

Attachment Referenced in Response to DOE Comment # 2 - Part II

**APPENDIX B1.2 FROM PRE-DESIGN STUDIES REPORT (MWH, 2014)
GEOTECHNICAL TEST RESULTS
ADVANCED TERRA TESTING**

COMPACTION TEST
ASTM D 698 A

CLIENT:	MWH	JOB NO.	2512-77
BORING NO.	WB-B1-06	DATE SAMPLED	11/14/2013
DEPTH	5-10'	DATE TESTED	01/02/2014 TMR
SAMPLE NO.		LOCATION	Church Rock
SOIL DESCR.	Silty Sand		

Moisture Determination

	1	2	3	4	5
Wt of Moisture added (ml)	240.00	200.00	280.00	320.00	160.00
Wt. of soil & dish (g)	593.12	640.08	593.58	568.75	616.80
Dry wt. soil & dish (g)	520.54	571.09	513.15	484.06	558.08
Net loss of moisture (g)	72.58	68.99	80.43	84.69	58.72
Wt. of dish (g)	6.52	8.23	6.57	6.65	6.55
Net wt. of dry soil (g)	514.02	562.86	506.58	477.41	551.53
Moisture Content (%)	14.12	12.26	15.88	17.74	10.65
Corrected Moisture Content					

Density determination

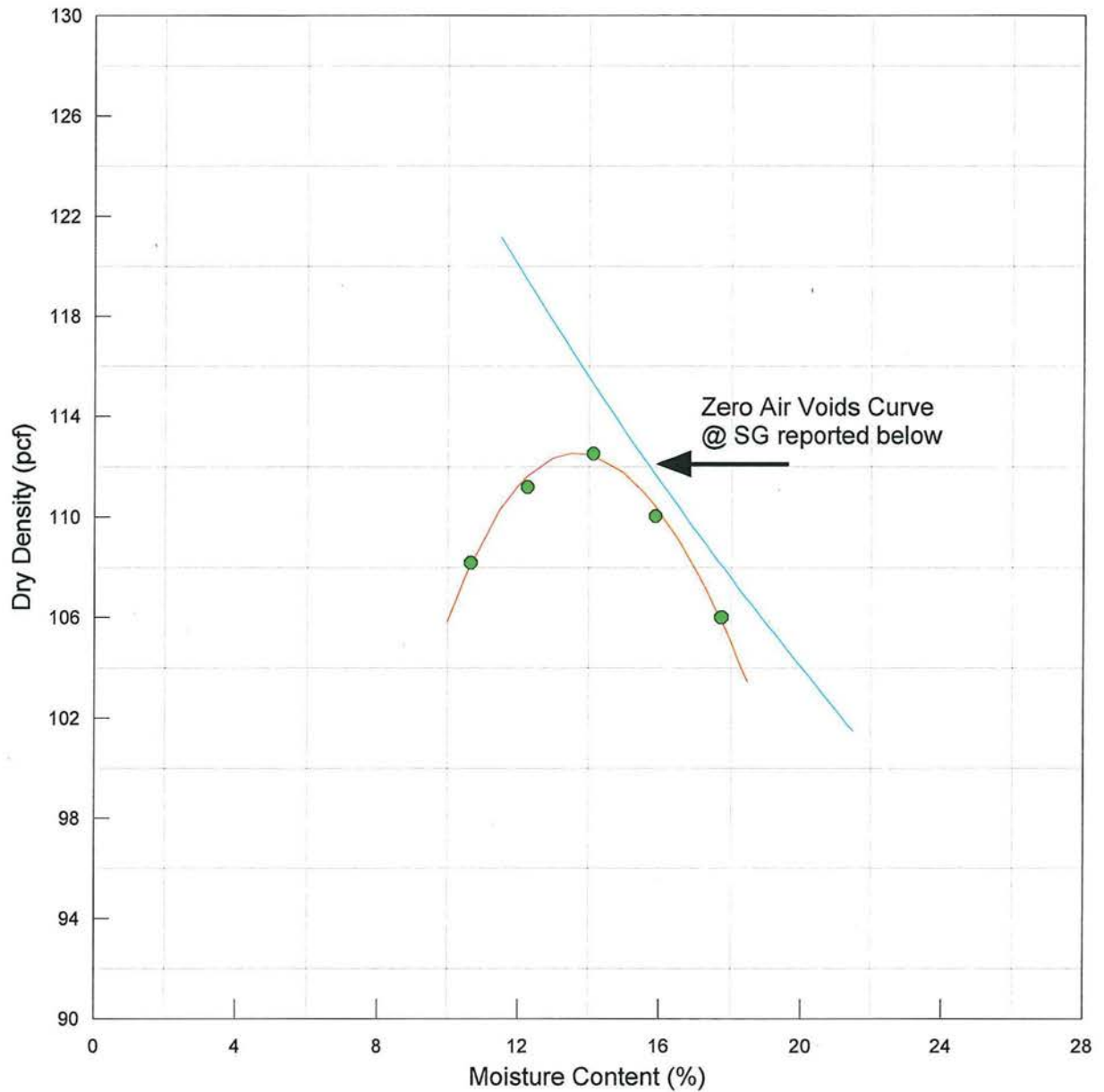
Wt of soil & mold (lb)	14.07	13.95	14.04	13.95	13.78
Wt. of mold (lb)	9.79	9.79	9.79	9.79	9.79
Net wt. of wet soil (lb)	4.28	4.16	4.25	4.16	3.99
Net wt of dry soil (lb)	3.75	3.71	3.67	3.53	3.61
Dry Density, (pcf)	112.51	111.17	110.03	106.00	108.18
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

