100.0	
1 "	25 000	100.0	
3/8 "	9 500	100 0	
No.4	4 750	100.0	
No. 10	2 000	96 9	
No. 40	0 425	50.0	
No. 200	0.075	10 8	

Grain Size Analysis



Cu	11 1
Cc	1.2

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM None

Envirotech

10/12/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 74701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name.	Charlie Skiba			Sample ID	OP-17
Project:	S013213A00			Sample Description.	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/7/2001
Tested By:	L. Hay	Date.	10/8/2010	Sampled By.	R. Swenson
Reviewed By.	J. Voss	Date:	10/11/2010	Date Received	10/7/2010

Natural Moisture Content

Natural Moisture	3.9%

Atterberg Limits Test Results (ASTM D-4318)

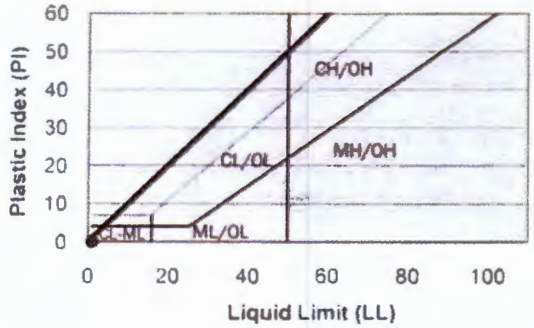
Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

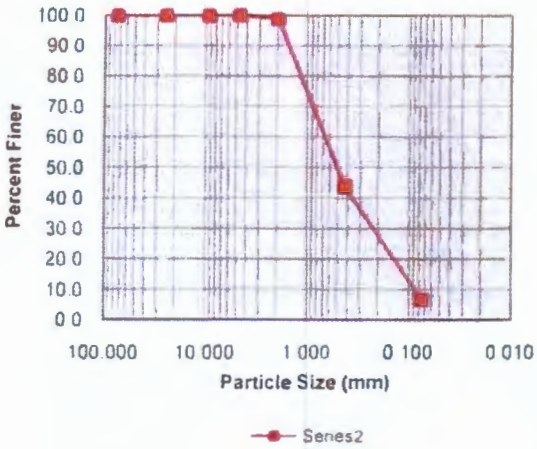
Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.9	
No. 40	0.425	43.7	
No. 200	0.075	6.7	

Cu	8.4
Cc	0.9

Soil Classification Chart



Grain Size Analysis



Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-18
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/7/2001
Tested By	L. Hay	Date:	10/8/2010	Sampled By:	R. Swenson
Reviewed By	J. Voss	Date:	10/11/2010	Date Received	10/7/2010

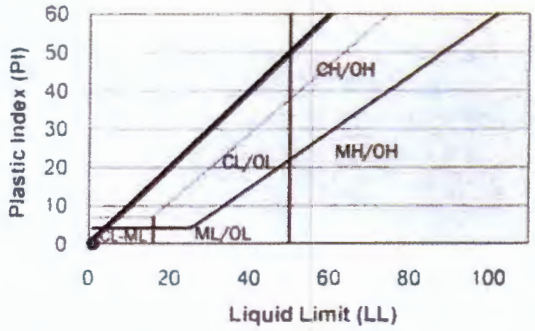
Natural Moisture Content

Natural Moisture	3.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

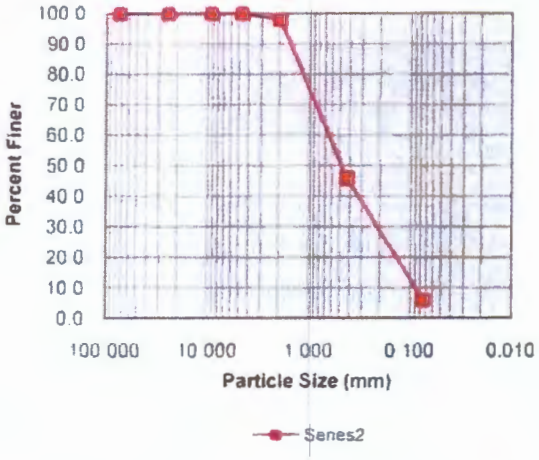
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.0	
No. 40	0.425	46.0	
No. 200	0.075	6.2	

Grain Size Analysis



Cu	7.8
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/11/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-19
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/7/2001
Tested By:	L. Hay	Date	10/8/2010	Sampled By.	R. Swenson
Reviewed By.	J. Voss	Date.	10/11/2010	Date Received.	10/7/2010

Natural Moisture Content

Natural Moisture	4.4%

Atterberg Limits Test Results (ASTM D-4318)

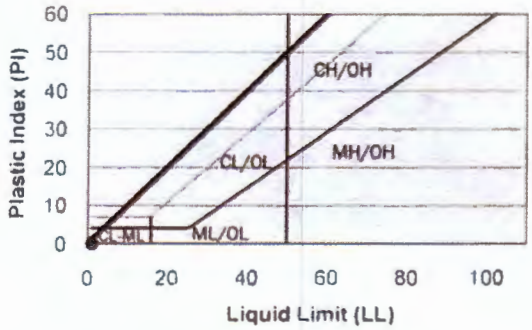
Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

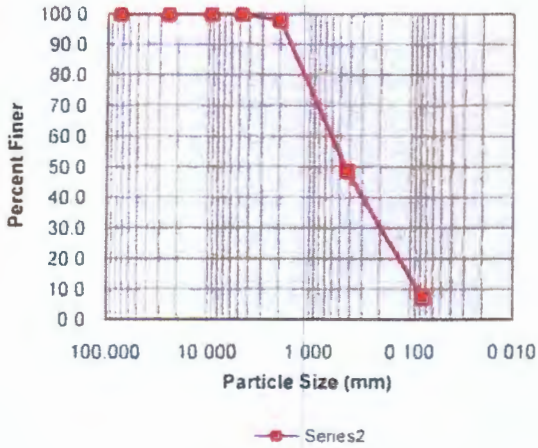
Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100 0	
1 "	25.000	100 0	
3/8 "	9.500	100 0	
No.4	4.750	100 0	
No. 10	2.000	97.8	
No. 40	0 425	48 7	
No. 200	0.075	7 3	

Cu	8.0
Cc	0 9

Soil Classification Chart



Grain Size Analysis



Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM None

Envirotech

10/12/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-20
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/8/2010
Tested By:	L Hay	Date:	10/12/2010	Sampled By:	R Swenson
Reviewed By:	J Voss	Date:	10/13/2010	Date Received:	10/8/2010

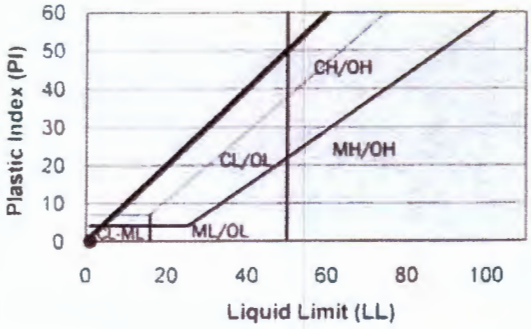
Natural Moisture Content

Natural Moisture	2.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

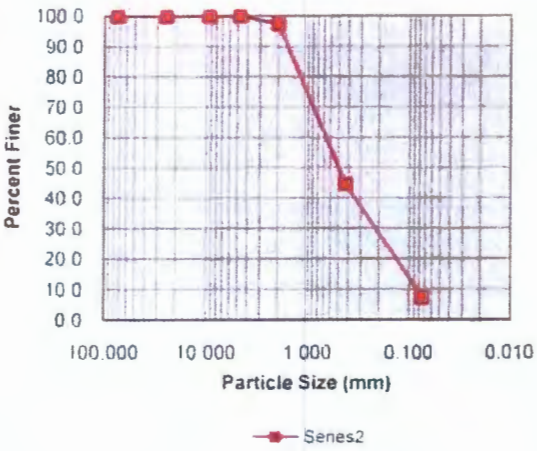
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.4	
No. 40	0.425	44.8	
No. 200	0.075	7.6	

Grain Size Analysis



Cu	9.0
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name.	Charlie Skiba			Sample ID	OP-21
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/8/2010
Tested By:	R. Swenson	Date.	10/14/2010	Sampled By:	R. Swenson
Reviewed By.	J. Voss	Date.	10/15/2010	Date Received.	10/8/2010

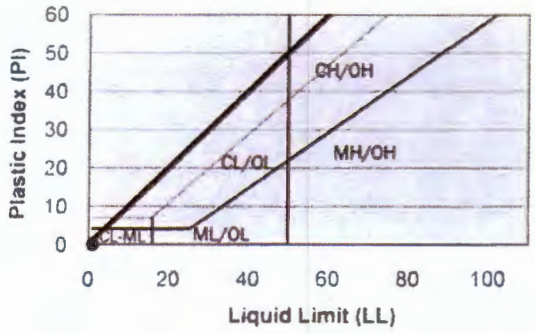
Natural Moisture Content

Natural Moisture	4 1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

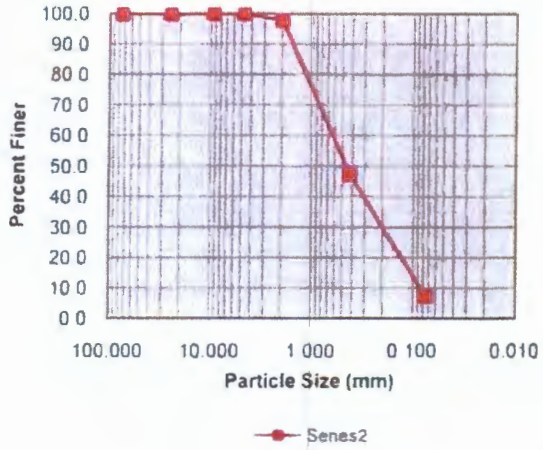
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25 000	100 0	
3/8 "	9.500	100 0	
No.4	4 750	100 0	
No. 10	2.000	97.9	
No. 40	0.425	47.5	
No. 200	0 075	7.4	

Grain Size Analysis



Cu	8 3
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-22
Project	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date	10/8/2010
Tested By:	R. Swenson	Date:	10/14/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/15/2010	Date Received:	10/8/2010

Natural Moisture Content

Natural Moisture	4.4%

Atterberg Limits Test Results (ASTM D-4318)

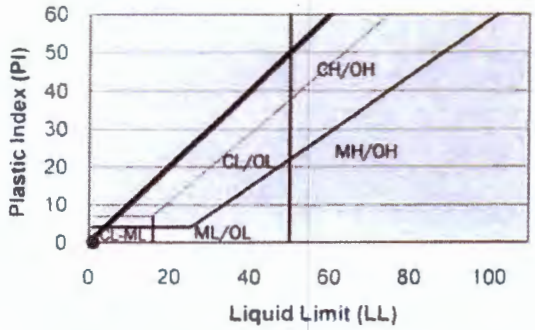
Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

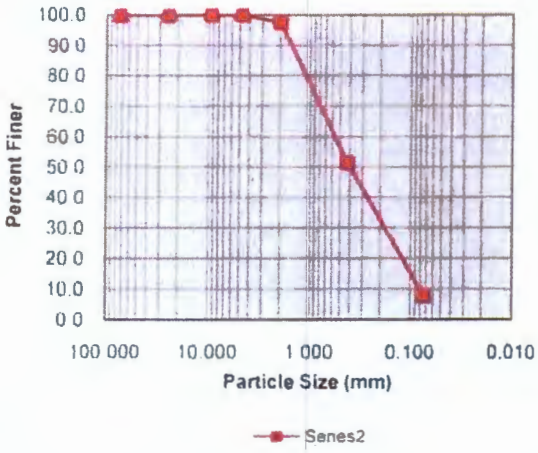
Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.6	
No. 40	0.425	51.5	
No. 200	0.075	8.0	

Cu	7.9
Cc	1.0

Soil Classification Chart



Grain Size Analysis



Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-23
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/8/2010
Tested By:	R. Swenson	Date:	10/14/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/15/2010	Date Received:	10/8/2010

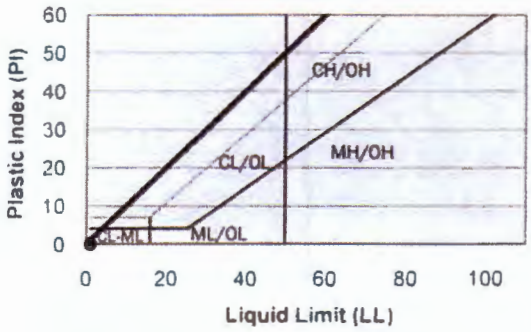
Natural Moisture Content

Natural Moisture	4.3%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

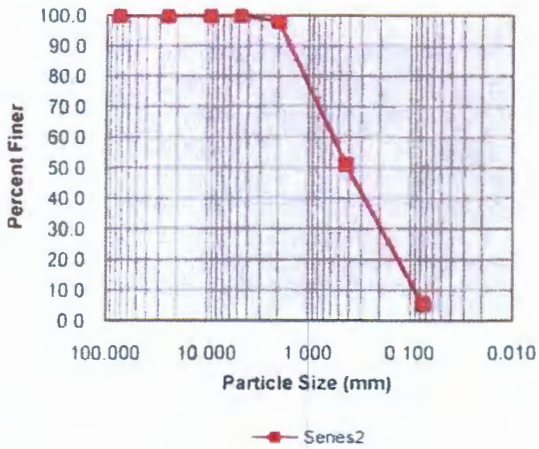
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.0	
No. 40	0.425	51.4	
No. 200	0.075	5.5	

Grain Size Analysis



Cu	6.5
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: **Washington Closure Hanford**
Submittal: **05-18M Operations Lab Testing**

Sample Information

Contact Name	Charlie Skiba			Sample ID	OP-24
Project:	S013213A00			Sample Description	Operations Soil
Project Location	ERDF Cells 9-10			Sampling Date	10/8/2010
Tested By:	R. Swenson	Date	10/14/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/15/2010	Date Received	10/8/2010

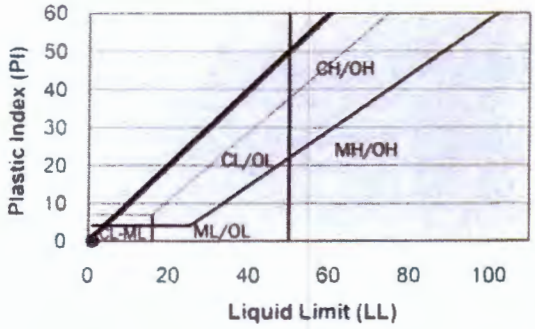
Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

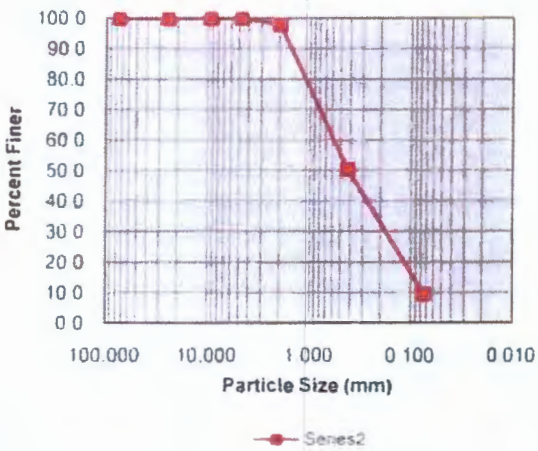
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.0	
No. 40	0.425	50.6	
No. 200	0.075	9.7	

Grain Size Analysis



Cu	9.5
Cc	1.1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

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(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name.	Charlie Skiba			Sample ID	OP-25
Project:	S013213A00			Sample Description.	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date	10/11/2010
Tested By:	R. Swenson	Date.	10/14/2010	Sampled By.	R. Swenson
Reviewed By:	J. Voss	Date.	10/15/2010	Date Received.	10/11/2010

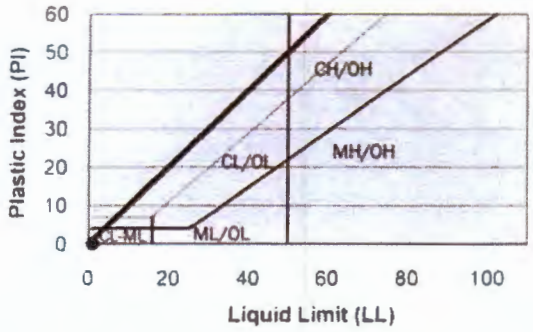
Natural Moisture Content

Natural Moisture	2.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

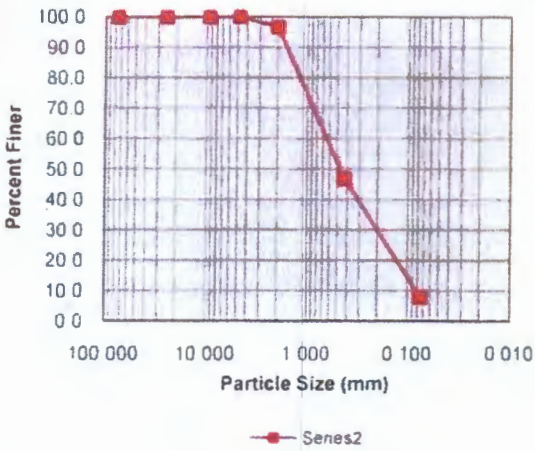
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	96.6	
No. 40	0.425	47.0	
No. 200	0.075	8.1	

Grain Size Analysis



Cu	9.1
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

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(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-26
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/11/2010

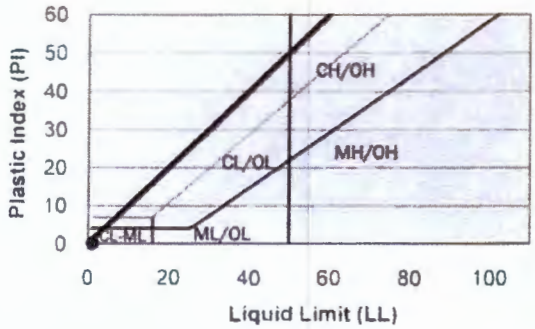
Natural Moisture Content

Natural Moisture	3.3%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

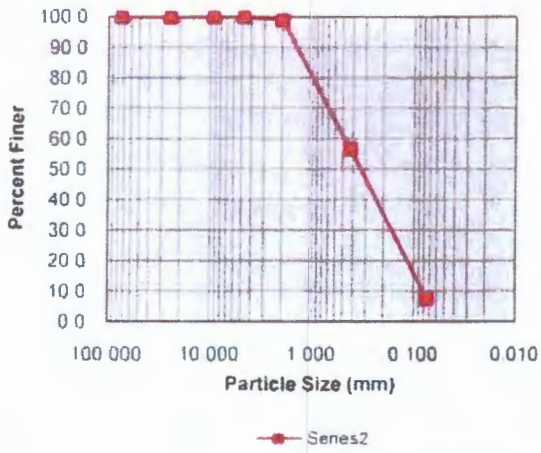
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100 0	
1 "	25 000	100 0	
3/8 "	9 500	100 0	
No.4	4 750	100 0	
No. 10	2 000	99 0	
No. 40	0.425	56 9	
No. 200	0.075	7 7	

Grain Size Analysis



Cu	5.9
Cc	1 1

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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10/18/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-27
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/11/2010

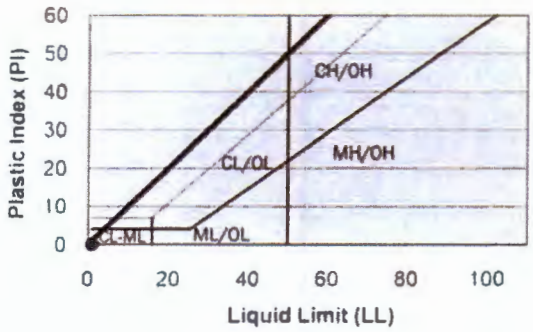
Natural Moisture Content

Natural Moisture	3.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

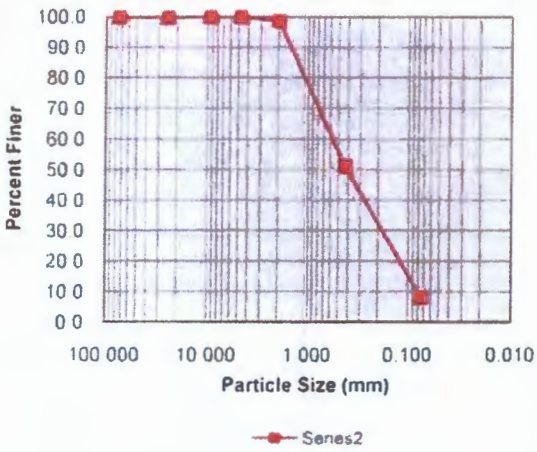
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.8	
No. 40	0.425	51.2	
No. 200	0.075	8.4	

Grain Size Analysis



Cu	8.1
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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10/14/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok. 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-28
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/11/2010

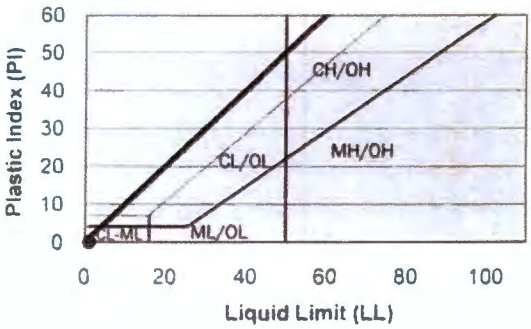
Natural Moisture Content

Natural Moisture	3.4%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

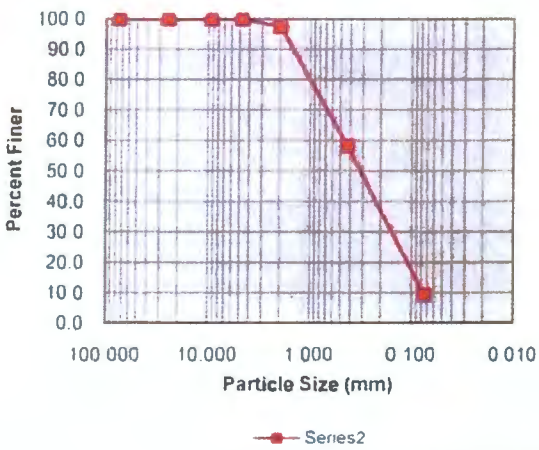
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.6	
No. 40	0.425	58.3	
No. 200	0.075	9.6	