Data entered by: TMR Date: 01/03/2014
 Data checked by: [Signature] Date: 1/6/14
 FileName: PRB10603



Proctor Compaction Test

WB-B1-06, 5-10',



Best Fit Curve

● Actual Data

— Zero Air Voids Curve @ SG = 2.50

OPTIMUM MOISTURE CONTENT = 13.7 MAXIMUM DRY DENSITY = 112.5
ASTM D 698 A, Rock correction applied? N

COMPACTION TEST
ASTM D 698 A

CLIENT:	MWH	JOB NO.	2512-77
BORING NO.	SB-B1-04	DATE SAMPLED	12/12/2013
DEPTH	0-25'	DATE TESTED	01/02/2014 TMR
SAMPLE NO.		LOCATION	Church Rock
SOIL DESCR.	Silty Clay w/ Sand		

Moisture Determination

	1	2	3	4
Wt of Moisture added (ml)	240.00	200.00	160.00	120.00
Wt. of soil & dish (g)	609.67	619.69	610.90	562.15
Dry wt. soil & dish (g)	525.82	542.76	543.03	508.38
Net loss of moisture (g)	83.85	76.93	67.87	53.77
Wt. of dish (g)	6.67	6.49	6.74	6.66
Net wt. of dry soil (g)	519.15	536.27	536.29	501.72
Moisture Content (%)	16.15	14.35	12.66	10.72
Corrected Moisture Content				

Density determination

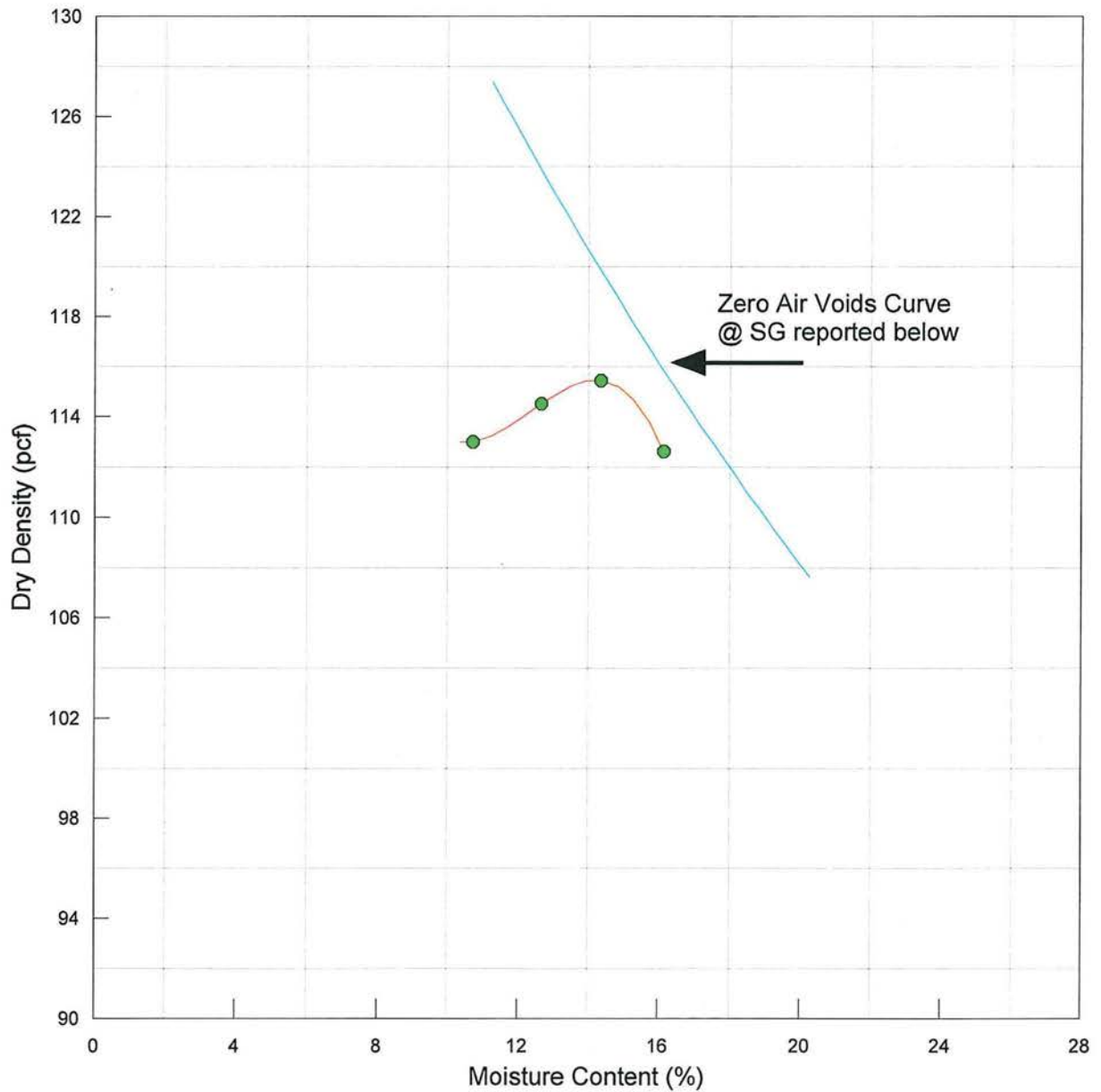
Wt of soil & mold (lb)	14.15	14.19	14.09	13.96
Wt. of mold (lb)	9.79	9.79	9.79	9.79
Net wt. of wet soil (lb)	4.36	4.40	4.30	4.17
Net wt of dry soil (lb)	3.75	3.85	3.82	3.77
Dry Density, (pcf)	112.61	115.44	114.51	112.99
Corrected Dry Density (pcf)				
Volume Factor	30	30	30	30

Data entered by: TMR Date: 01/03/2014
 Data checked by: SLL Date: 1/6/14
 FileName: PRB10405



Proctor Compaction Test

SB-B1-04, 0-25',



Best Fit Curve

Actual Data

Zero Air Voids Curve @ SG = 2.65

OPTIMUM MOISTURE CONTENT = 14.2 MAXIMUM DRY DENSITY = 115.5
ASTM D 698 A, Rock correction applied? N

COMPACTION TEST
ASTM D 698 A

CLIENT:	MWH	JOB NO.	2512-77
BORING NO.	NB-B2-04	DATE SAMPLED	
DEPTH	0-10'	DATE TESTED	01/14/2014 TMR
SAMPLE NO.		LOCATION	Church Rock
SOIL DESCR.	Sandy Clay		