Grain Size Analysis



Cu	6.3
Cc	1.3

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM None

Envirotech

10/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-29
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/11/2010

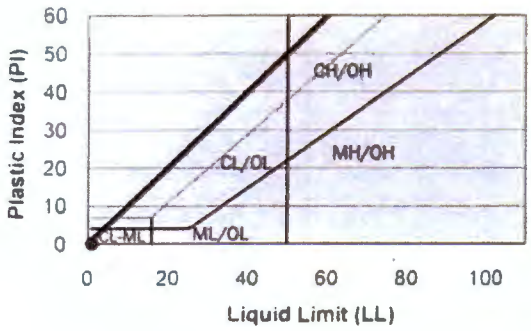
Natural Moisture Content

Natural Moisture	3.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

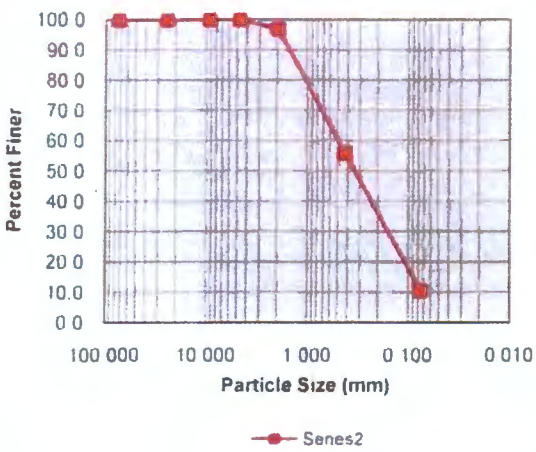
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.0	
No. 40	0.425	55.9	
No. 200	0.075	10.7	

Grain Size Analysis



Cu	8.3
Cc	1.2

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580-234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-30
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received	10/11/2010

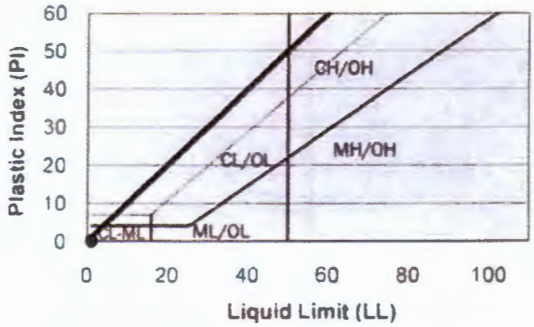
Natural Moisture Content

Natural Moisture	4.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

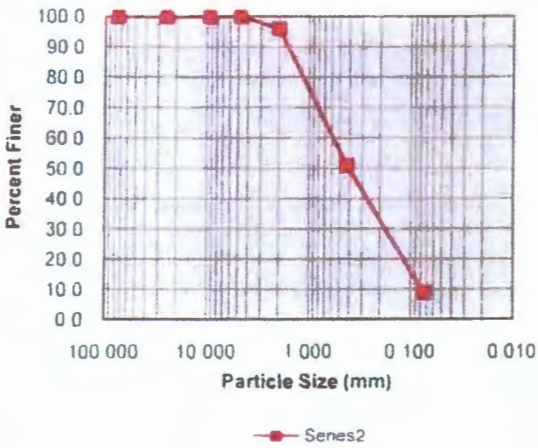
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	96.1	
No. 40	0.425	51.2	
No. 200	0.075	9.1	

Grain Size Analysis



Cu	8.9
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

10/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID.	OP-31
Project:	S013213A00			Sample Description.	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/12/2010
Tested By:	R. Swenson	Date.	10/15/2010	Sampled By.	R. Swenson
Reviewed By:	J. Voss	Date.	10/18/2010	Date Received:	10/12/2010

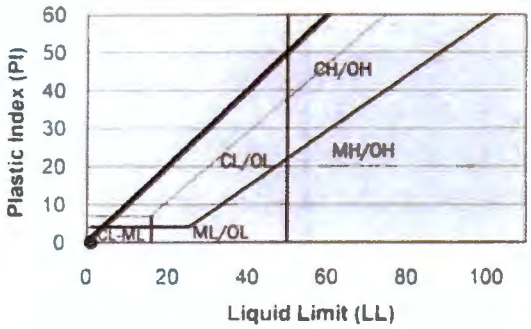
Natural Moisture Content

Natural Moisture	4 7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

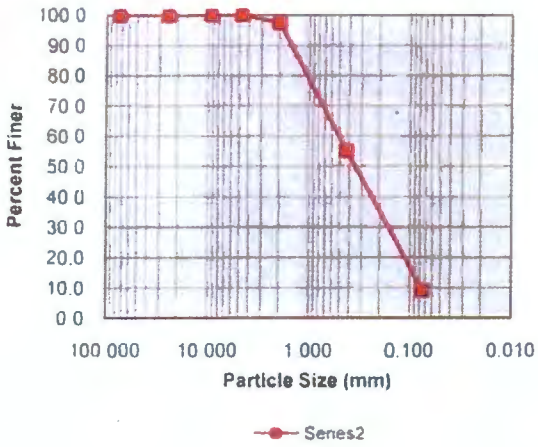
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100 0	
1 "	25 000	•100 0	
3/8 "	9.500	100.0	
No.4	4.750	100 0	
No. 10	2 000	97 4	
No. 40	0.425	55 3	
No. 200	0 075	9 3	

Grain Size Analysis



Cu	7.5
Cc	1 1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM. None

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10/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-32
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/12/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/12/2010

Natural Moisture Content

Natural Moisture	4.4%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

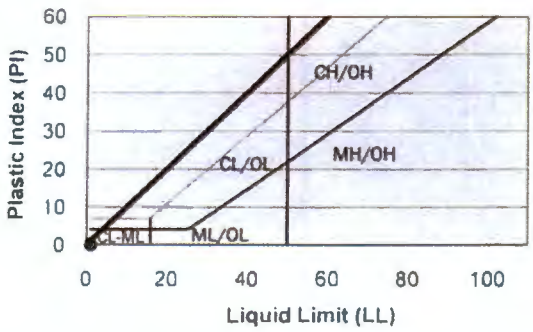
Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	58.2	
No. 200	0.075	13.1	

Cu	9.7
Cc	1.7

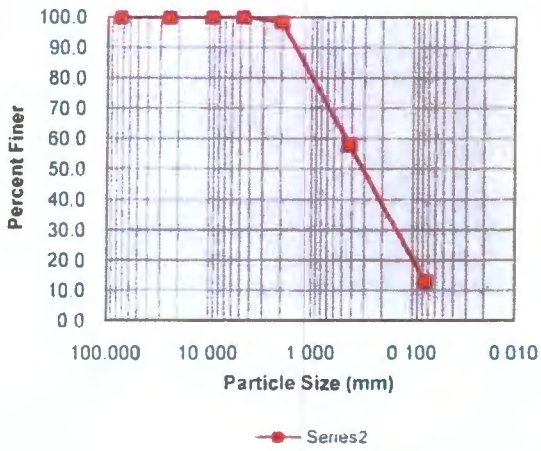
Unified Soil Classification (ASTM D-2487)
SM: Silty Sand

Deviations from ASTM: None

Soil Classification Chart



Grain Size Analysis



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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name.	Charlie Skiba			Sample ID	OP-33
Project:	S013213A00			Sample Description.	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date:	10/12/2010
Tested By:	R. Swenson	Date:	10/18/2010	Sampled By:	R. Swenson
Reviewed By.	J. Voss	Date:	10/19/2010	Date Received	10/12/2010

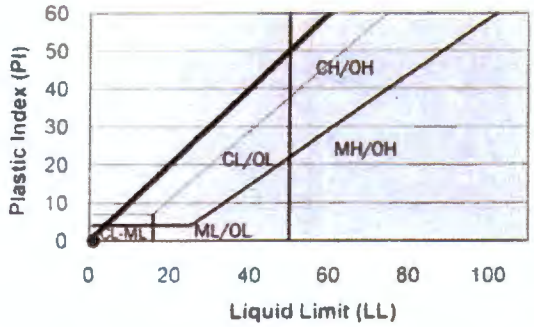
Natural Moisture Content

Natural Moisture	4.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

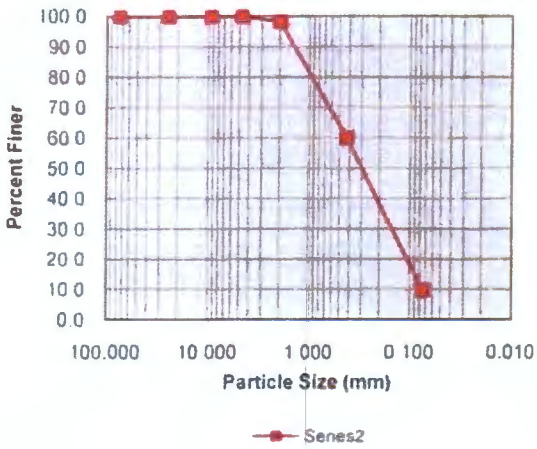
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.3	
No. 40	0.425	60.1	
No. 200	0.075	9.8	

Grain Size Analysis



Cu	5.5
Cc	1.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok. 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-34
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/12/2010
Tested By:	R. Swenson	Date	10/18/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date	10/19/2010	Date Received	10/12/2010

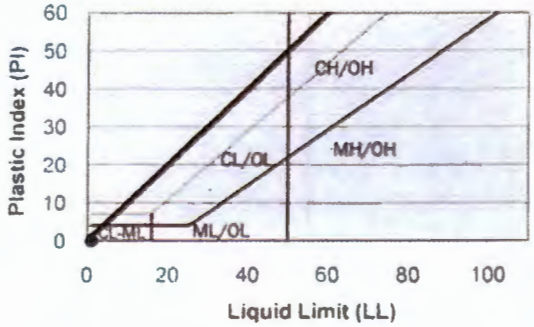
Natural Moisture Content

Natural Moisture	4.3%

Atterberg Limits Test Results (ASTM D-4318)

		Spec
Flow Index	N/A	
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

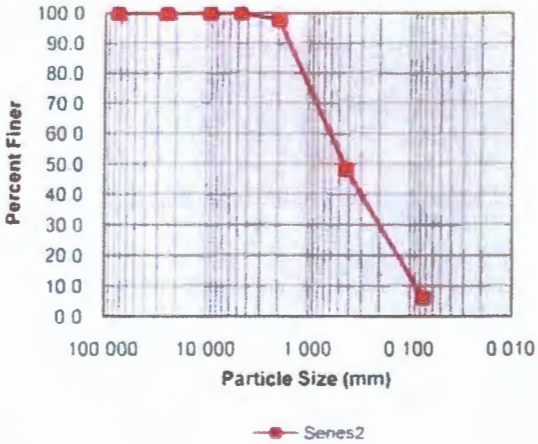
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.9	
No. 40	0.425	48.3	
No. 200	0.075	6.2	

Grain Size Analysis



Cu	7.5
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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10/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

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580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID.	OP-35
Project.	S013213A00			Sample Description	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date:	10/12/2010
Tested By:	R Swenson	Date:	10/18/2010	Sampled By:	R. Swenson
Reviewed By	J. Voss	Date.	10/19/2010	Date Received	10/12/2010

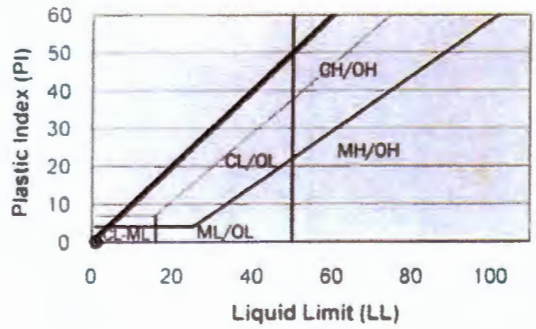
Natural Moisture Content

Natural Moisture	4 6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

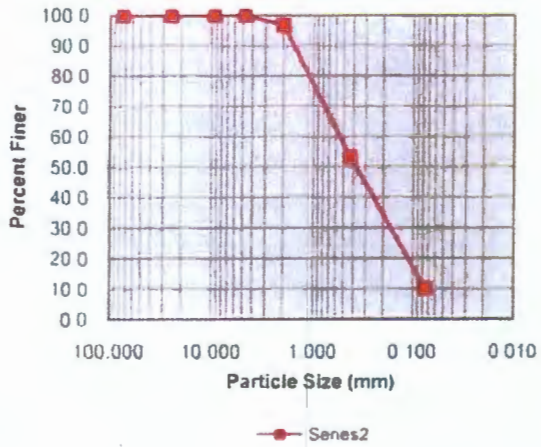
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100.0	
1 "	25.000	100 0	
3/8 "	9.500	100.0	
No 4	4.750	100 0	
No 10	2.000	96 8	
No. 40	0 425	53.2	
No. 200	0 075	10 1	

Grain Size Analysis



Cu	9 1
Cc	1.1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM None

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10/20/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

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(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-36
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/12/2010
Tested By:	R. Swenson	Date	10/19/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date	10/20/2010	Date Received:	10/12/2010

Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

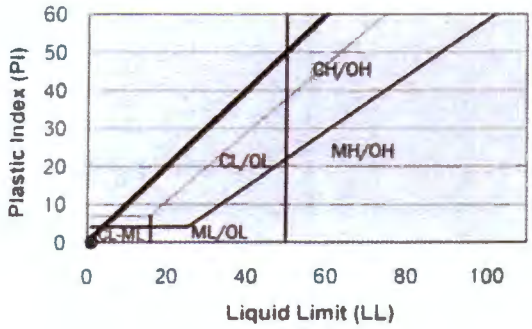
Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.1	
No. 40	0.425	54.7	
No. 200	0.075	9.4	

Cu	7.7
Cc	1.1

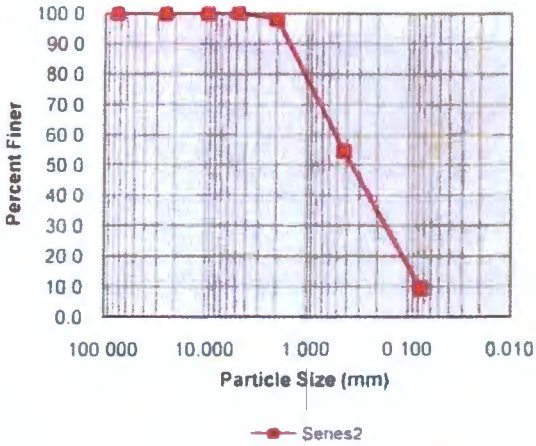
Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Soil Classification Chart



Grain Size Analysis



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SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-37
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	J.Marsh	Date:	10/20/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/21/2010	Date Received:	10/15/2010

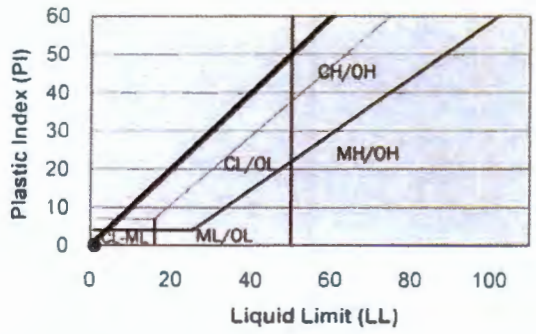
Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

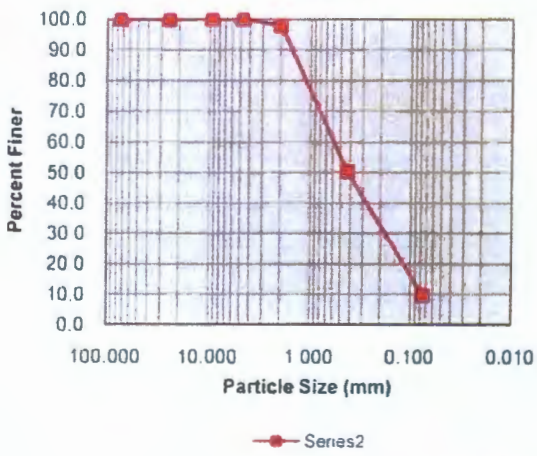
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.0	
No. 40	0.425	50.3	
No. 200	0.075	9.6	

Grain Size Analysis



Cu	9.5
Cc	1.1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4102

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-38
Project:	S013213A00			Sample Description:	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/12/2010
Tested By.	R. Swenson	Date:	10/19/2010	Sampled By	R. Swenson
Reviewed By:	J. Voss	Date.	10/20/2010	Date Received.	10/12/2010

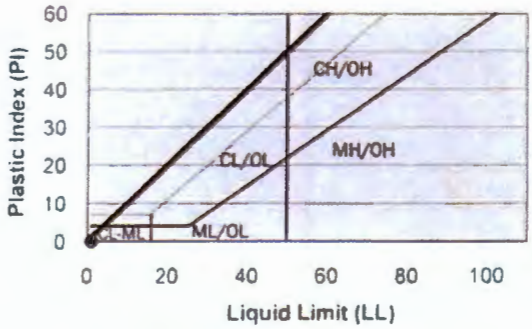
Natural Moisture Content

Natural Moisture	5 3%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

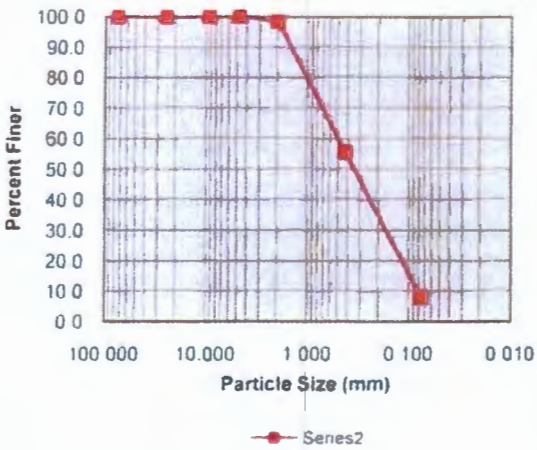
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100 0	
1 "	25 000	100 0	
3/8 "	9.500	100 0	
No 4	4 750	100 0	
No. 10	2 000	98 5	
No 40	0 425	55 7	
No. 200	0.075	8 0	

Grain Size Analysis



Cu	6.5
Cc	1 1

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM None

Envirotech

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-39
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	J.Marsh	Date:	10/20/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/21/2010	Date Received:	10/15/2010

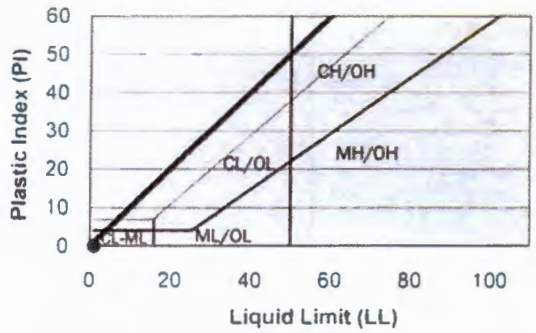
Natural Moisture Content

Natural Moisture	3 7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

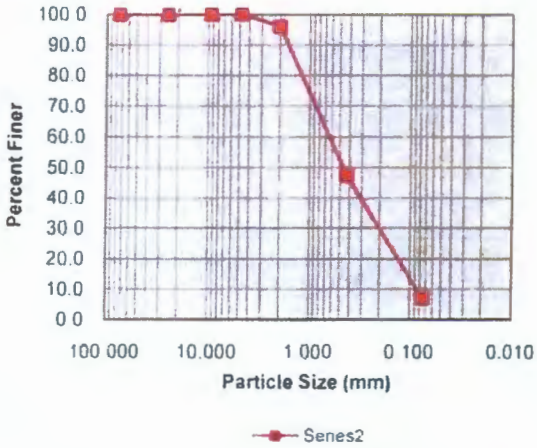
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100.0	
1 "	25.000	100.0	
3/8 "	9 500	100.0	
No.4	4.750	100.0	
No. 10	2.000	96.0	
No. 40	0.425	47 5	
No. 200	0.075	7 1	

Grain Size Analysis



Cu	8.3
Cc	0 9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-40
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	J.Marsh	Date.	10/19/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date.	10/20/2010	Date Received:	10/15/2010

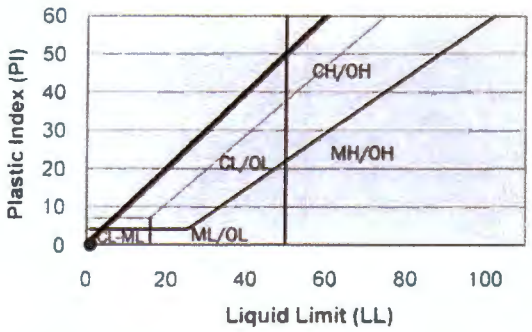
Natural Moisture Content

Natural Moisture	1.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

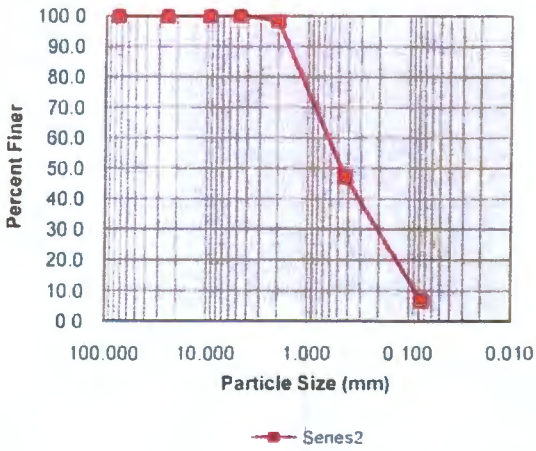
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	47.3	
No. 200	0.075	6.9	

Grain Size Analysis



Cu	8.0
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-41
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	R. Swenson	Date:	10/19/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/20/2010	Date Received:	10/15/2010