Moisture Determination

	1	2	3	4	5
Wt of Moisture added (ml)	240.00	200.00	280.00	160.00	320.00
Wt. of soil & dish (g)	586.75	586.86	538.32	566.90	586.25
Dry wt. soil & dish (g)	512.61	520.09	463.04	511.11	497.32
Net loss of moisture (g)	74.14	66.77	75.28	55.79	88.93
Wt. of dish (g)	6.66	6.60	6.50	6.62	6.55
Net wt. of dry soil (g)	505.95	513.49	456.54	504.49	490.77
Moisture Content (%)	14.65	13.00	16.49	11.06	18.12
Corrected Moisture Content					

Density determination

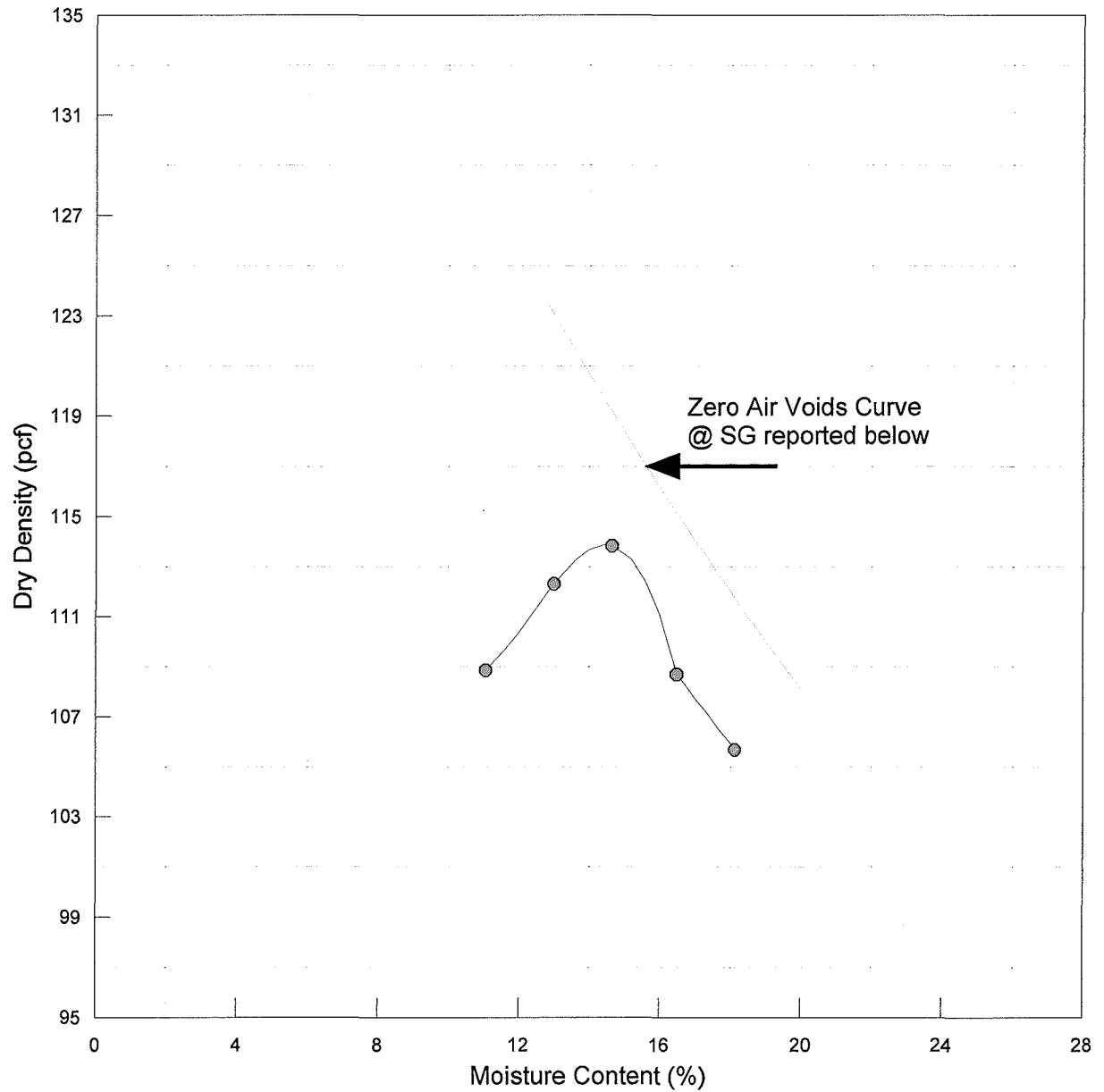
Wt of soil & mold (lb)	14.14	14.02	14.01	13.82	13.95
Wt. of mold (lb)	9.79	9.79	9.79	9.79	9.79
Net wt. of wet soil (lb)	4.35	4.23	4.22	4.03	4.16
Net wt of dry soil (lb)	3.79	3.74	3.62	3.63	3.52
Dry Density, (pcf)	113.82	112.30	108.68	108.86	105.65
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