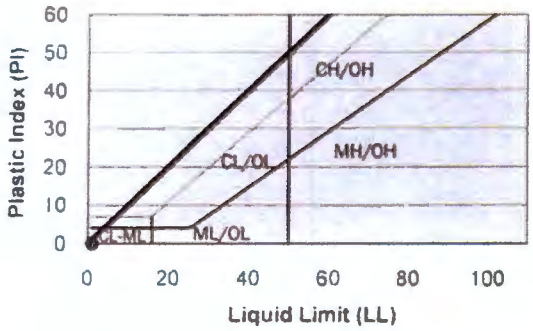
Natural Moisture Content

Natural Moisture	4.0%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

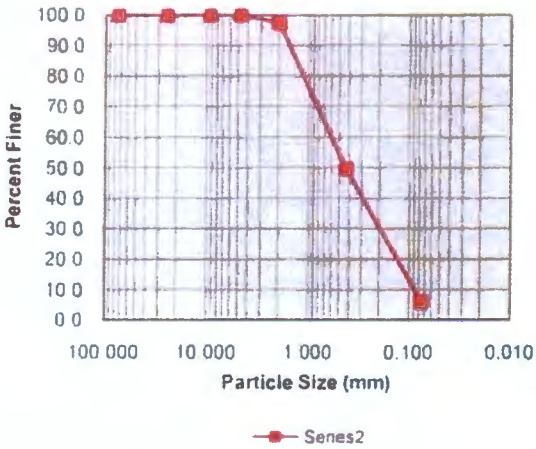
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.4	
No. 40	0.425	49.6	
No. 200	0.075	6.0	

Grain Size Analysis



Cu	7.2
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/20/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-42
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	R. Swenson	Date:	10/19/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date.	10/20/2010	Date Received:	10/15/2010

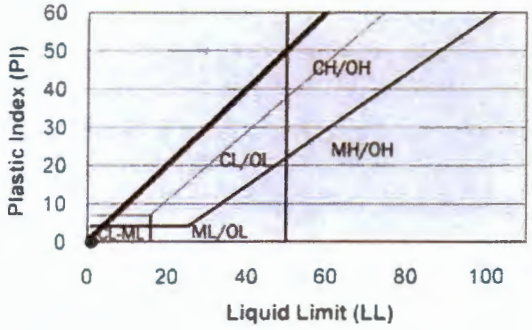
Natural Moisture Content

Natural Moisture	4.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

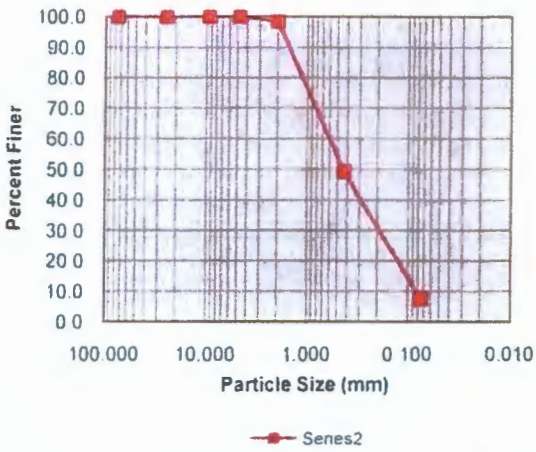
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100 0	
1 "	25 000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	49 2	
No. 200	0.075	7.6	

Grain Size Analysis



Cu	8 1
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID.	OP-43
Project.	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date	10/15/2010
Tested By:	J.Marsh	Date:	10/20/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date.	10/21/2010	Date Received.	10/15/2010

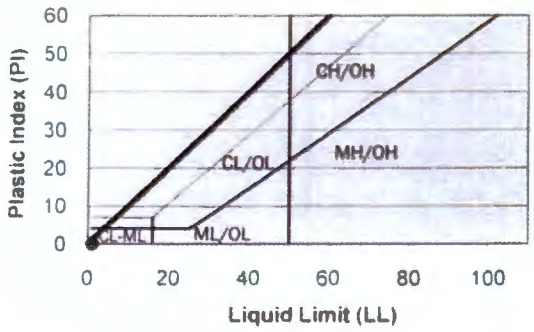
Natural Moisture Content

Natural Moisture	4.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

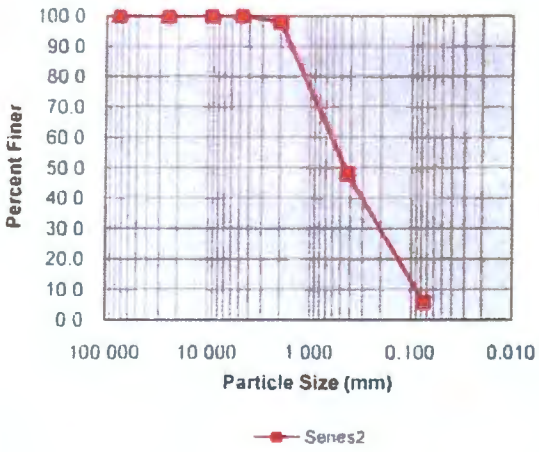
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100 0	
1 "	25 000	100 0	
3/8 "	9.500	100 0	
No.4	4 750	100 0	
No. 10	2.000	97 9	
No. 40	0 425	48 3	
No. 200	0.075	5 9	

Grain Size Analysis



Cu	7 3
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Enviroteech

10/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok. 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-44
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	R. Swenson	Date	10/19/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/20/2010	Date Received:	10/15/2010

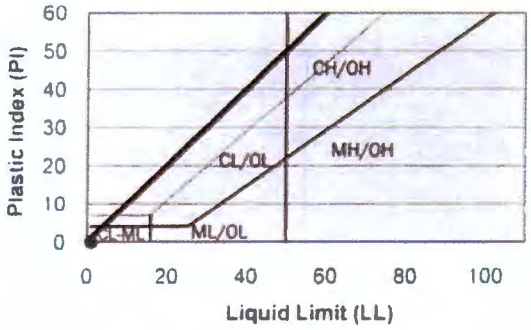
Natural Moisture Content

Natural Moisture	4.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

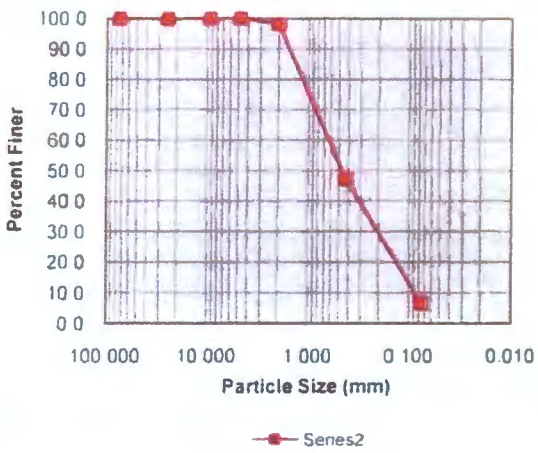
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.1	
No. 40	0.425	47.3	
No. 200	0.075	6.7	

Grain Size Analysis



Cu	7.9
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

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(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-45
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By:	J. Marsh	Date	10/21/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date	10/22/2010	Date Received:	10/18/2010

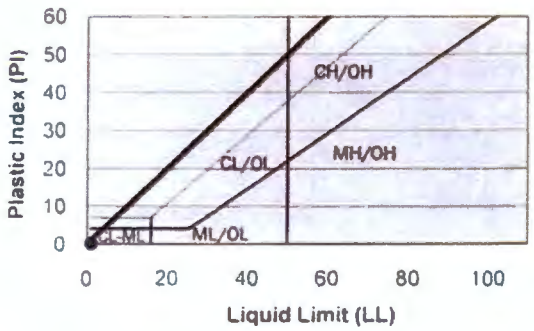
Natural Moisture Content

Natural Moisture	1.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

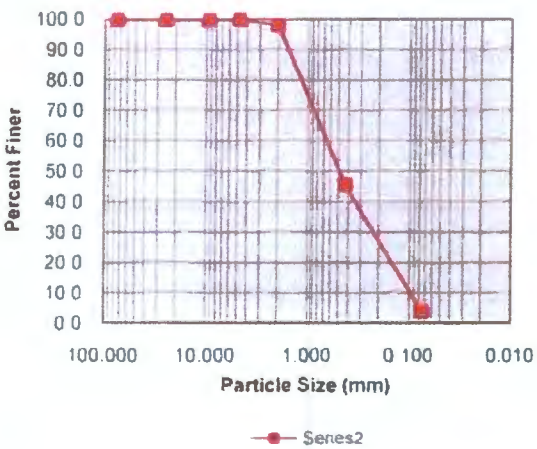
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	45.8	
No. 200	0.075	4.1	

Grain Size Analysis



Cu	6.8
Cc	0.8

Unified Soil Classification (ASTM D-2487)
SP: Poorly-graded sand

Deviations from ASTM: None

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10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID	OP-46
Project:	S013213A00			Sample Description.	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By.	J. Marsh	Date:	10/21/2010	Sampled By	R. Swenson
Reviewed By.	J. Voss	Date:	10/22/2010	Date Received.	10/18/2010

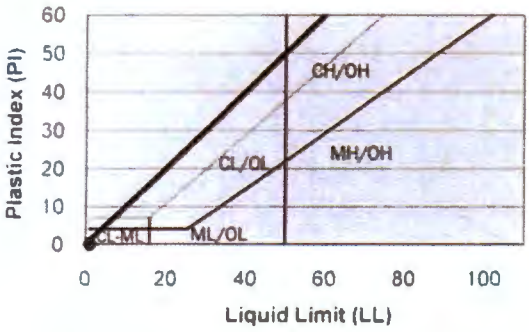
Natural Moisture Content

Natural Moisture	3.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

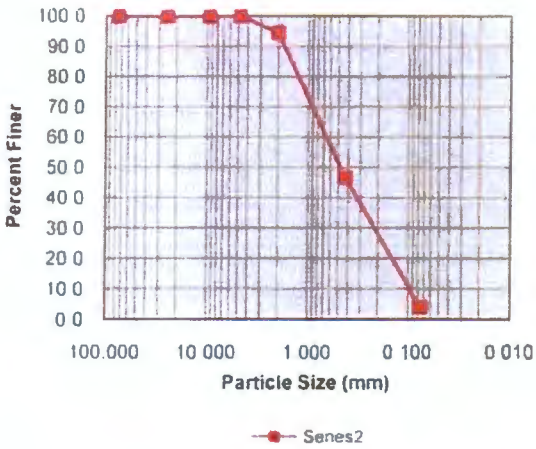
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100 0	
1 "	25.000	100 0	
3/8 "	9.500	100 0	
No.4	4 750	100 0	
No. 10	2 000	94 5	
No. 40	0 425	47 0	
No 200	0 075	4 3	

Grain Size Analysis



Cu	7 0
Cc	0 8

Unified Soil Classification (ASTM D-2487)
SP: Poorly-graded sand

Deviations from ASTM: None

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10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580-234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name.	Charlie Skiba			Sample ID	OP-47
Project:	S013213A00			Sample Description:	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/18/2010
Tested By:	J. Marsh	Date:	10/21/2010	Sampled By:	R. Swenson
Reviewed By.	J Voss	Date	10/22/2010	Date Received	10/18/2010

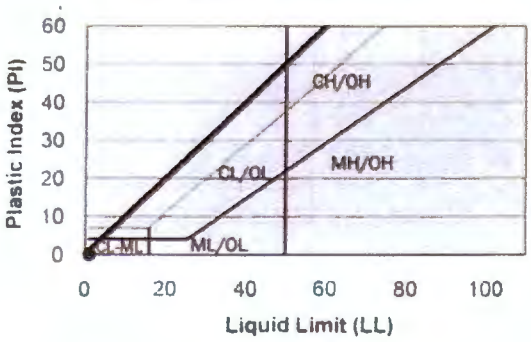
Natural Moisture Content

Natural Moisture	3 9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

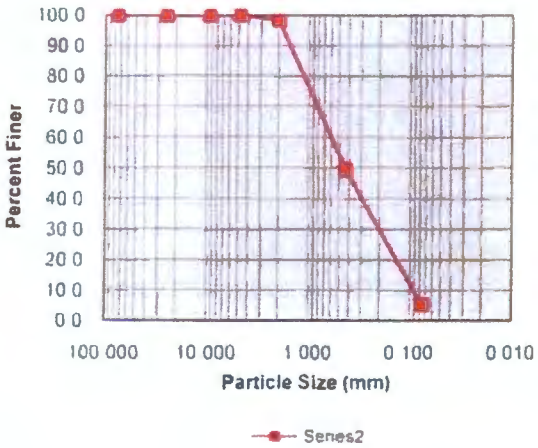
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100 0	
1 "	25 000	100 0	
3/8 "	9 500	100 0	
No.4	4 750	100.0	
No. 10	2 000	98 5	
No. 40	0 425	49.6	
No. 200	0 075	5.5	

Grain Size Analysis



Cu	6 9
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM None

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10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2700 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-48
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By:	J. Marsh	Date	10/21/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/22/2010	Date Received:	10/18/2010

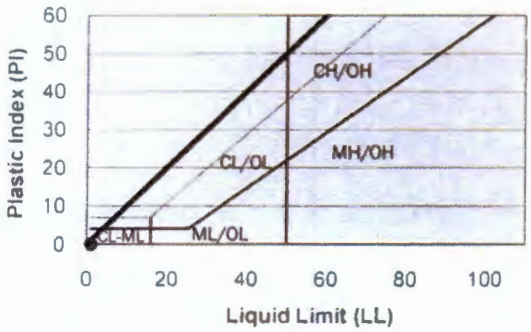
Natural Moisture Content

Natural Moisture	3.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

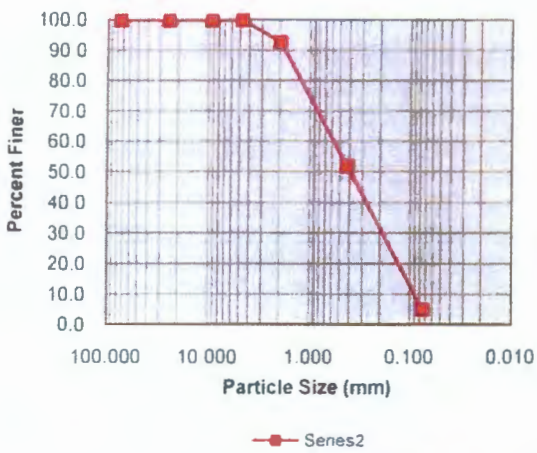
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100 0	
1 "	25.000	100.0	
3/8 "	9.500	100 0	
No.4	4.750	100.0	
No. 10	2.000	92 9	
No. 40	0.425	52.1	
No. 200	0.075	5 4	

Grain Size Analysis



Cu	6.7
Cc	0.8

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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12/20/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, Ok. 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-49
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By:	J. Marsh	Date:	10/21/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/22/2010	Date Received:	10/18/2010

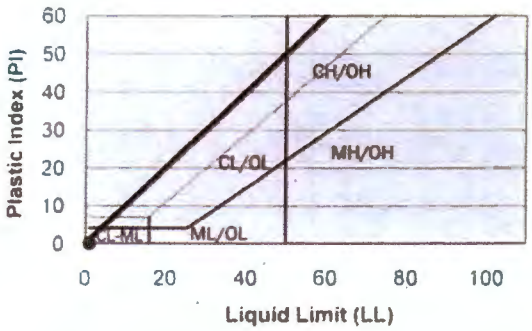
Natural Moisture Content

Natural Moisture	4.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

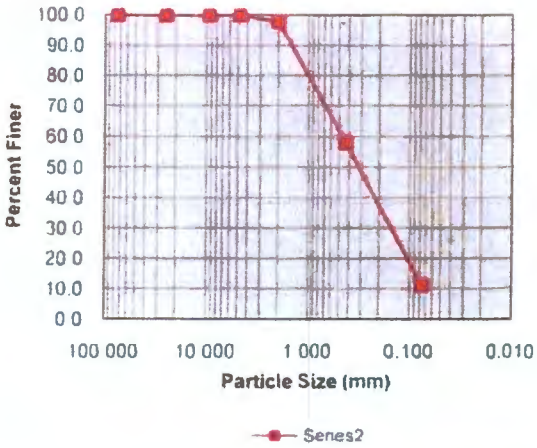
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.9	
No. 40	0.425	58.2	
No. 200	0.075	11.3	

Grain Size Analysis



Cu	7.6
Cc	1.4

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name.	Charlie Skiba			Sample ID	OP-50
Project.	S013213A00			Sample Description.	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By:	J. Marsh	Date:	10/22/2010	Sampled By	R. Swenson
Reviewed By:	J. Voss	Date:	10/25/2010	Date Received	10/18/2010

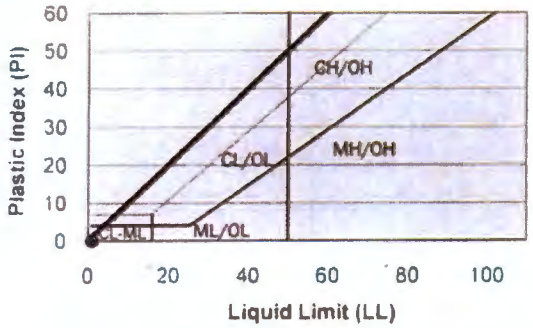
Natural Moisture Content

Natural Moisture	2.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

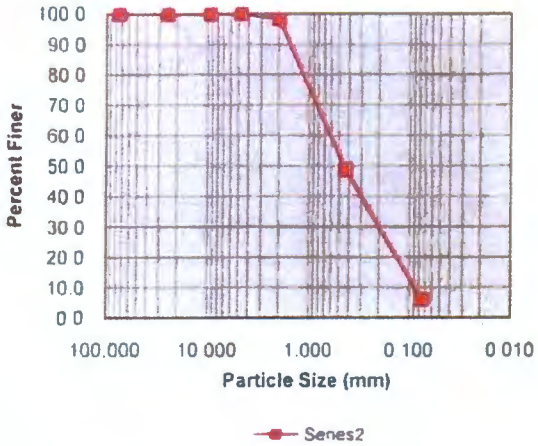
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.3	
No. 40	0.425	48.9	
No. 200	0.075	6.2	

Grain Size Analysis



Cu	7.4
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

10/26/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-51
Project:	S013213A00			Sample Description.	Operations Soil
Project Location.	ERDF Cells 9-10			Sampling Date:	10/19/2010
Tested By:	J. Marsh	Date.	10/21/2010	Sampled By:	J. Marsh
Reviewed By.	J. Voss	Date	10/22/2010	Date Received.	10/19/2010

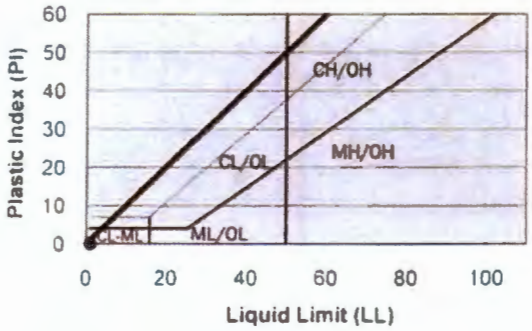
Natural Moisture Content

Natural Moisture	3.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

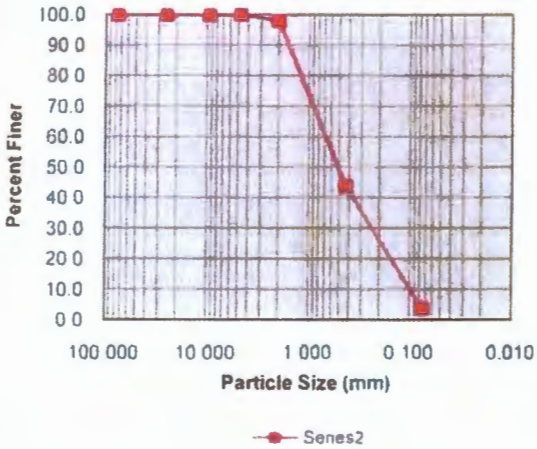
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75 000	100.0	
1 "	25 000	100.0	
3/8 "	9.500	100.0	
No.4	4 750	100 0	
No. 10	2.000	98.0	
No. 40	0 425	43.9	
No. 200	0.075	4 0	

Grain Size Analysis



Cu	7 0
Cc	0 8

Unified Soil Classification (ASTM D-2487)
SP: Poorly-graded sand

Deviations from ASTM: None

Envirotech

10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-52
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/19/2010
Tested By:	J. Marsh	Date	10/21/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	10/22/2010	Date Received:	10/19/2010

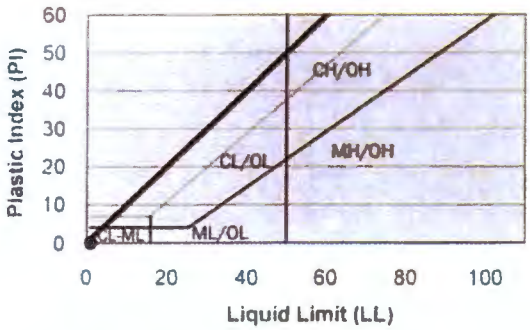
Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

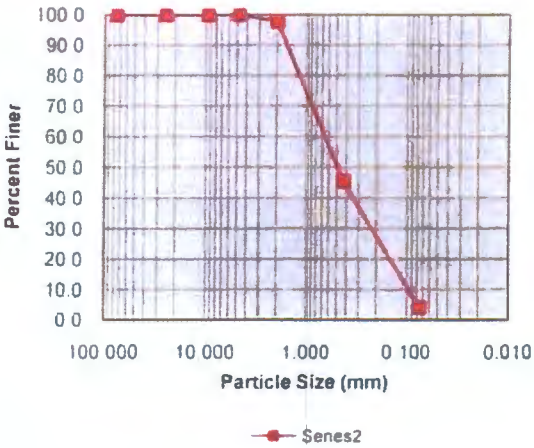
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1"	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.8	
No. 40	0.425	45.6	
No. 200	0.075	4.3	

Grain Size Analysis



Cu	7.0
Cc	0.8

Unified Soil Classification (ASTM D-2487)
SP: Poorly-graded sand

Deviations from ASTM: None

Envirotech

10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-53
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/19/2010
Tested By:	J. Marsh	Date:	10/21/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date	10/22/2010	Date Received:	10/19/2010