Data entered by: TMR Date: 01/15/2014
 Data checked by: an Date: 1/15/14
 FileName: PRB20408



Proctor Compaction Test

NB-B2-04, 0-10',



Best Fit Curve

● Actual Data

Zero Air Voids Curve @ SG = 2.65

OPTIMUM MOISTURE CONTENT = 14.5 MAXIMUM DRY DENSITY = 113.9
ASTM D 698 A, Rock correction applied? N

COMPACTION TEST
ASTM D 698 A

CLIENT:	MWH	JOB NO.	2512-77
BORING NO.	DH-B1-03	DATE SAMPLED	12/10/2013
DEPTH	0-10'	DATE TESTED	01/15/2014 TMR/BDF
SAMPLE NO.		LOCATION	Church Rock
SOIL DESCR.	Silty Clay w/ Sand		

Moisture Determination

	1	2	3	4	5
Wt of Moisture added (ml)	280.00	240.00	320.00	200.00	360.00
Wt. of soil & dish (g)	602.30	485.77	501.31	526.54	544.01
Dry wt. soil & dish (g)	530.57	434.93	434.63	479.10	465.98
Net loss of moisture (g)	71.73	50.84	66.68	47.44	78.03
Wt. of dish (g)	6.58	6.58	6.52	6.49	6.57
Net wt. of dry soil (g)	523.99	428.35	428.11	472.61	459.41
Moisture Content (%)	13.69	11.87	15.58	10.04	16.98
Corrected Moisture Content					