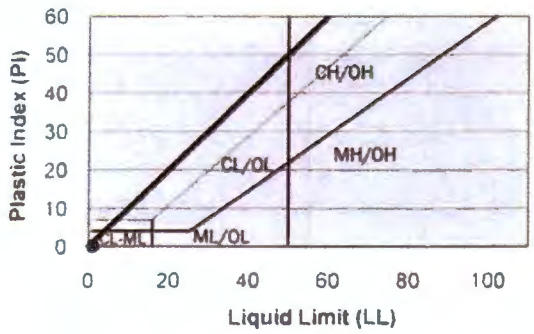
Natural Moisture Content

Natural Moisture	4.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

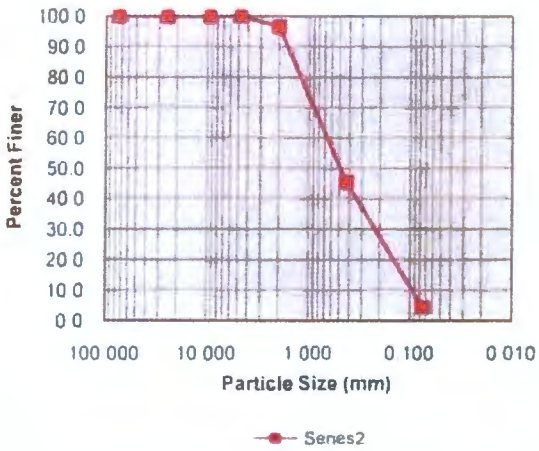
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	96.7	
No. 40	0.425	45.6	
No. 200	0.075	4.7	

Grain Size Analysis



Cu	7.2
Cc	0.8

Unified Soil Classification (ASTM D-2487)
SP: Poorly-graded sand

Deviations from ASTM: None

Envirotech

10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-54
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/19/2010
Tested By:	J. Marsh	Date:	10/21/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	10/22/2010	Date Received:	10/19/2010

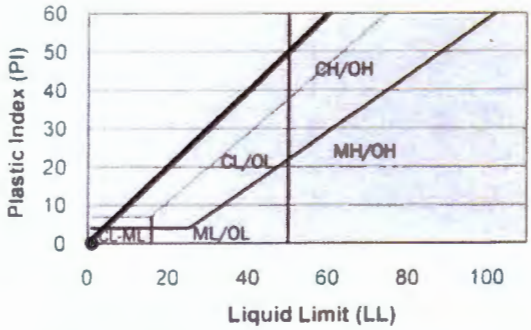
Natural Moisture Content

Natural Moisture	4.0%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

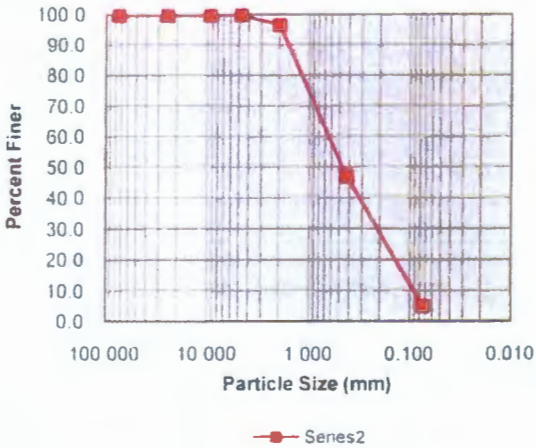
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	96.6	
No. 40	0.425	47.2	
No. 200	0.075	5.1	

Grain Size Analysis



Cu	7.2
Cc	0.8

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM. None

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12/20/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-55
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/19/2010
Tested By:	J. Marsh	Date:	10/22/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	10/25/2010	Date Received:	10/19/2010

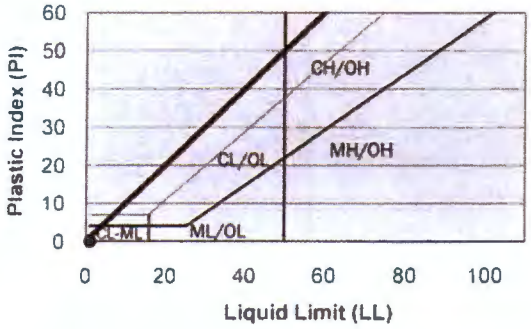
Natural Moisture Content

Natural Moisture	5.4%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

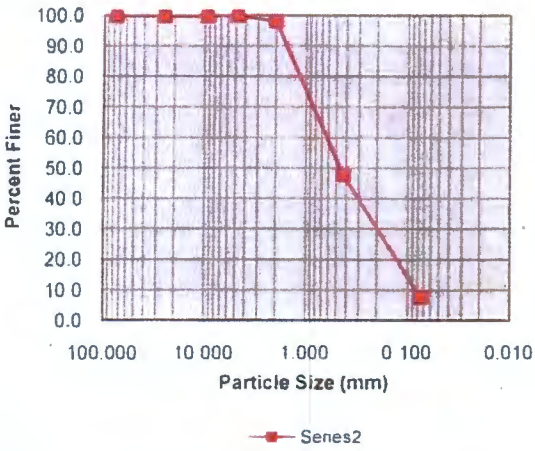
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.4	
No. 40	0.425	47.9	
No. 200	0.075	8.0	

Grain Size Analysis



Cu	8.7
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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10/26/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-56
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/29/2010
Tested By:	L. Hay	Date:	11/2/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	11/3/2010	Date Received:	10/29/2010

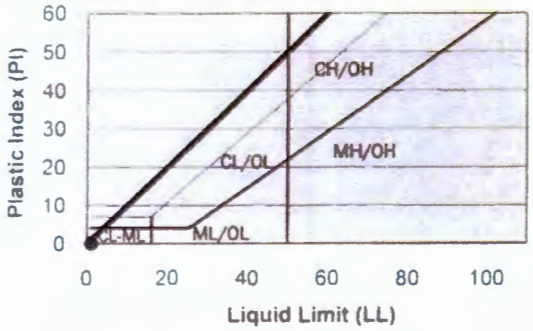
Natural Moisture Content

Natural Moisture	5.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

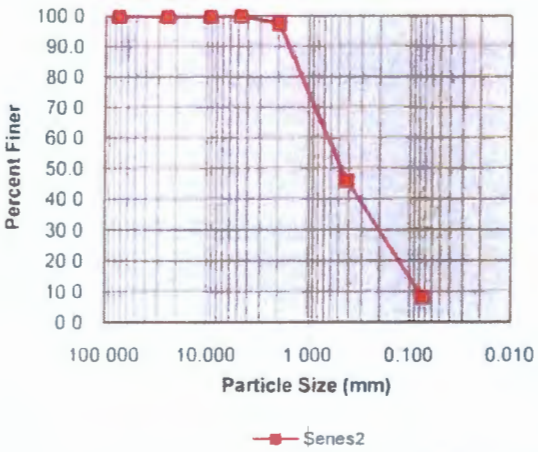
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3"	75.000	100.0	
1."	25.000	100.0	
3/8"	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.4	
No. 40	0.425	46.2	
No. 200	0.075	8.4	

Grain Size Analysis



Cu	9.4
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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12/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-57
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/29/2010
Tested By:	L. Hay	Date:	11/2/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	11/3/2010	Date Received:	10/29/2010

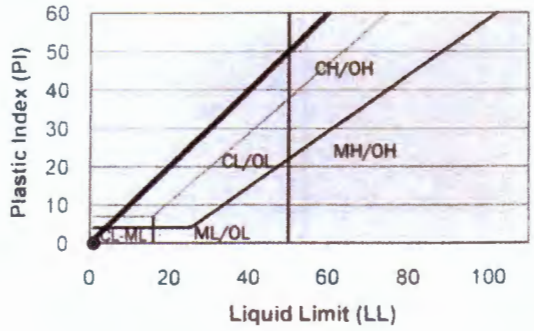
Natural Moisture Content

Natural Moisture	4.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

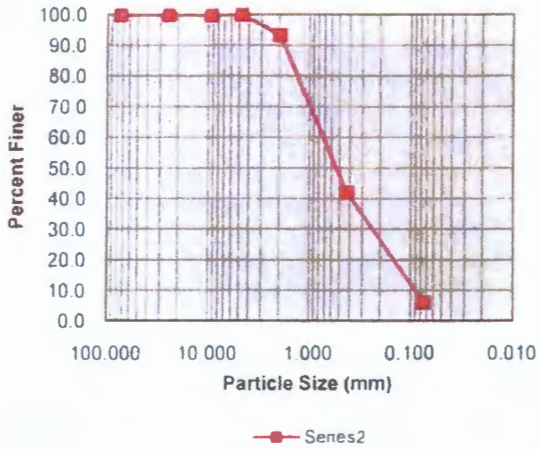
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	93.4	
No. 40	0.425	42.2	
No. 200	0.075	6.3	

Grain Size Analysis



Cu	8.8
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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12/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-58
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/29/2010
Tested By:	L. Hay	Date:	11/2/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	11/3/2010	Date Received:	10/29/2010

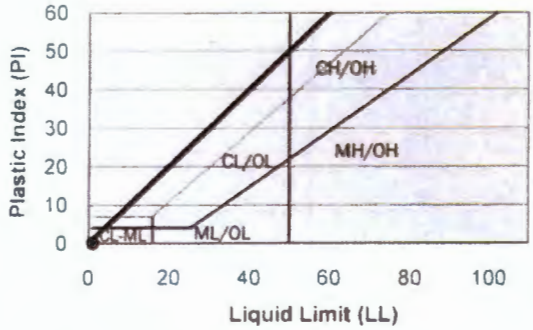
Natural Moisture Content

Natural Moisture	5.6%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

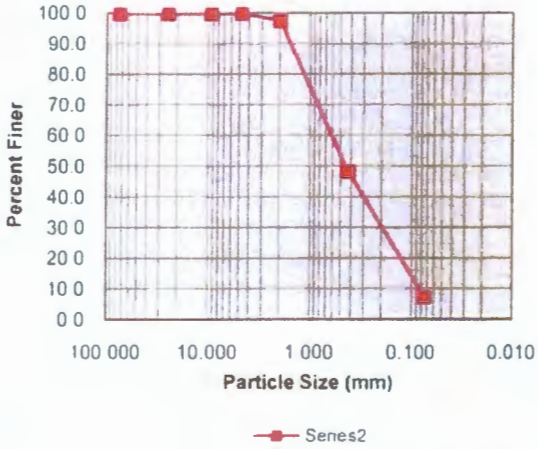
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.7	
No. 40	0.425	48.3	
No. 200	0.075	7.4	

Grain Size Analysis



Cu	8.2
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-59
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/29/2010
Tested By:	L. Hay	Date:	11/2/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	11/3/2010	Date Received:	10/29/2010

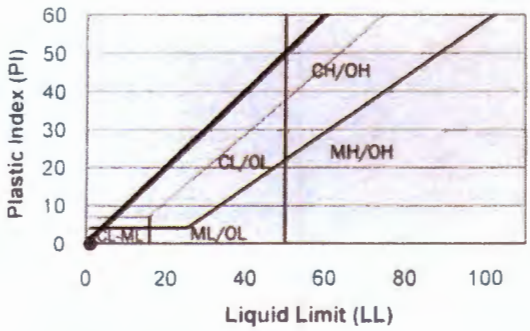
Natural Moisture Content

Natural Moisture	4.7%

Atterberg Limits Test Results (ASTM D-4318)

		Spec
Flow Index	N/A	
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

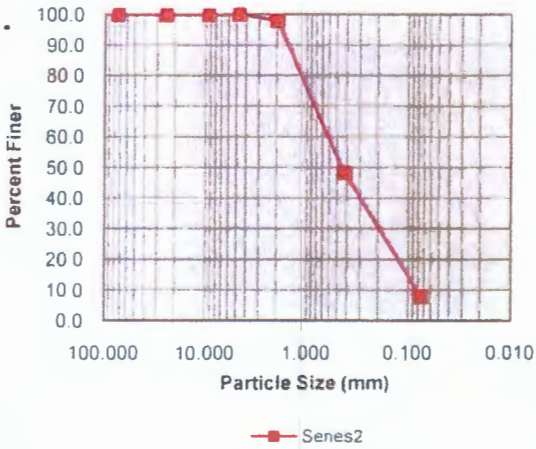
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.0	
No. 40	0.425	48.4	
No. 200	0.075	8.2	

Grain Size Analysis



Cu	8.8
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

11/2/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-60
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/29/2010
Tested By:	L. Hay	Date:	11/1/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	11/3/2010	Date Received:	10/29/2010

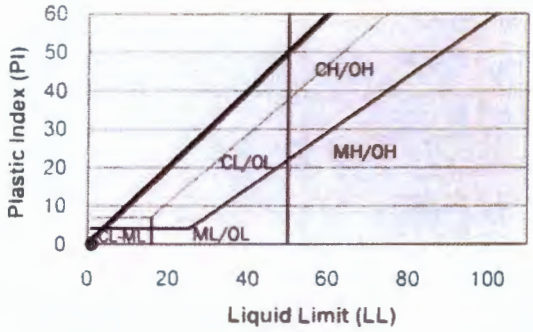
Natural Moisture Content

Natural Moisture	4.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

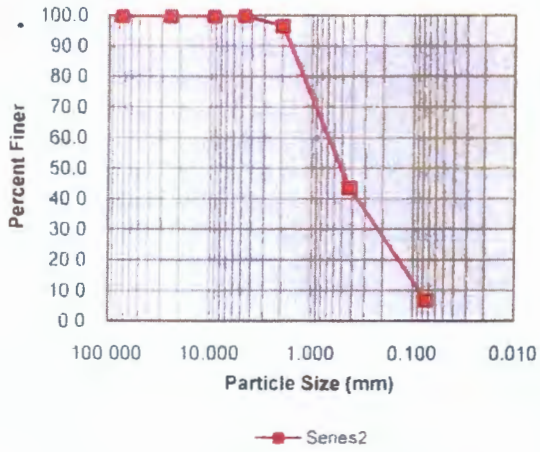
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	96.6	
No. 40	0.425	43.9	
No. 200	0.075	7.0	

Grain Size Analysis



Cu	8.7
Cc	0.9

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

12/21/10

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-61
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/10/2010
Tested By:	J. Schut	Date:	11/22/2010	Sampled By:	T. Williams
Reviewed By:	J. Voss	Date:	11/29/2010	Date Received:	11/10/2010

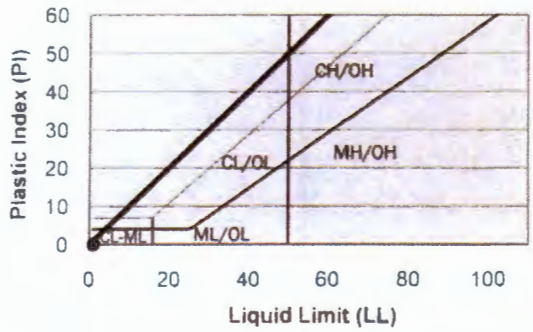
Natural Moisture Content

Natural Moisture	3.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

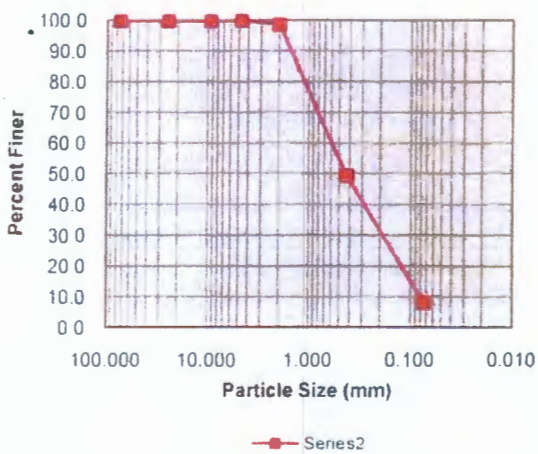
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.7	
No. 40	0.425	49.4	
No. 200	0.075	8.3	

Grain Size Analysis



Cu	8.5
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

12/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-62
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/10/2010
Tested By:	J. Schut	Date:	11/22/2010	Sampled By:	T. Williams
Reviewed By:	J. Voss	Date:	11/29/2010	Date Received:	11/10/2010

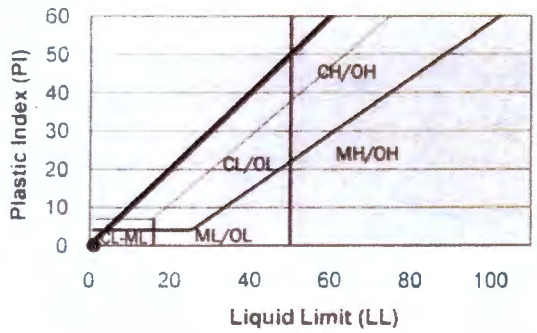
Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

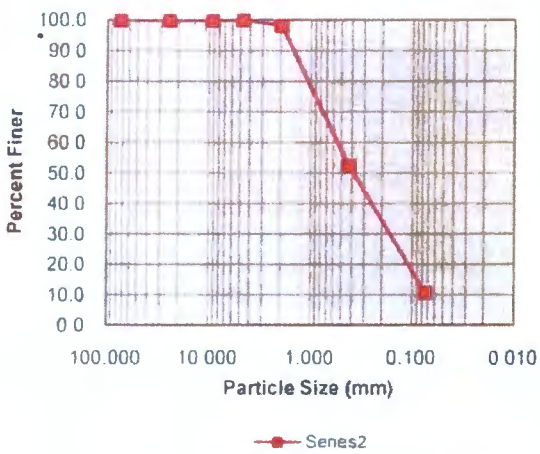
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.2	
No. 40	0.425	52.5	
No. 200	0.075	11.0	

Grain Size Analysis



Cu	10.2
Cc	1.2

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Envirotech

12/20/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-63
Project:	S013213A00			Sample Description	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/10/2010
Tested By:	J. Schut	Date:	11/22/2010	Sampled By:	T. Williams
Reviewed By:	J. Voss	Date:	11/29/2010	Date Received:	11/10/2010

Natural Moisture Content

Natural Moisture	4.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

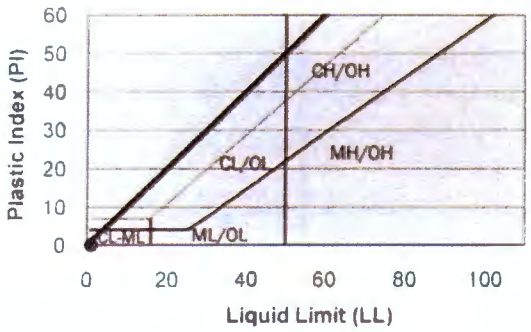
Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100 0	
3/8 "	9.500	100.0	
No.4	4 750	100 0	
No. 10	2.000	96 8	
No. 40	0.425	50.8	
No. 200	0.075	9 7	

Cu	9.6
Cc	1.1

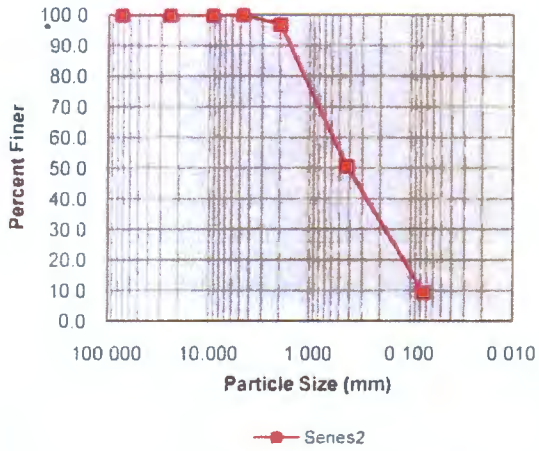
Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

Soil Classification Chart



Grain Size Analysis



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12/21/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-64
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/10/2010
Tested By:	J. Schut	Date:	11/16/2010	Sampled By:	T. Williams
Reviewed By:	J. Voss	Date:	12/14/2010	Date Received:	11/10/2010

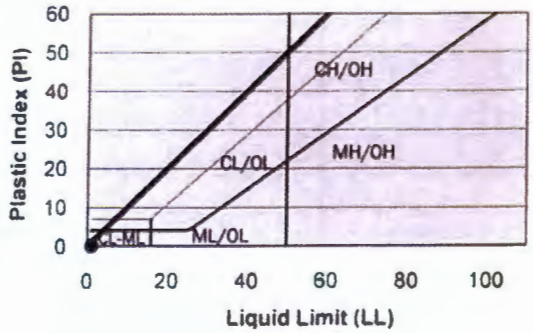
Natural Moisture Content

Natural Moisture	4.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

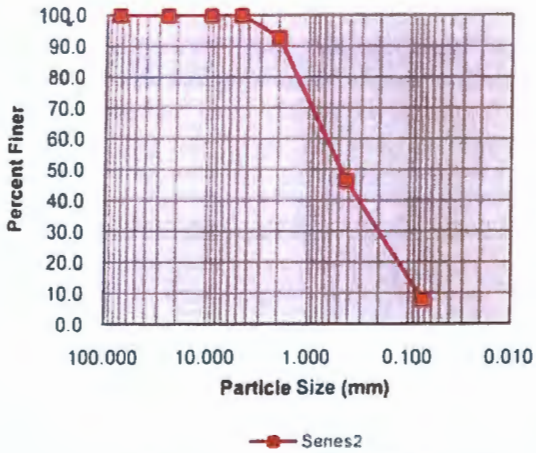
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	92.7	
No. 40	0.425	46.3	
No. 200	0.075	7.9	

Grain Size Analysis



Cu	N/A
Cc	N/A

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with Silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N 11th Street | Enid, Ok 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-65
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/12/2010
Tested By:	J. Schut	Date:	11/22/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	11/29/2010	Date Received:	11/12/2010

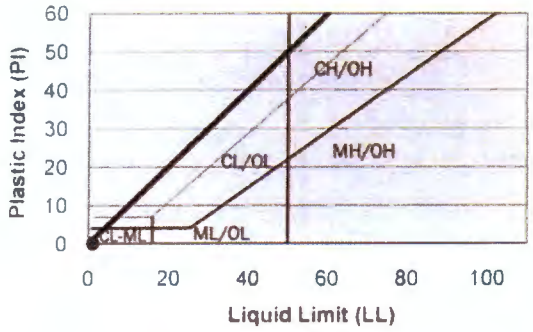
Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

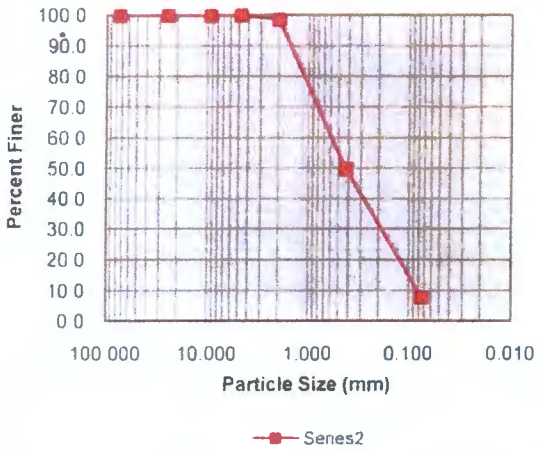
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4 750	100.0	
No. 10	2.000	98.6	
No. 40	0.425	49 9	
No. 200	0 075	7.9	

Grain Size Analysis



Cu	8.2
Cc	1.0

Unified Soil Classification (ASTM D-2487)
SW-SM: Well-graded sand with silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-66
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/19/2010
Tested By:	J. Schut	Date:	11/20/2010	Sampled By:	T. Williams
Reviewed By:	J. Voss	Date:	12/14/2010	Date Received:	11/19/2010

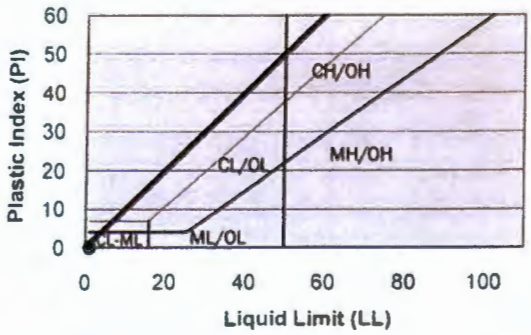
Natural Moisture Content

Natural Moisture	4.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

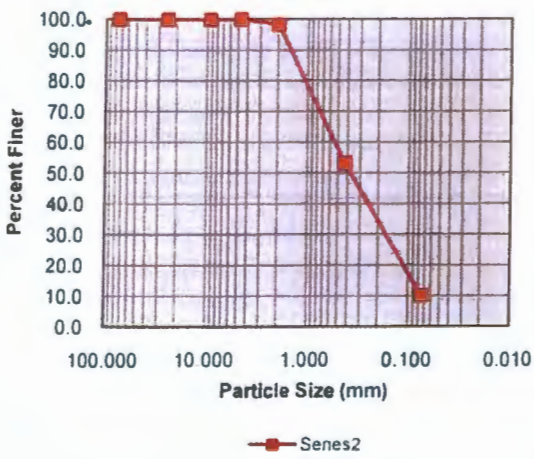
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.3	
No. 40	0.425	53.2	
No. 200	0.075	10.4	

Grain Size Analysis



Cu	2.8
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with Silt

Deviations from ASTM: None

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SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-67
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/19/2010
Tested By:	J. Schut	Date:	11/20/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/14/2010	Date Received:	11/19/2010

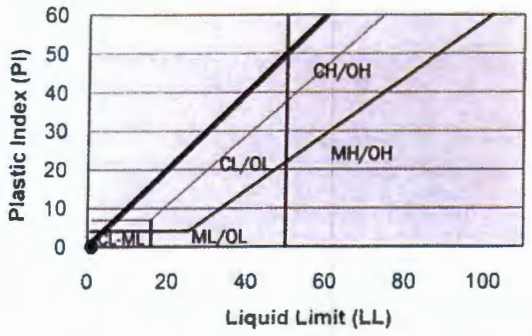
Natural Moisture Content

Natural Moisture	5.0%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

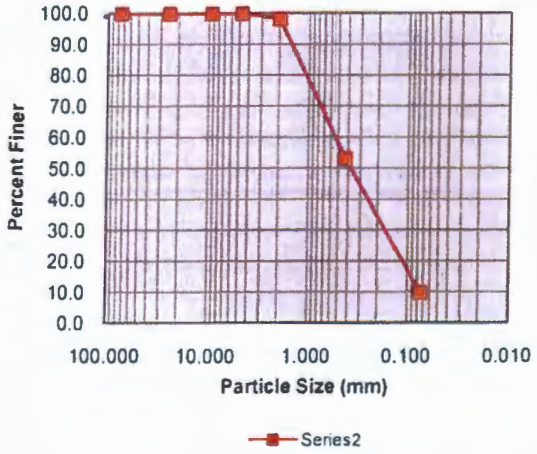
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.2	
No. 40	0.425	53.2	
No. 200	0.075	9.8	

Grain Size Analysis



Cu	2.8
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with Silt

Deviations from ASTM: None

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12/14/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-68
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/19/2010
Tested By:	J. Schut	Date:	11/20/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/14/2010	Date Received:	11/19/2010

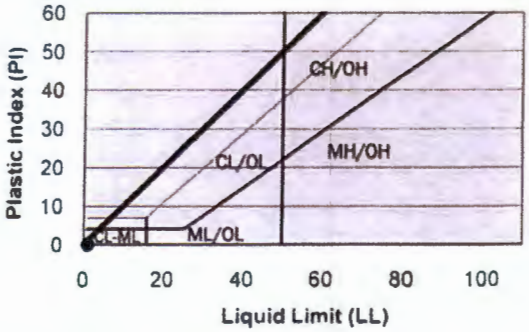
Natural Moisture Content

Natural Moisture	4.1%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

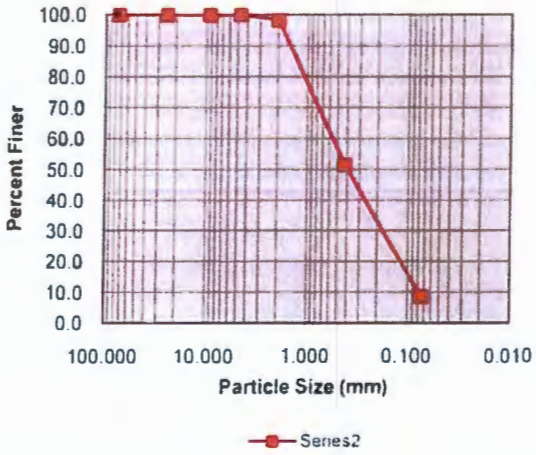
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.2	
No. 40	0.425	51.6	
No. 200	0.075	8.8	

Grain Size Analysis



Cu	2.9
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with Silt

Deviations from ASTM: None

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12/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-69
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/19/2010
Tested By:	J. Schut	Date:	11/20/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/14/2010	Date Received:	11/19/2010

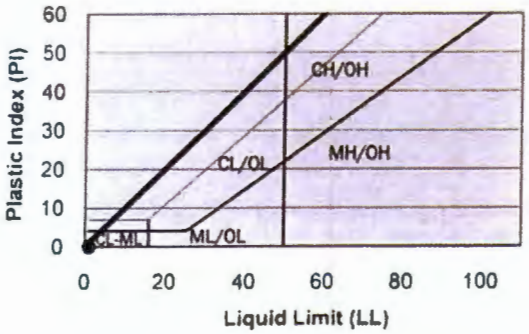
Natural Moisture Content

Natural Moisture	3.8%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

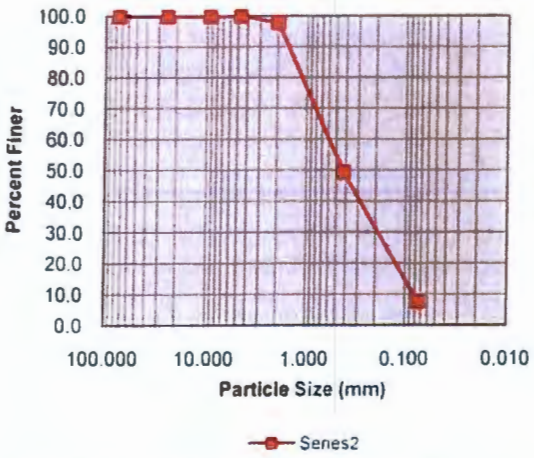
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	97.8	
No. 40	0.425	49.5	
No. 200	0.075	7.8	

Grain Size Analysis



Cu	2.9
Cc	0.3

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with Silt

Deviations from ASTM: None

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Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-70
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/18/2010
Tested By:	J. Schut	Date	11/20/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/14/2010	Date Received:	11/18/2010

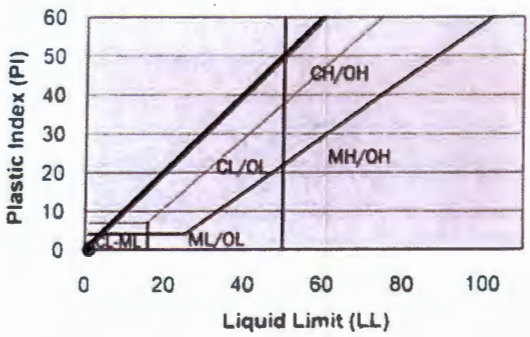
Natural Moisture Content

Natural Moisture	5.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

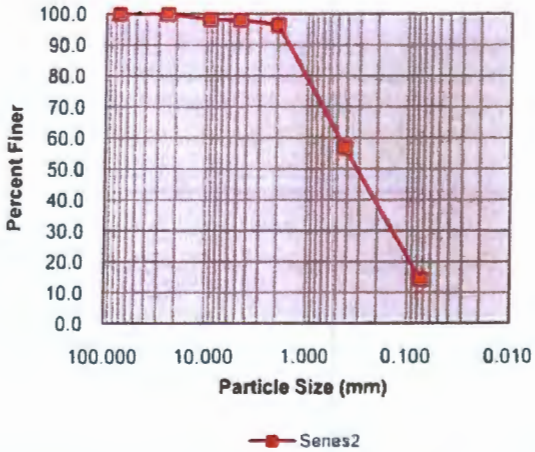
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	98.3	
No.4	4.750	98.0	
No. 10	2.000	96.5	
No. 40	0.425	57.1	
No. 200	0.075	14.5	

Grain Size Analysis



Cu	2.7
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SM: Silty Sand

Deviations from ASTM: None

Envirotech

12/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-71
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/10/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/15/2010	Date Received:	12/8/2010

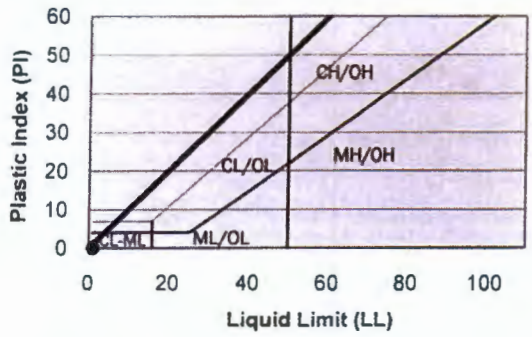
Natural Moisture Content

Natural Moisture	5.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

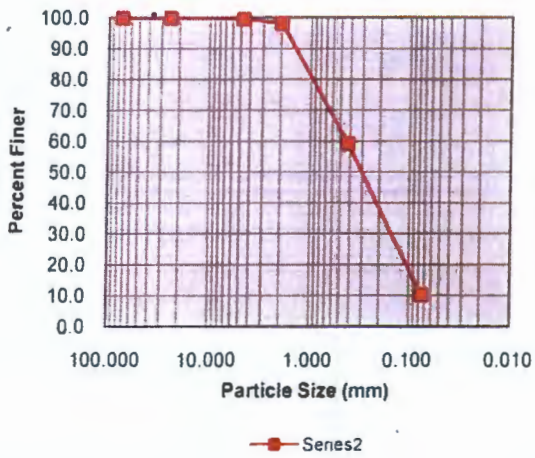
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.6	
No. 10	2.000	98.2	
No. 40	0.425	59.3	
No. 200	0.075	10.4	

Grain Size Analysis



Cu	2.1
Cc	0.5

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

12/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-72
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/10/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/15/2010	Date Received:	12/8/2010

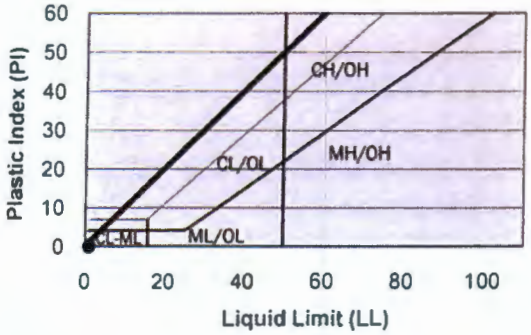
Natural Moisture Content

Natural Moisture	4.9%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

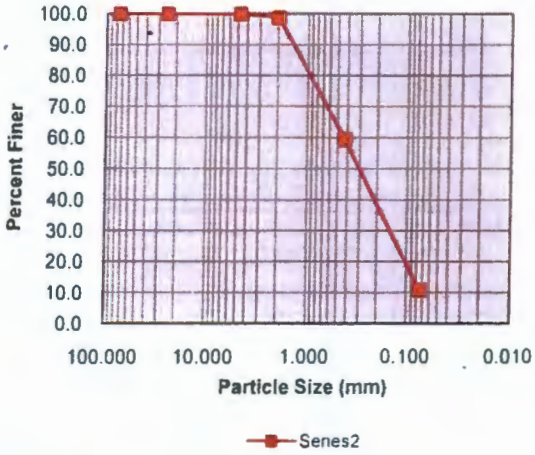
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	100.0	
No. 10	2.000	98.7	
No. 40	0.425	59.5	
No. 200	0.075	11.0	

Grain Size Analysis



Cu	2.1
Cc	0.5

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH
2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-73
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/10/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/15/2010	Date Received:	12/8/2010

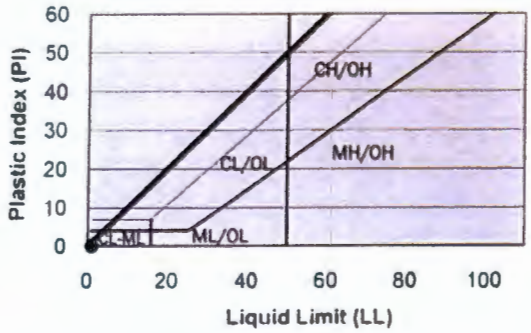
Natural Moisture Content

Natural Moisture	4.8%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

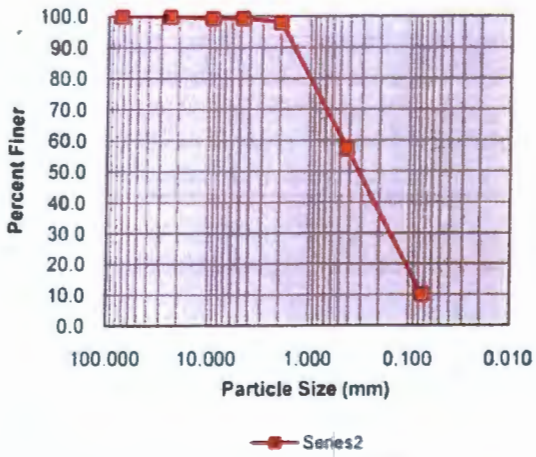
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	99.5	
No.4	4.750	99.4	
No. 10	2.000	98.0	
No. 40	0.425	57 3	
No. 200	0.075	10 2	

Grain Size Analysis



Cu	2.4
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

Envirotech

12/19/10
Date

SOIL CLASSIFICATION (ASTM D-2487)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-74
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/10/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/15/2010	Date Received:	12/8/2010

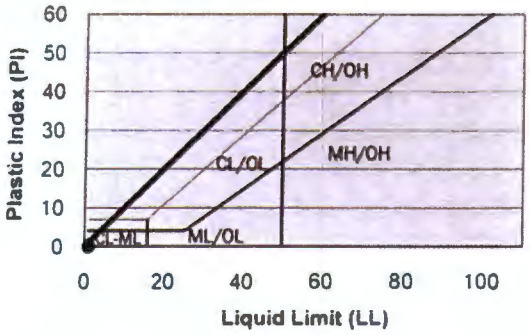
Natural Moisture Content

Natural Moisture	4.2%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

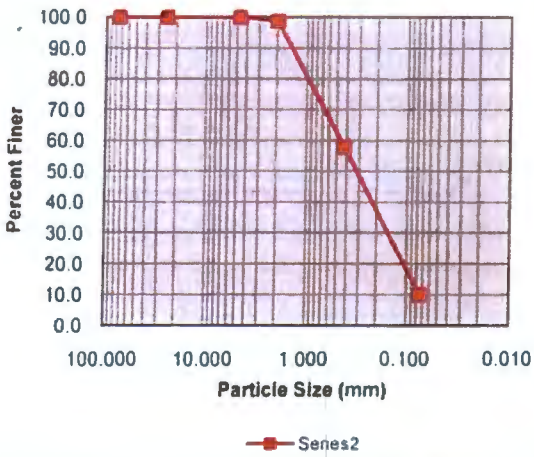
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.9	
No. 10	2.000	98.6	
No. 40	0.425	57.9	
No. 200	0.075	10.3	

Grain Size Analysis



Cu	2.3
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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SOIL CLASSIFICATION (ASTM D-2487)

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Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-75
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date	12/10/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/15/2010	Date Received:	12/8/2010

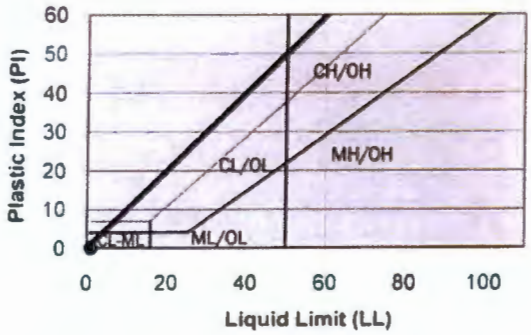
Natural Moisture Content

Natural Moisture	7.7%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

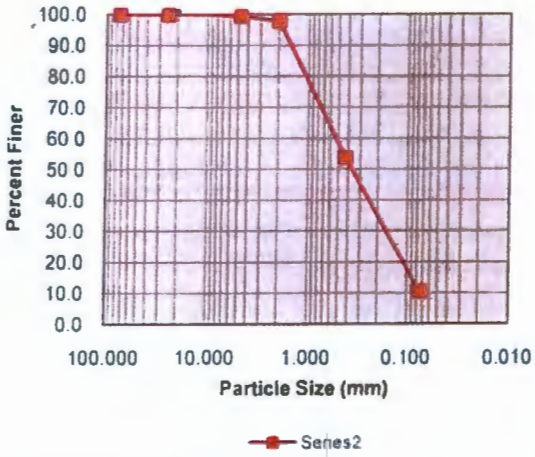
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.5	
No. 10	2.000	97.8	
No. 40	0.425	53.8	
No. 200	0.075	10.6	

Grain Size Analysis



Cu	2.8
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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SOIL CLASSIFICATION (ASTM D-2487)

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Client: Washington Closure Hanford
Submittal: 05-18M Operations Lab Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-76
Project:	S013213A00			Sample Description:	Operations Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/10/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/15/2010	Date Received:	12/8/2010

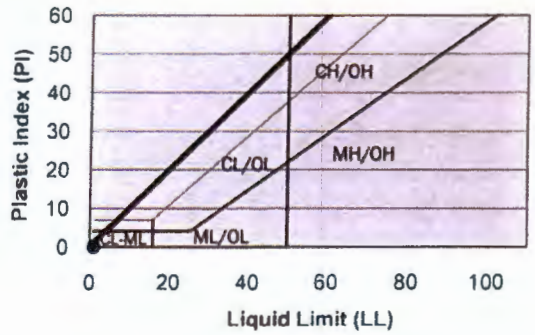
Natural Moisture Content

Natural Moisture	4.5%

Atterberg Limits Test Results (ASTM D-4318)

Flow Index	N/A	Spec
Liquid Limit	N/A	
Plastic Limit	N/A	
Plasticity Index	N/A	

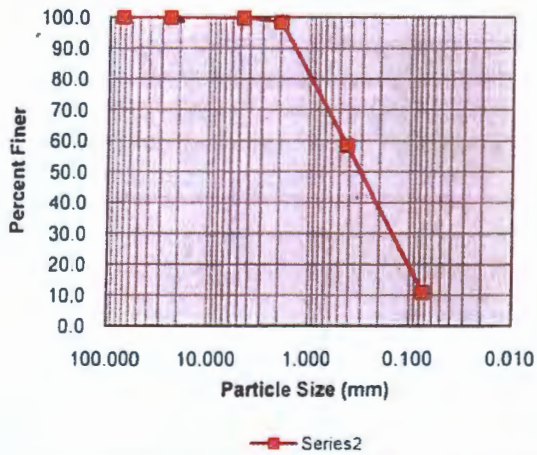
Soil Classification Chart



Particle Size Anaylsis (ASTM D-422)
200 Wash Sieve Analysis (ASTM D-1140)

Sieve No	Sieve Opening	% Passing	Spec
3 "	75.000	100.0	
1 "	25.000	100.0	
3/8 "	9.500	100.0	
No.4	4.750	99.8	
No. 10	2.000	98.4	
No. 40	0.425	58.6	
No. 200	0.075	11.0	

Grain Size Analysis



Cu	2.2
Cc	0.4

Unified Soil Classification (ASTM D-2487)
SP-SM: Poorly-graded sand with silt

Deviations from ASTM: None

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J.2

PRE-CONSTRUCTION PROCTORS

Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-01
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	4/28/2010
Tested By:	L. Hay	Date:	5/5/2010	Sampled By:	L. Hay
Reviewed By:	T. Williams	Date:	5/6/2010	Date Received:	4/28/2010
Comments:				Report No.	05-016-062

DENSITY DATA (lbs)

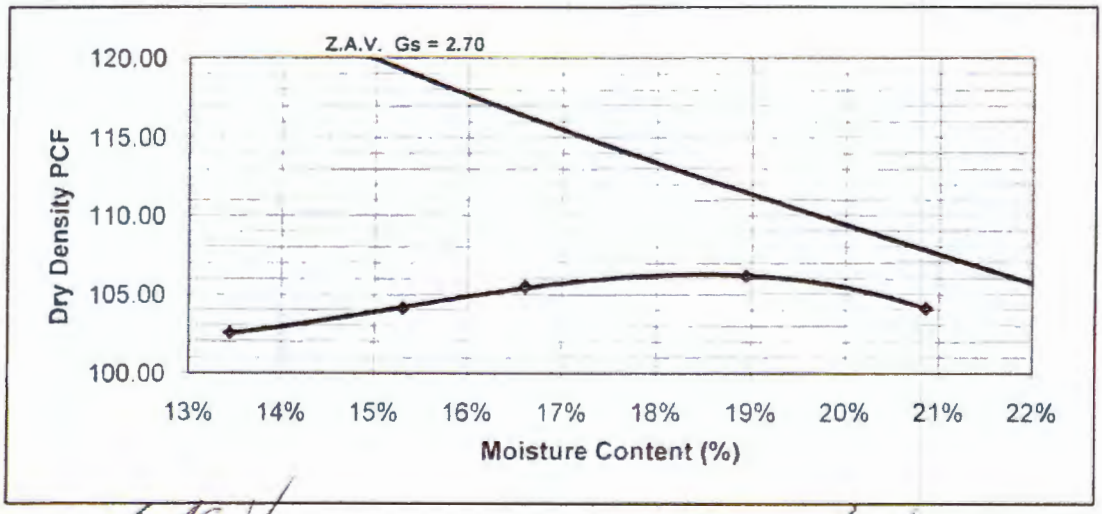
Mold + Wet Soil	12.5985	12.7230	12.8205	12.9305	12.9150
Mold Wt.	8.72	8.72	8.72	8.72	8.72
Wet Soil	3.88	4.00	4.10	4.21	4.19
lbs/cu ft. (wet)	116.3	120.1	123.0	126.3	125.8
lbs/cu ft. (dry)	102.6	104.1	105.5	106.2	104.1

MOISTURE DATA (grams)

Tin No.	E3	E5	A8	II	A9
Wet Soil + Tin	919.30	907.50	543.70	584.40	581.10
Dry Soil + Tin	839.60	819.80	473.40	499.30	489.20
Tin Wt.	246.50	246.70	50.00	49.90	48.50
Dry Soil	593.10	573.10	423.40	449.40	440.70
% Moisture	13.4%	15.3%	16.6%	18.9%	20.9%
% Saturation	56.4%	66.9%	75.1%	87.2%	91.1%

MAXIMUM DRY DENSITY (PCF) 106.2

OPTIMUM MOISTURE CONTENT (%) 19.0%



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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-05
Project	S013213A00			Sample Des.	Op. Soil
Project Location	ERDF Cells 9-10			Sampling Date:	10/4/2010
Tested By:	L. Hay	Date	10/8/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date.	10/12/2010	Date Received:	10/4/2010
Comments:				Report No.	5-16-176

DENSITY DATA (lbs)

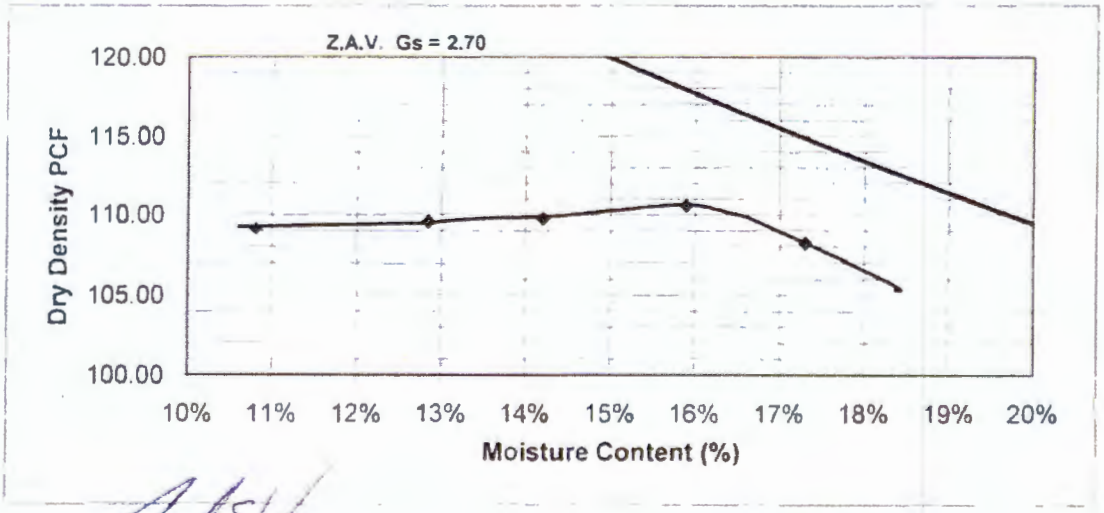
Mold + Wet Soil	12.9500	12.7485	12.8390	12.8965	12.9895
Mold Wt	8.72	8.72	8.72	8.72	8.72
Wet Soil	4.23	4.03	4.12	4.18	4.27
lbs/cu. ft. (wet)	126.9	120.9	123.6	125.3	128.1
lbs/cu. ft. (dry)	108.2	109.1	109.5	109.7	110.6

MOISTURE DATA (grams)

Tin No.	A12	M2	M3	M4	M5
Wet Soil + Tin	562.60	587.70	616.70	597.10	662.70
Dry Soil + Tin	487.00	535.30	552.30	529.10	578.70
Tin Wt.	50.00	50.00	50.50	50.40	50.00
Dry Soil	437.00	485.30	501.80	478.70	528.70
% Moisture	17.3%	10.8%	12.8%	14.2%	15.9%
% Saturation	83.9%	53.6%	64.4%	71.6%	81.9%

MAXIMUM DRY DENSITY (PCF) **110.6**

OPTIMUM MOISTURE CONTENT (%) **16.0%**



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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-10
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/5/2010
Tested By:	L. Hay	Date:	10/8/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/11/2010	Date Received:	10/5/2010
Comments:				Report No.	5-16-176

DENSITY DATA (lbs)

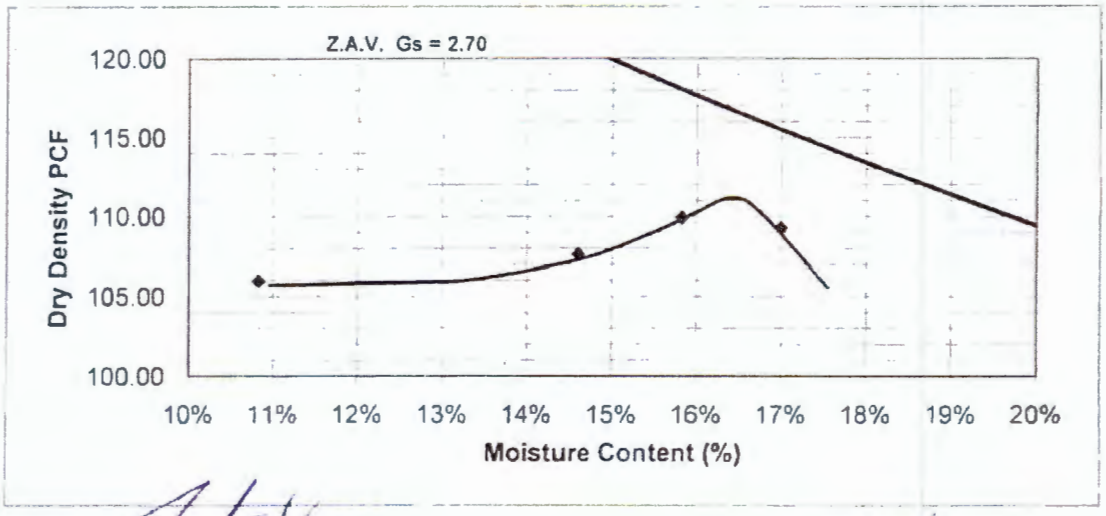
Mold + Wet Soil	12.6340	12.8305	12.9625	12.9795	
Mold Wt.	8.72	8.72	8.72	8.72	
Wet Soil	3.92	4.11	4.24	4.26	
lbs/cu. ft. (wet)	117.5	123.3	127.3	127.8	
lbs/cu. ft. (dry)	106.0	107.6	109.9	109.3	

MOISTURE DATA (grams)

Tin No.	M6	M8	M9	M10	
Wet Soil + Tin	557.20	628.90	650.00	632.60	
Dry Soil + Tin	507.60	555.20	568.00	548.00	
Tin Wt	49.50	50.30	49.80	50.10	
Dry Soil	458.10	504.90	518.20	497.90	
% Moisture	10.8%	14.6%	15.8%	17.0%	
% Saturation	49.6%	69.7%	80.2%	84.6%	

MAXIMUM DRY DENSITY (PCF) **111.1**

OPTIMUM MOISTURE CONTENT (%) **16.4%**



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Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name	Charlie Skiba			Sample ID.	OP-15
Project:	S013213A00			Sample Des.	Op. Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	10/6/2010
Tested By:	L. Hay	Date.	10/8/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date	10/11/2010	Date Received:	10/6/2010
Comments:				Report No.	5-16-176

DENSITY DATA (lbs)

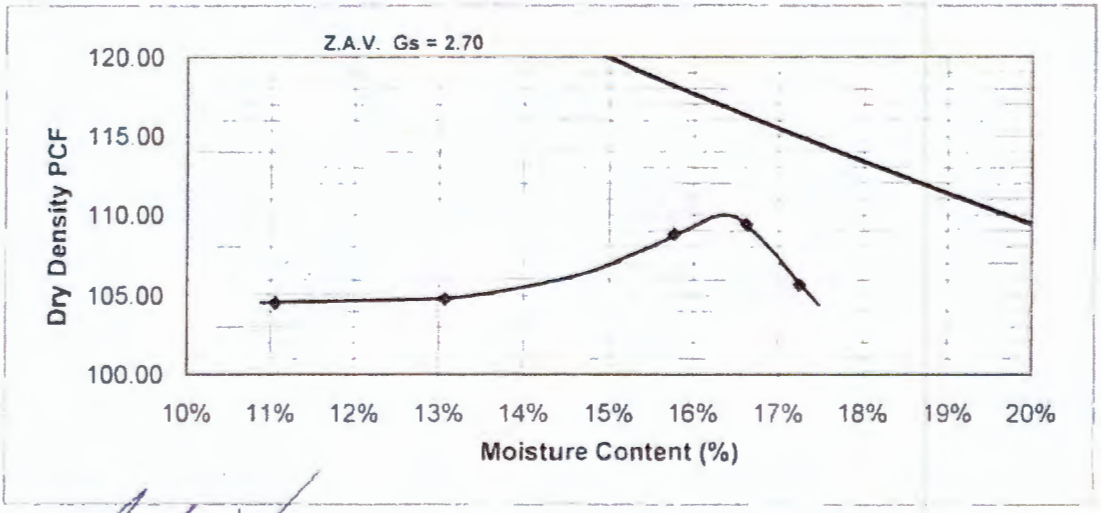
Mold + Wet Soil	12.5880	12.6675	12.8490	12.9175	12.9715
Mold Wt.	8.72	8.72	8.72	8.72	8.72
Wet Soil	3.87	3.95	4.13	4.20	4.25
lbs/cu. ft. (wet)	116.1	118.5	123.9	126.0	127.6
lbs/cu. ft. (dry)	104.5	104.8	105.7	108.8	109.4

MOISTURE DATA (grams)

Tin No	M11	A12	JI	X	BOO
Wet Soil + Tin	551.80	580.30	579.00	607.40	606.60
Dry Soil + Tin	501.70	519.00	501.20	531.50	527.30
Tin Wt.	48.50	50.00	50.00	50.10	50.00
Dry Soil	453.20	469.00	451.20	481.40	477.30
% Moisture	11.1%	13.1%	17.2%	15.8%	16.6%
% Saturation	48.8%	58.0%	78.3%	77.6%	83.1%

MAXIMUM DRY DENSITY (PCF) **110.0**

OPTIMUM MOISTURE CONTENT (%) **16.3%**



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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-20
Project:	S013213A00			Sample Des.	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/8/2010
Tested By:	L. Hay	Date:	10/12/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	10/19/2010	Date Received	10/8/2010
Comments:				Report No.	5-16-177

DENSITY DATA (lbs)

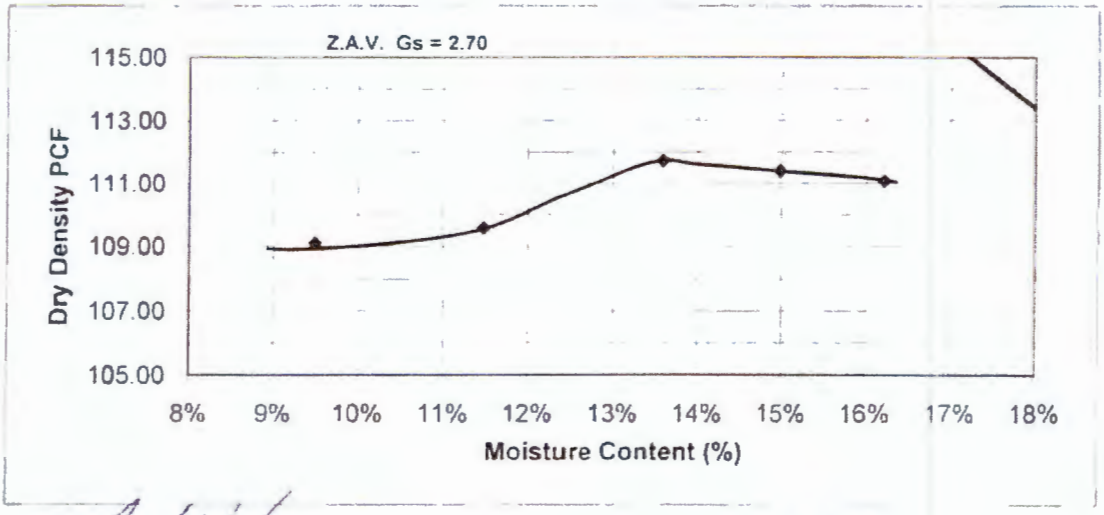
Mold + Wet Soil	12.6998	12.7897	12.9480	12.9877	13.0206
Mold Wt.	8.7184	8.7184	8.7184	8.7184	8.7180
Wet Soil	3.98	4.07	4.23	4.27	4.30
lbs/cu. ft. (wet)	119.4	122.1	126.9	128.1	129.1
lbs/cu. ft. (dry)	109.1	109.6	111.7	111.4	111.1

MOISTURE DATA (grams)

Tin No.	M1	M2	M3	M4	M1
Wet Soil + Tin	418.80	408.70	514.60	554.70	499.20
Dry Soil + Tin	386.90	371.80	459.10	489.00	436.60
Tin Wt.	50.60	50.10	50.50	50.40	50.60
Dry Soil	336.30	321.70	408.60	438.60	386.00
% Moisture	9.5%	11.5%	13.6%	15.0%	16.2%
% Saturation	47.0%	57.6%	72.2%	78.9%	84.7%

MAXIMUM DRY DENSITY (PCF) **111.7**

OPTIMUM MOISTURE CONTENT (%) **13.6%**



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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-25
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/8/2010
Tested By:	L. Hay	Date:	10/14/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	10/19/2010	Date Received:	10/8/2010
Comments:				Report No.	5-16-178

DENSITY DATA (lbs)

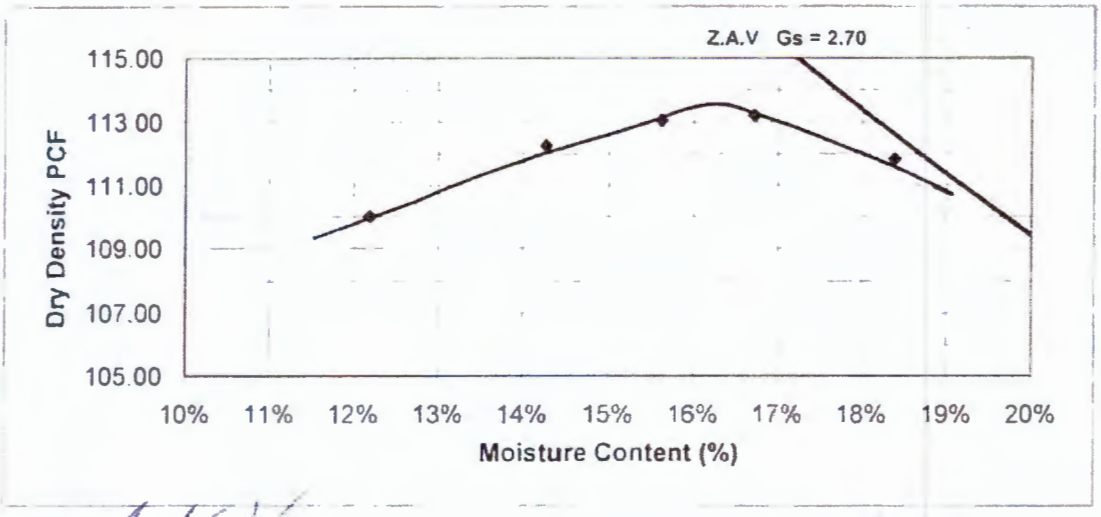
Mold + Wet Soil	13.1224	12.9932	13.1304	12.8321	13.0750
Mold Wt.	8.7184	8.7180	8.7180	8.7184	8.7184
Wet Soil	4.40	4.28	4.41	4.11	4.36
lbs/cu. ft. (wet)	132.1	128.3	132.4	123.4	130.7
lbs/cu. ft. (dry)	113.2	112.2	111.8	110.0	113.0

MOISTURE DATA (grams)

Tin No	<5	E1	M2	M2	M4
Wet Soil + Tin	548.50	427.20	489.90	462.00	502.50
Dry Soil + Tin	477.20	380.10	421.60	417.30	441.40
Tin Wt	50.60	50.00	50.00	50.40	50.10
Dry Soil	426.60	330.10	371.60	366.90	391.30
% Moisture	16.7%	14.3%	18.4%	12.2%	15.6%
% Saturation	92.4%	76.9%	97.9%	61.9%	86.0%

MAXIMUM DRY DENSITY (PCF)
113.5

OPTIMUM MOISTURE CONTENT (%)
16.2%



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Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-30
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/11/2010
Comments:				Report No.	5-16-181

DENSITY DATA (lbs)

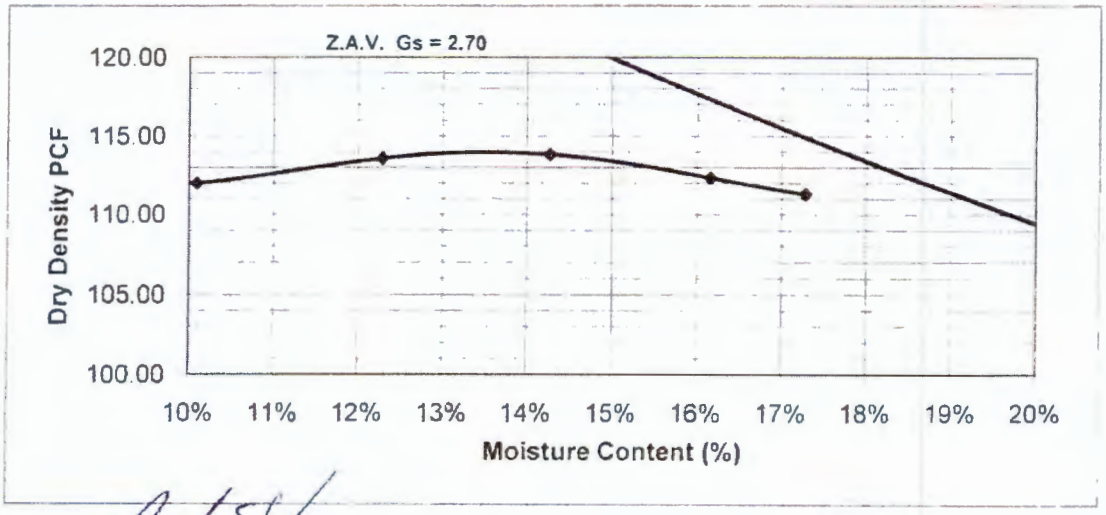
Mold + Wet Soil	13.0686	13.0534	12.9690	12.8277	13.0689
Mold Wt.	8.7187	8.7184	8.7184	8.7184	8.7184
Wet Soil	4.35	4.33	4.25	4.11	4.35
lbs/cu. ft. (wet)	130.5	130.0	127.5	123.3	130.5
lbs/cu. ft. (dry)	112.4	113.8	113.6	112.0	111.3

MOISTURE DATA (grams)

Tin No	M1	M2	M3	M4	M5
Wet Soil + Tin	518.70	530.60	512.30	622.20	598.60
Dry Soil + Tin	453.60	470.60	461.80	569.80	517.80
Tin Wt.	50.60	50.00	50.60	50.20	50.10
Dry Soil	403.00	420.60	411.20	519.60	467.70
% Moisture	16.2%	14.3%	12.3%	10.1%	17.3%
% Saturation	87.3%	80.2%	68.6%	54.0%	90.8%

MAXIMUM DRY DENSITY (PCF) **114.0**

OPTIMUM MOISTURE CONTENT (%) **13.5%**



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Standard Proctor (ASTM D698)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name	Charlie Skiba			Sample ID:	OP-35
Project:	S013213A00			Sample Des.	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/11/2010
Tested By:	R. Swenson	Date:	10/15/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/18/2010	Date Received:	10/11/2010
Comments				Report No.	5-16-180

DENSITY DATA (lbs)

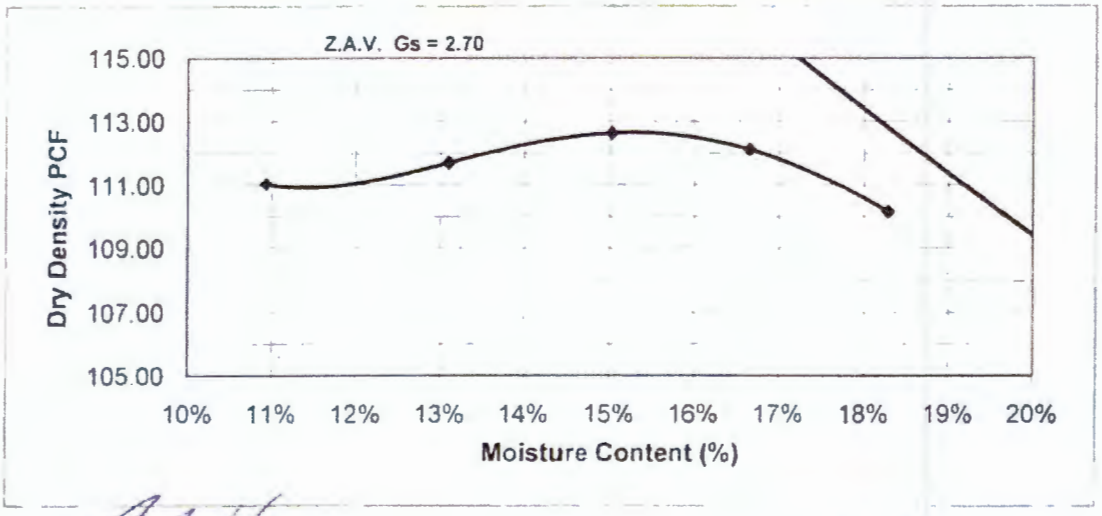
Mold + Wet Soil	13.0616	13.0774	13.0367	12.9291	12.8237
Mold Wt.	8.7187	8.7184	8.7184	8.7184	8.7184
Wet Soil	4.34	4.36	4.32	4.21	4.11
lbs/cu. ft. (wet)	130.3	130.8	129.5	126.3	123.2
lbs/cu. ft. (dry)	110.1	112.1	112.6	111.7	111.0

MOISTURE DATA (grams)

Tin No.	M4	JI	BOO	M11	A12
Wet Soil + Tin	564.20	585.20	662.70	564.20	600.50
Dry Soil + Tin	484.80	508.80	582.70	504.50	546.30
Tin Wt.	50.50	49.90	50.00	48.50	50.00
Dry Soil	434.30	458.90	532.70	456.00	496.30
% Moisture	18.3%	16.6%	15.0%	13.1%	10.9%
% Saturation	93.2%	89.4%	81.8%	69.5%	57.0%

MAXIMUM DRY DENSITY (PCF) **112.6**

OPTIMUM MOISTURE CONTENT (%) **15.2%**



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Standard Proctor (ASTM D698)

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2500 N. 11th Street | Enid, OK 73701
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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-40
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/15/2010
Tested By:	J. Marsh	Date:	10/20/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/21/2010	Date Received:	10/15/2010
Comments:				Report No.	5-16-183

DENSITY DATA (lbs)

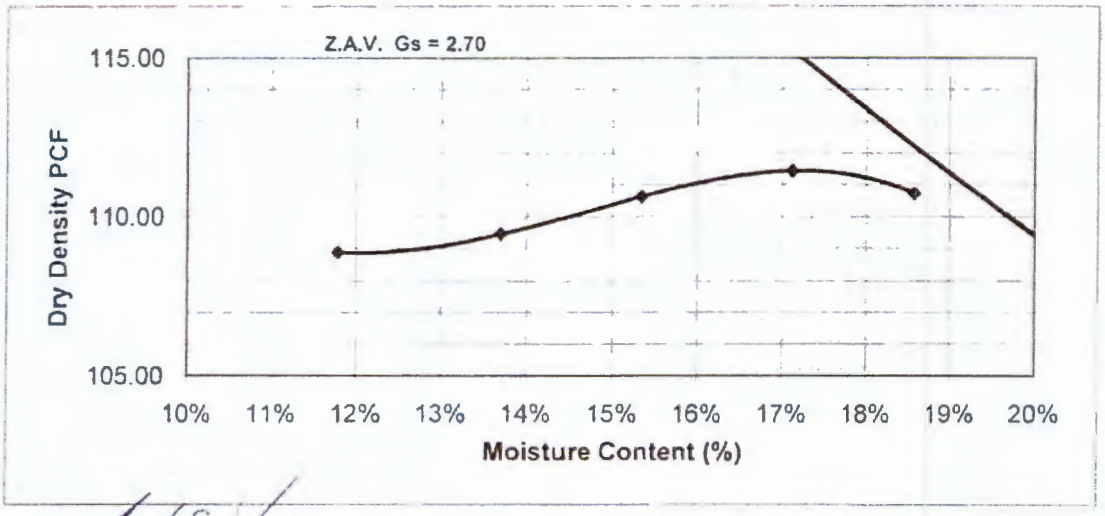
Mold + Wet Soil	12 7748	12.8660	12.9712	13.0942	13.0684
Mold Wt.	8.7180	8.7180	8.7180	8.7180	8.7180
Wet Soil	4 06	4.15	4.25	4.38	4.35
lbs/cu. ft. (wet)	121.7	124 4	127.6	131.3	130.5
lbs/cu. ft. (dry)	108 9	109.5	110 6	110.7	111.4

MOISTURE DATA (grams)

Tin No	M1	M2	M3	M3	M5
Wet Soil + Tin	542 90	518 20	518.90	477.60	463.30
Dry Soil + Tin	491.00	461.80	456.60	410.70	402.90
Tin Wt	50.60	50.00	50.50	50.50	50.10
Dry Soil	440.40	411.80	406 10	360.20	352.80
% Moisture	11.8%	13.7%	15.3%	18 6%	17.1%
% Saturation	58.1%	68 6%	79.2%	96.1%	90.3%

MAXIMUM DRY DENSITY (PCF) **111.5**

OPTIMUM MOISTURE CONTENT (%) **17.3%**



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Standard Proctor (ASTM D698)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford
Form: 05-18M Operations Proctor

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-45
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By:	J. Marsh	Date:	10/21/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/22/2010	Date Received:	10/18/2010
Comments				Report No.	5-16-185

DENSITY DATA (lbs)

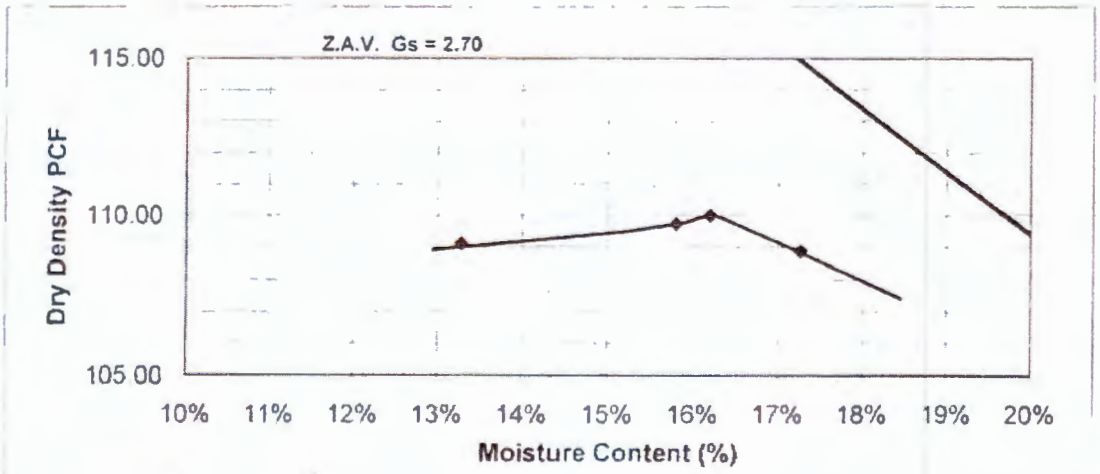
Mold + Wet Soil	12.9533	12.8378	12.9736	12.9782	0.0000
Mold Wt.	8.7180	8.7180	8.7180	8.7180	8.7180
Wet Soil	4.24	4.12	4.26	4.26	
lbs/cu. ft. (wet)	127.1	123.6	127.7	127.8	
lbs/cu. ft. (dry)	109.7	109.1	108.9	110.0	

MOISTURE DATA (grams)

Tin No	M1	M2	M3	M5	M5
Wet Soil + Tin	470.00	462.10	502.20	512.20	512.20
Dry Soil + Tin	412.80	413.80	435.70	447.80	447.80
Tin Wt	50.60	50.00	50.50	50.10	50.10
Dry Soil	362.20	363.80	385.20	397.70	397.70
% Moisture	15.8%	13.3%	17.3%	16.2%	16.2%
% Saturation	79.6%	65.9%	85.1%	82.2%	#VALUE!

MAXIMUM DRY DENSITY (PCF) 110.0

OPTIMUM MOISTURE CONTENT (%) 16.2%



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Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID	OP-50
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/18/2010
Tested By:	J. Marsh	Date:	10/22/2010	Sampled By:	R. Swenson
Reviewed By:	J. Voss	Date:	10/25/2010	Date Received:	10/18/2010
Comments:				Report No.	5-16-186

DENSITY DATA (lbs)

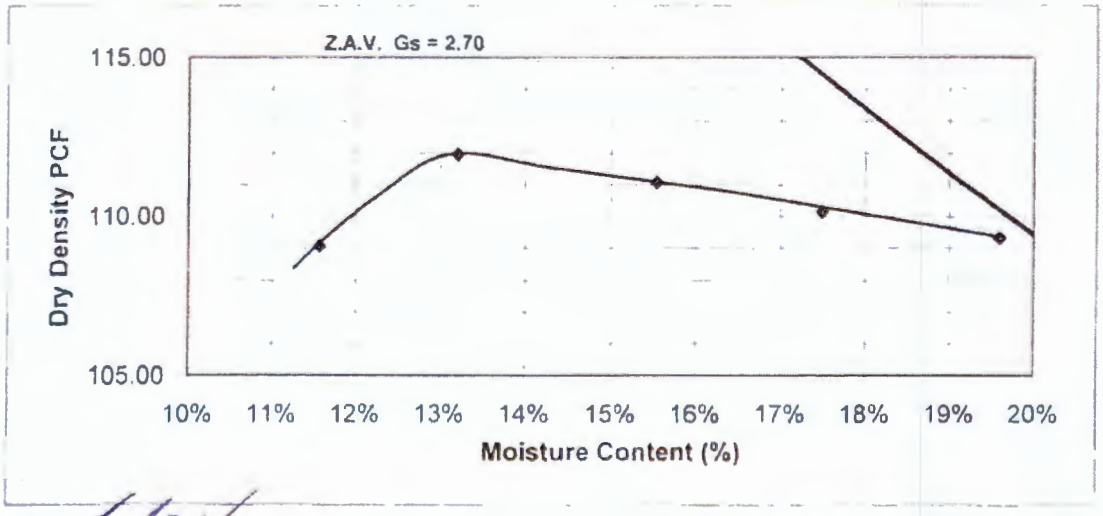
Mold + Wet Soil	12.7737	12.9427	12.9963	13.0314	13.0759
Mold Wt.	8.7180	8.7180	8.7180	8.7180	8.7180
Wet Soil	4.06	4.22	4.28	4.31	4.36
lbs/cu. ft. (wet)	121.7	126.7	128.3	129.4	130.7
lbs/cu. ft. (dry)	109.1	112.0	111.1	110.1	109.3

MOISTURE DATA (grams)

Tin No	JI	E1	AR	A11	M10
Wet Soil + Tin	428.00	447.90	504.90	481.50	511.60
Dry Soil + Tin	388.90	401.50	443.80	417.30	436.00
Tin Wt.	50.60	50.00	50.50	50.10	50.10
Dry Soil	338.30	351.50	393.30	367.20	385.90
% Moisture	11.6%	13.2%	15.5%	17.5%	19.6%
% Saturation	57.3%	70.6%	81.2%	89.1%	97.7%

MAXIMUM DRY DENSITY (PCF) **110.0**

OPTIMUM MOISTURE CONTENT (%) **16.2%**



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Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID.	OP-55
Project:	S013213A00			Sample Des.	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date	10/19/2010
Tested By:	J. Marsh	Date.	10/22/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date.	10/25/2010	Date Received	10/19/2010
Comments:				Report No.	5-16-186

DENSITY DATA (lbs)

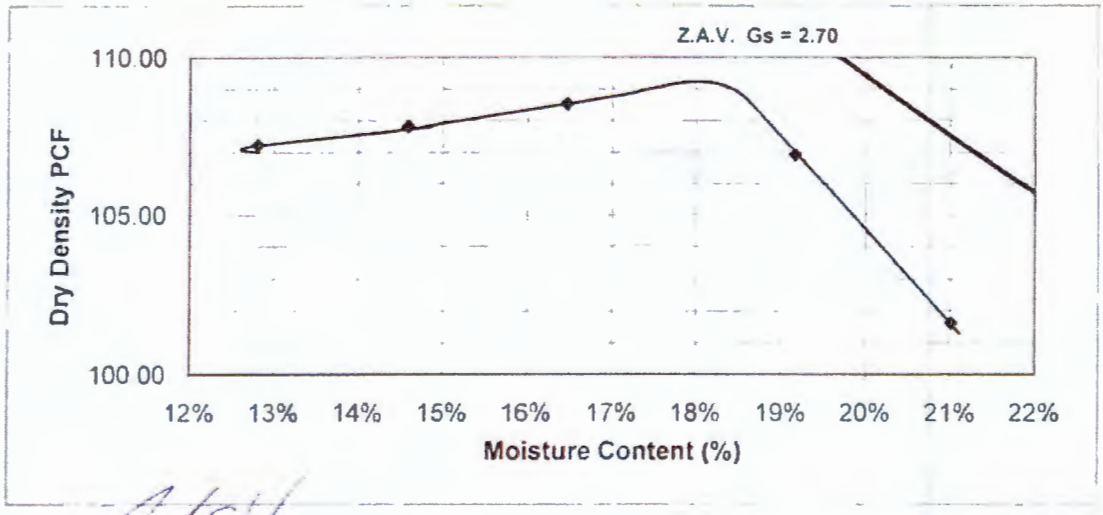
Mold + Wet Soil	12.7501	12.8360	12.9313	12.9646	12.8171
Mold Wt.	8.7180	8.7180	8.7180	8.7180	8.7180
Wet Soil	4.03	4.12	4.21	4.25	4.10
lbs/cu. ft. (wet)	121.0	123.5	126.4	127.4	123.0
lbs/cu. ft. (dry)	107.2	107.8	108.5	106.9	101.6

MOISTURE DATA (grams)

Tin No.	M11	BOO	M8	M9	M7
Wet Soil + Tin	427.50	435.00	479.40	479.40	675.80
Dry Soil + Tin	384.50	386.00	418.70	410.40	567.20
Tin Wt	48.50	50.00	49.90	50.20	50.10
Dry Soil	336.00	336.00	368.80	360.20	517.10
% Moisture	12.8%	14.6%	16.5%	19.2%	21.0%
% Saturation	60.5%	70.0%	80.5%	89.8%	86.2%

MAXIMUM DRY DENSITY (PCF) **109.2**

OPTIMUM MOISTURE CONTENT (%) **18.1%**



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Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-60
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	10/29/2010
Tested By:	T. Williams	Date:	11/15/2010	Sampled By:	J. Marsh
Reviewed By:	J. Voss	Date:	11/29/2010	Date Received:	10/29/2010
Comments:				Report No.	211

DENSITY DATA (lbs)

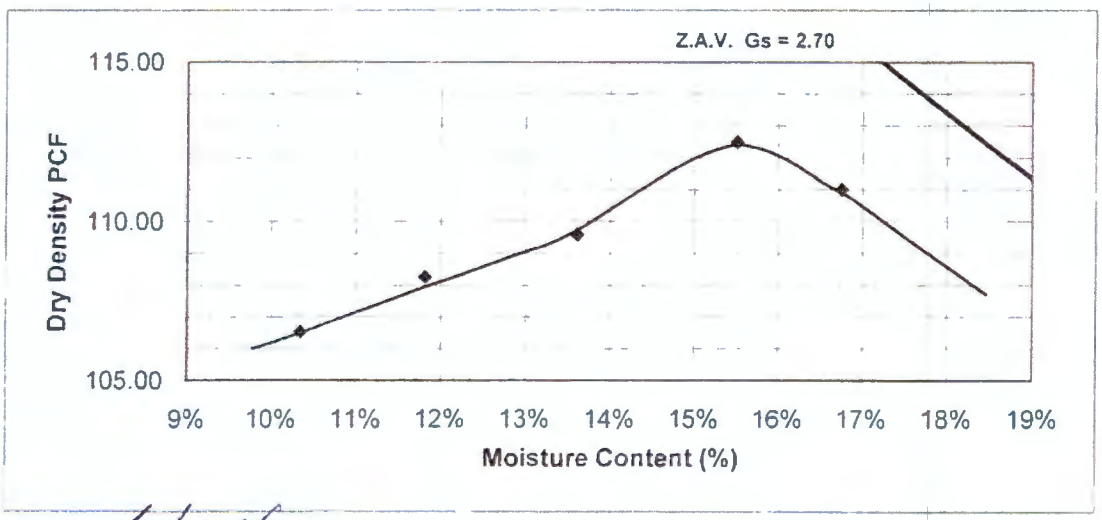
Mold + Wet Soil	12.8675	12.7520	12.6360	13.0375	13.0485
Mold Wt.	8.7175	8.7175	8.7175	8.7175	8.7175
Wet Soil	4.15	4.03	3.92	4.32	4.33
lbs/cu. ft. (wet)	124.5	121.0	117.6	129.6	129.9
lbs/cu. ft. (dry)	109.6	108.3	106.5	111.0	112.5

MOISTURE DATA (grams)

Tin No.	BX	E5	E5	JI	LH
Wet Soil + Tin	760.05	966.00	2016.10	529.50	2113.20
Dry Soil + Tin	689.90	890.00	1850.20	460.70	1853.00
Tin Wt.	174.40	246.40	246.40	50.00	175.30
Dry Soil	515.50	643.60	1603.80	410.70	1677.70
% Moisture	13.6%	11.8%	10.3%	16.8%	15.5%
% Saturation	68.4%	57.3%	48.0%	87.4%	84.1%

MAXIMUM DRY DENSITY (PCF)
112.5

OPTIMUM MOISTURE CONTENT (%)
15.5%



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Date

Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-65
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	11/12/2010
Tested By:	J. Schut	Date:	11/22/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	11/29/2010	Date Received:	11/12/2010
Comments.				Report No.	211

DENSITY DATA (lbs)

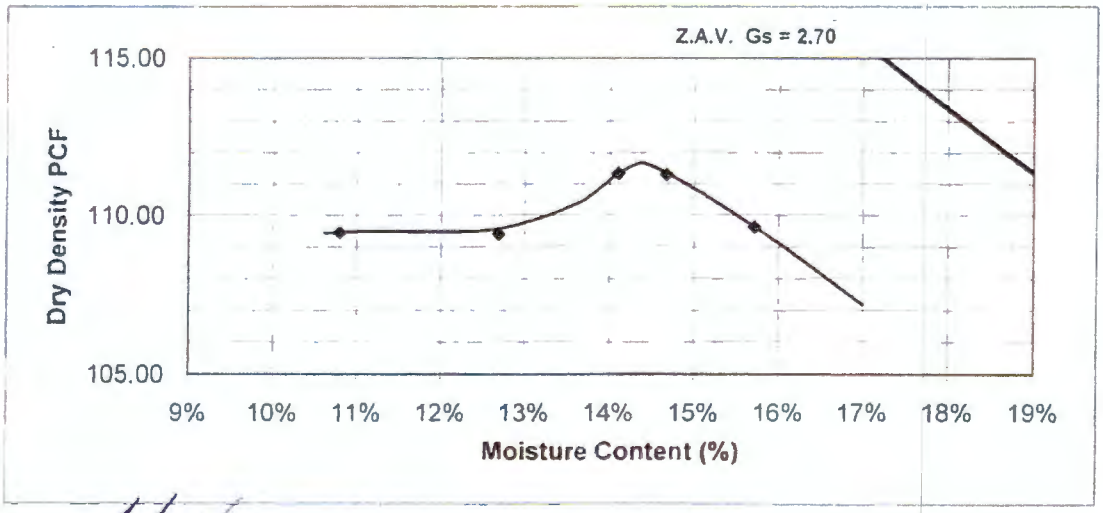
Mold + Wet Soil	12.7595	12.8270	12.9520	12.9715	12.9455
Mold Wt.	8.7175	8.7175	8.7175	8.7175	8.7175
Wet Soil	4.04	4.11	4.23	4.25	4.23
lbs/cu. ft. (wet)	121.3	123.3	127.0	127.6	126.8
lbs/cu. ft. (dry)	109.5	109.4	111.3	111.3	109.6

MOISTURE DATA (grams)

Tin No.	M3	M4	M8	M10	M11
Wet Soil + Tin	402.80	458.20	524.50	466.00	584.10
Dry Soil + Tin	368.50	412.30	465.90	412.80	511.40
Tin Wt.	50.50	50.40	50.10	50.00	48.50
Dry Soil	318.00	361.90	415 80	362.80	462.90
% Moisture	10.8%	12.7%	14.1%	14.7%	15.7%
% Saturation	54.0%	63.4%	74 2%	77.1%	79.0%

MAXIMUM DRY DENSITY (PCF) **111.7**

OPTIMUM MOISTURE CONTENT (%) **14.4%**



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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-70
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/15/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/17/2010	Date Received:	12/8/2010
Comments:				Report No.	5-16-225

DENSITY DATA (lbs)

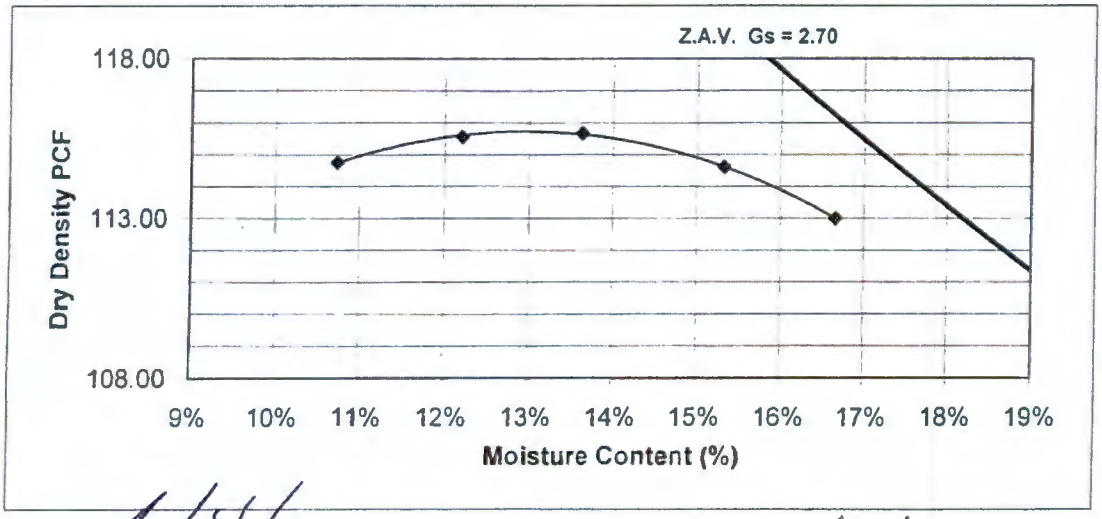
Mold + Wet Soil	12.9530	13.0395	13.0990	13.1230	13.1115
Mold Wt.	8.7175	8.7175	8.7175	8.7175	8.7175
Wet Soil	4.24	4.32	4.38	4.41	4.39
lbs/cu. ft. (wet)	127.1	129.7	131.4	132.2	131.8
lbs/cu. ft. (dry)	114.7	115.6	115.7	114.6	113.0

MOISTURE DATA (grams)

Tin No.	M3	M4	M8	M10	M11
Wet Soil + Tin	485.80	517.60	485.20	545.30	527.50
Dry Soil + Tin	443.60	466.80	433.00	479.50	459.10
Tin Wt.	50.40	50.40	50.10	50.00	48.50
Dry Soil	393.20	416.40	382.90	429.50	410.60
% Moisture	10.7%	12.2%	13.6%	15.3%	16.7%
% Saturation	61.9%	71.9%	80.6%	88.0%	91.6%

MAXIMUM DRY DENSITY (PCF) **115.8**

OPTIMUM MOISTURE CONTENT (%) **13.0%**



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Standard Proctor (ASTM D698)

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Client: **Washington Closure Hanford**

Form: **05-18M Operations Proctor**

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	OP-75
Project:	S013213A00			Sample Des:	Op. Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	12/8/2010
Tested By:	J. Schut	Date:	12/15/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	12/17/2010	Date Received:	12/8/2010
Comments:				Report No.	5-16-225

DENSITY DATA (lbs)

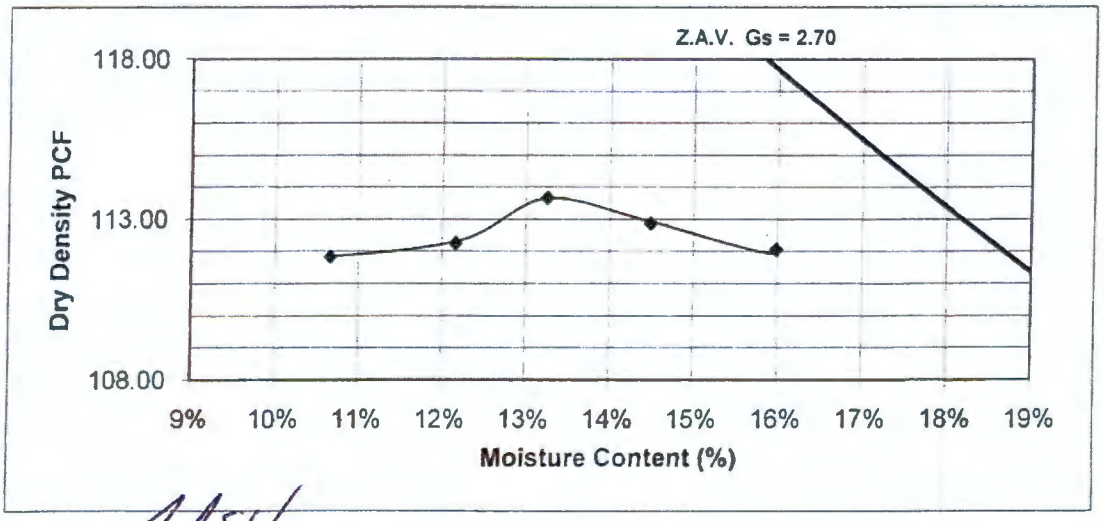
Mold + Wet Soil	12.8420	12.9140	13.0090	13.0245	13.0495
Mold Wt.	8.7175	8.7175	8.7175	8.7175	8.7175
Wet Soil	4.12	4.20	4.29	4.31	4.33
lbs/cu. ft. (wet)	123.7	125.9	128.7	129.2	130.0
lbs/cu. ft. (dry)	111.8	112.2	113.7	112.9	112.1

MOISTURE DATA (grams)

Tin No.	M3	M4	M8	M10	M11
Wet Soil + Tin	739.50	729.90	661.10	732.40	645.90
Dry Soil + Tin	692.00	678.20	604.10	670.90	580.90
Tin Wt.	246.40	253.00	174.00	246.30	174.20
Dry Soil	445.60	425.20	430.10	424.60	406.70
% Moisture	10.7%	12.2%	13.3%	14.5%	16.0%
% Saturation	56.8%	65.5%	74.2%	79.4%	85.7%

MAXIMUM DRY DENSITY (PCF) **113.7**

OPTIMUM MOISTURE CONTENT (%) **13.3%**



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J.3

RISER TRENCH FIELD DENSITY TESTING

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

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(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford

Submittal: 5-18Q Anchor Trench/Riser Field Testing

Soil Information

Project	ERDF Cells 9-10 Expansion			Proctor	SF-11
Project ID	S013213A00			Max Dry Density (pcf)	114.5
Report No	5-16-116	Date	7/23/2010	Optimum Moisture (%):	11.0%
Description	Brown Black Sand			Proctor	SF-08
Troxler ID	27881			Max Dry Density (pcf).	118.0
Moist Std	640	Density Std	2208	Optimum Moisture (%)	11.3%
Moist offset:	-	Density offset:	-	Proctor:	SF-09
Allowable Moisture Range		N/A		Max Dry Density (pcf)	148.0
Necessary % Proctor:		90%		Optimum Moisture (%):	3.5%

Test No	Location	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
Cell 9 Secondary Riser Trench (90% Compaction)											
R9-01	35-ft from Shoulder	SF-11	1	7:03	JS	6	110.6	4.2%	92.7%	106.1	PASS
R9-02	100-ft from Shoulder	SF-11	2	7:31	JS	6	117.2	6.7%	95.9%	109.8	PASS
R9-03	50-ft from Shoulder	SF-11	3	16:01	JS	6	119.9	8.9%	96.2%	110.1	PASS

Reviewed by: TW

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8/20/10
Date

FIELD DENSITY TEST (ASTM D-6938)

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Client: Washington Closure Hanford

Submittal: 5-18Q Anchor Trench/Riser Field Testing

Soil Information

Project:	ERDF Cells 9-10 Expansion		
Project ID:	S013213A00		
Report No	5-16-136	Date	8/18/2010
Description:	Brown Black Sand		
Troxler ID:	27881		
Moist Std:	635	Density Std:	2218
Moist offset	-	Density offset:	-
Allowable Moisture Range:		N/A	
Necessary % Proctor:		90%	

Proctor:	SF-01
Max Dry Density (pcf):	113.6
Optimum Moisture (%):	12.4%
Proctor:	SF-11
Max Dry Density (pcf):	114.5
Optimum Moisture (%):	11.0%
Proctor:	SF-04
Max Dry Density (pcf):	120.5
Optimum Moisture (%):	12.8%

Test No	Location	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
Secondary Riser Trench Cell 10											
RT10-01	80-ft from Top of Slope	SF-11	1	16.07	JS	12	120.0	10.1%	95.2%	109.0	PASS

Reviewed by: TW

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8/20/10
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FIELD DENSITY TEST (ASTM D-6938)

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Client: Washington Closure Hanford

Submittal: 5-18Q Anchor Trench/Riser Field Testing

Soil Information

Project	ERDF Cells 9-10 Expansion			Proctor	SF-01
Project ID	S013213A00			Max Dry Density (pcf)	113.6
Report No	5-16-137	Date	8/18/2010	Optimum Moisture (%)	12.4%
Description	Brown Black Sand			Proctor	SF-11
Troxler ID	27881			Max Dry Density (pcf)	114.5
Moist Std	641	Density Std	2202	Optimum Moisture (%)	11.0%
Moist offset	-	Density offset	-	Proctor	SF-04
Allowable Moisture Range		N/A		Max Dry Density (pcf)	120.5
Necessary % Proctor		90%		Optimum Moisture (%)	12.8%

Test No	Location	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
Secondary Riser Trench Cell 10											
RT10-02	225-ft from Top of Slope	SF-11	2	14 15	TW	12	120.5	7.3%	98 1%	112.3	PASS
Sand Cone Verification											
SCV-13	Liner Yard	N/A	-	15:00	TW	6	120.5	3.6%	N/A	116.3	N/A

Reviewed by: TW

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8/20/10
Date

UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

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(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	5-18Q Admix Field Data

Sample Information

Contact Name:	Charlie Skiba		Sample ID:	SCV-13
Project:	S013213A00		Sample Description:	Brown Sand
Project Location:	ERDF Cells 9-10		Sampling Date:	8/19/2010
Tested By:	T. Williams	8/19/2010	Sampled By:	T. Williams
Reviewed By:	J. Voss Date:	8/20/2010	Date Received:	8/19/2010
Comments:			Report No.:	5-16-137

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1	Mass of Proctor mold, W_1	3955.00 g
2	Mass of Proctor mold + sand, W_2	5394.20 g
3	Volume of mold, V_1	0.03 ft
4	Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.19 lb/ft^3

Calibration Cone

5	Mass of bottle + cone + sand (before use), W_3	6370.20 g
6	Mass of bottle + cone + sand (after use), W_4	4754.00 g
7	Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.56 lb

Results from Field Tests

3	8	Mass of bottle + cone + sand (before use), W_6	5543.6 g
	9	Mass of bottle + cone + sand (after use), W_8	2318.4 g
	10.	Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0373 ft^3
	11	Mass of gallon can, W_5	505.50 g
	12.	Mass of gallon can + moist soil, W_7	2501.80 g
	13	Mass of gallon can + dry soil, W_9	2440.70 g
	14.	Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	118.10 lb/ft^3
	15.	Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	3.2%
	16.	Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	114.49 lb/ft^3
	17.	Comparision moisture content =	3.6%
	18.	Dry unit weight comparison =	116.3 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

2500 N. 11th Street | Enid, Ok. 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford

Submittal: 5-18Q Anchor Trench/Riser Field Testing

Soil Information

Project:	ERDF Cells 9-10 Expansion			Proctor	SF-01
Project ID	S013213A00			Max Dry Density (pcf):	113.6
Report No	5-16-177	Date	10/13/2010	Optimum Moisture (%):	12.4%
Description	Brown Black Sand			Proctor:	SF-11
Troxler ID	27881			Max Dry Density (pcf):	114.5
Moist Std	645	Density Std	2231	Optimum Moisture (%):	11.0%
Moist offset	-	Density offset	-	Proctor:	SF-04
Allowable Moisture Range:		N/A		Max Dry Density (pcf):	120.5
Necessary % Proctor		90%		Optimum Moisture (%):	12.8%

Test No	Location	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
Cell 9 Primary Riser Trench											
RT9-04	0+75 from Shoulder	SF-04	1	8:30	JS	6	129.6	14.0%	94.3%	113.7	PASS
Sand Cone Verification											
SCV-23	-	-	-	16:23	JS	6	119.0	5.4%	-	112.9	-

Reviewed by: TIW

Envirotech Engineering & Consulting Inc

10/19/10
Date

UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	5-18B Earthwork Field Testing

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SCV-23
Project:	S013213A00			Sample Description:	Brown Sand
Project Location:	ERDF Cells 9-10			Sampling Date:	10/13/2010
Tested By:	J. Schut		10/13/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	10/14/2010	Date Received:	10/13/2010
Comments				Report No.	5-16-177

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3955.40 g
2. Mass of Proctor mold + sand W_2	5397.80 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.40 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4722.90 g
6. Mass of bottle + cone + sand (after use), W_4	3107.90 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.56 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	5907.8 g
9. Mass of bottle + cone + sand (after use), W_8	2726.8 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0362 ft^3
11. Mass of gallon can, W_5	505.20 g
12. Mass of gallon can + moist soil, W_7	2441.70 g
13. Mass of gallon can + dry soil, W_9	2339.60 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	117.97 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	5.6%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	111.75 lb/ft^3
17. Comparision moisture content =	5.4%
18. Dry unit weight comparison =	112.9 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580 234-8780 | Fax 580 237-4302

Client: Washington Closure Hanford

Submittal: 5-18Q Anchor Trench/Riser Field Testing

Soil Information

Project	ERDF Cells 9-10 Expansion		
Project ID	S013213A00		
Report No	5-16-182	Date	10/19/2010
Description	Brown Black Sand		
Troxler ID	27881		
Moist Std:	651	Density Std:	2211
Moist offset.	-	Density offset.	-
Allowable Moisture Range		N/A	
Necessary % Proctor.		90%	

Proctor:	SF-01
Max Dry Density (pcf)	113.6
Optimum Moisture (%):	12.4%
Proctor:	SF-11
Max Dry Density (pcf).	114.5
Optimum Moisture (%):	11.0%
Proctor.	SF-04
Max Dry Density (pcf)	120.5
Optimum Moisture (%):	12.8%

Test No	Location	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
Cell 9 Primary Riser Trench											
RT10-03	Cell 10: 0+50 from Top	SF-04	1	13.11	JS	6	118.5	8.6%	90.6%	109.1	PASS

Reviewed by: JW

Envirotech Engineering & Consulting, Inc

10/21/10
Date

J.4

CONSTRUCTION FIELD DENSITY TESTING

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford

Submittal: 5-18N Operations Field Data

Soil Information

Project:	ERDF Cells 9-10 Expansion			Proctor:	OP-65
Project ID:	S013213A00			Max Dry Density (pcf):	111.7
Report No.	5-16-219	Date	12/10/2010	Optimum Moisture (%):	14.4%
Description.	Cell 9 Operations			Proctor:	SF-04
Troxler ID:	27881			Max Dry Density (pcf):	120.5
Moist Std:	636	Density Std:	2216	Optimum Moisture (%):	12.8%
Moist offset:	-	Density offset:	-	Proctor:	SF-09
Allowable Moisture Range:		N/A		Max Dry Density (pcf):	138.9
Necessary % Proctor:		90%		Optimum Moisture (%):	2.6%

Test No	Zone	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
OL9-01	J5	OP-65	Final	9:03	JS	6	111.7	4.6%	95.6%	106.8	PASS
OL9-02	K5	OP-65	Final	9:07	JS	6	109.3	5.8%	92.5%	103.3	PASS
OL9-03	L5	OP-65	Final	9:10	JS	6	111.3	5.5%	94.4%	105.5	PASS
OL9-04	M5	OP-65	Final	9:12	JS	6	115.0	6.0%	97.1%	108.5	PASS
OL9-05	M4	OP-65	Final	9:13	JS	6	110.3	6.3%	92.9%	103.8	PASS
OL9-06	L4	OP-65	Final	9:14	JS	6	112.3	6.3%	94.6%	105.6	PASS
OL9-07	K4	OP-65	Final	9:16	JS	6	116.3	5.5%	98.7%	110.2	PASS
OL9-08	J4	OP-65	Final	9:18	JS	6	115.3	6.2%	97.2%	108.6	PASS
OL9-09	J3	OP-65	Final	9:19	JS	6	109.1	5.4%	92.7%	103.5	PASS
OL9-10	K3	OP-65	Final	9:20	JS	6	111.9	5.9%	94.6%	105.7	PASS
OL9-11	L3	OP-65	Final	9:21	JS	6	116.2	6.2%	98.0%	109.4	PASS
OL9-12	M3	OP-65	Final	9:23	JS	6	109.0	5.0%	92.9%	103.8	PASS
OL9-13	M2	OP-65	Final	9:27	JS	6	112.8	6.1%	95.2%	106.3	PASS
OL9-14	L2	OP-65	Final	9:29	JS	6	113.9	5.0%	97.1%	108.5	PASS
OL9-15	K2	OP-65	Final	9:30	JS	6	114.3	6.3%	96.3%	107.5	PASS
OL9-16	J2	OP-65	Final	9:13	JS	6	108.6	5.5%	92.2%	102.9	PASS
OL9-17	J1	OP-65	Final	9:40	JS	6	114.5	7.4%	95.4%	106.6	PASS

Reviewed by:

/irotech Engineering & Consulting, Inc

12/19/10
Date

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford

Submittal: 5-18N Operations Field Data

Soil Information

Project:	ERDF Cells 9-10 Expansion	Proctor:	OP-65
Project ID:	S013213A00	Max Dry Density (pcf):	111.7
Report No.	5-16-219 Date 12/10/2010	Optimum Moisture (%):	14.4%
Description:	Cell 9 Operations	Proctor:	SF-04
Troxler ID:	27881	Max Dry Density (pcf):	120.5
Moist Std:	636 Density Std: 2216	Optimum Moisture (%):	12.8%
Moist offset:	- Density offset: -	Proctor:	SF-09
Allowable Moisture Range:	N/A	Max Dry Density (pcf):	138.9
Necessary % Proctor:	90%	Optimum Moisture (%):	2.6%

Test No	Zone	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
OL9-18	K1	OP-65	Final	9:42	JS	6	113.4	5.5%	96.2%	107.5	PASS
OL9-19	L1	OP-65	Final	9:43	JS	6	110.8	5.0%	94.5%	105.5	PASS
OL9-20	M1	OP-65	Final	9:44	JS	6	116.3	7.1%	97.2%	108.6	PASS
OL9-21	I1	OP-65	Final	10:22	JS	6	111.6	5.5%	94.7%	105.8	PASS
OL9-22	H1	OP-65	Final	10:23	JS	6	109.9	5.4%	93.3%	104.3	PASS
OL9-23	G1	OP-65	Final	10:24	JS	6	113.5	6.6%	95.3%	106.5	PASS
OL9-24	F1	OP-65	Final	10:25	JS	6	117.4	7.1%	98.1%	109.6	PASS
OL9-25	E1	OP-65	Final	10:26	JS	6	115.2	6.1%	97.2%	108.6	PASS
OL9-26	D1	OP-65	Final	10:27	JS	6	113.0	5.8%	95.6%	106.8	PASS
OL9-27	D2	OP-65	Final	10:28	JS	6	113.1	6.3%	95.3%	106.4	PASS
OL9-28	E2	OP-65	Final	10:29	JS	6	112.3	4.8%	95.9%	107.2	PASS
OL9-29	F2	OP-65	Final	10:30	JS	6	112.1	5.0%	95.6%	106.8	PASS
OL9-30	G2	OP-65	Final	10:31	JS	6	116.9	6.6%	98.2%	109.7	PASS
OL9-31	H2	OP-65	Final	10:33	JS	6	115.9	7.5%	96.5%	107.8	PASS
OL9-32	I2	OP-65	Final	10:34	JS	6	116.7	6.0%	98.6%	110.1	PASS
OL9-33	I3	OP-65	Final	12:14	JS	6	109.4	5.7%	92.7%	103.5	PASS
OL9-34	H3	OP-65	Final	12:15	JS	6	109.1	5.7%	92.4%	103.2	PASS

Reviewed by:

virotech Engineering & Consulting, Inc

12/18/10
Date

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: Washington Closure Hanford

Submittal: 5-18N Operations Field Data

Soil Information

Project:	ERDF Cells 9-10 Expansion			Proctor:	OP-65
Project ID:	S013213A00			Max Dry Density (pcf):	111.7
Report No.	5-16-219	Date	12/10/2010	Optimum Moisture (%):	14.4%
Description:	Cell 9 Operations			Proctor:	SF-04
Troxler ID:	27881			Max Dry Density (pcf):	120.5
Moist Std:	636	Density Std:	2216	Optimum Moisture (%):	12.8%
Moist offset:	-	Density offset:	-	Proctor:	SF-09
Allowable Moisture Range:		N/A		Max Dry Density (pcf):	138.9
Necessary % Proctor:		90%		Optimum Moisture (%):	2.6%

Test No	Zone	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
OL9-35	G3	OP-65	Final	12:17	JS	6	117.7	6.5%	98.9%	110.5	PASS
OL9-36	F3	OP-65	Final	12:18	JS	6	112.0	6.5%	94.1%	105.2	PASS
OL9-37	E3	OP-65	Final	12:19	JS	6	115.5	6.0%	97.5%	109.0	PASS
OL9-38	D3	OP-65	Final	12:21	JS	6	115.4	6.4%	97.1%	108.5	PASS
OL9-39	D4	OP-65	Final	12:22	JS	6	118.1	7.5%	98.4%	109.9	PASS
OL9-40	E4	OP-65	Final	12:23	JS	6	113.0	5.8%	95.6%	106.8	PASS
OL9-41	F4	OP-65	Final	12:25	JS	6	118.0	6.3%	99.4%	111.0	PASS
OL9-42	G4	OP-65	Final	12:26	JS	6	115.4	6.0%	97.5%	108.9	PASS
OL9-43	H4	OP-65	Final	12:27	JS	6	114.9	6.8%	96.3%	107.6	PASS
OL9-44	I4	OP-65	Final	12:29	JS	6	110.3	5.4%	93.7%	104.6	PASS
OL9-45	I5	OP-65	Final	12:30	JS	6	109.3	5.2%	93.0%	103.9	PASS
OL9-46	H5	OP-65	Final	12:32	JS	6	111.7	5.4%	94.9%	106.0	PASS
OL9-47	G5	OP-65	Final	12:33	JS	6	110.5	6.2%	93.2%	104.0	PASS
OL9-48	F5	OP-65	Final	12:34	JS	6	113.0	5.0%	96.3%	107.6	PASS
OL9-49	E5	OP-65	Final	12:35	JS	6	112.9	6.5%	94.9%	106.0	PASS
OL9-50	D5	OP-65	Final	12:36	JS	6	111.9	5.9%	94.6%	105.7	PASS
									93.8%	104.8	PASS

Reviewed by:

virotech Engineering & Consulting. Inc

12/18/10
Date

FIELD DENSITY TEST (ASTM D-6938)

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Client: Washington Closure Hanford

Submittal: 5-18N Operations Field Data

Soil Information

Project:	ERDF Cells 9-10 Expansion			Proctor:	OP-65
Project ID:	S013213A00			Max Dry Density (pcf):	111.7
Report No.	5-16-219	Date	12/10/2010	Optimum Moisture (%):	14.4%
Description:	Cell 9 Operations			Proctor:	SF-04
Troxler ID:	27881			Max Dry Density (pcf):	120.5
Moist Std:	636	Density Std:	2216	Optimum Moisture (%):	12.8%
Moist offset:	-	Density offset:	-	Proctor:	SF-09
Allowable Moisture Range:		N/A		Max Dry Density (pcf):	138.9
Necessary % Proctor:		90%		Optimum Moisture (%):	2.6%

Test No	Zone	Pr.	Lift	Time	Oper	Depth (in.)	Wet Density (pcf)	Moist Content (%)	% Proctor (calc)	Dry Density (calc)	Pass / Fail
Cell 9 East Termination Berm											
OL9-51	Cell 9 Term. Berm North	OP-65	Final	14:45	JS	6	115.6	6.2%	97.4%	108.9	PASS
OL9-52	Cell 9 Term Berm Mid-South	OP-65	Final	14:47	JS	6	115.6	6.2%	97.4%	108.9	PASS
OL9-53	Cell 9 Term Berm Mid-North	OP-65	Final	14:49	JS	6	113.1	4.9%	96.5%	107.8	PASS
OL9-54	Cell 9 Term Berm South	OP-65	Final	14:52	JS	6	111.5	5.6%	94.5%	105.6	PASS

Reviewed by:

virotech Engineering & Consulting, Inc

12/19/10

Date