Density determination

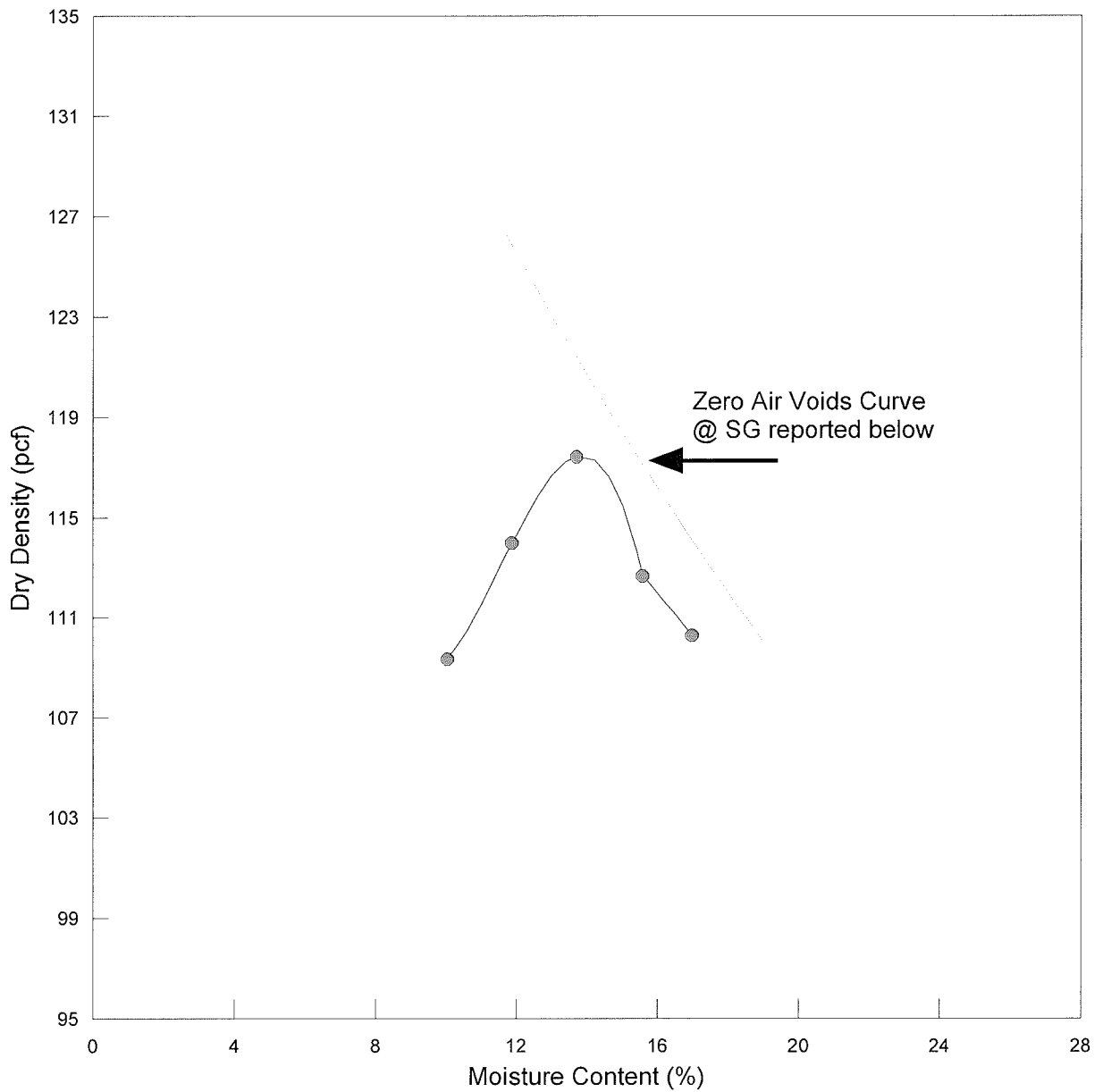
Wt of soil & mold (lb)	14.23	14.03	14.12	13.79	14.08
Wt. of mold (lb)	9.78	9.78	9.78	9.78	9.78
Net wt. of wet soil (lb)	4.45	4.25	4.34	4.01	4.30
Net wt of dry soil (lb)	3.91	3.80	3.76	3.64	3.68
Dry Density, (pcf)	117.43	113.97	112.65	109.33	110.27
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

Data entered by: TMR Date: 01/16/2014
 Data checked by: SJL Date: 1/16/14
 FileName: PRB10309



Proctor Compaction Test

DH-B1-03, 0-10',



Best Fit Curve

● Actual Data

Zero Air Voids Curve @ SG = 2.65

OPTIMUM MOISTURE CONTENT = 13.8 MAXIMUM DRY DENSITY = 117.5
ASTM D 698 A, Rock correction applied? N

COMPACTION TEST
ASTM D 698 A

CLIENT:	MWH	JOB NO.	2512-77
BORING NO.	WB-B5-005	DATE SAMPLED	11/18/2013
DEPTH	0-10'	DATE TESTED	01/10/2014 TMR
SAMPLE NO.		LOCATION	Church Rock
SOIL DESCR.	Sand w/ Silt		

Moisture Determination

	1	2	3	4	5
Wt of Moisture added (ml)	200.00	160.00	240.00	120.00	280.00
Wt. of soil & dish (g)	617.47	631.90	530.95	636.99	519.59
Dry wt. soil & dish (g)	549.49	571.27	465.29	585.80	448.43
Net loss of moisture (g)	67.98	60.63	65.66	51.19	71.16
Wt. of dish (g)	6.53	8.26	6.49	6.55	6.74
Net wt. of dry soil (g)	542.96	563.01	458.80	579.25	441.69
Moisture Content (%)	12.52	10.77	14.31	8.84	16.11
Corrected Moisture Content					

Density determination

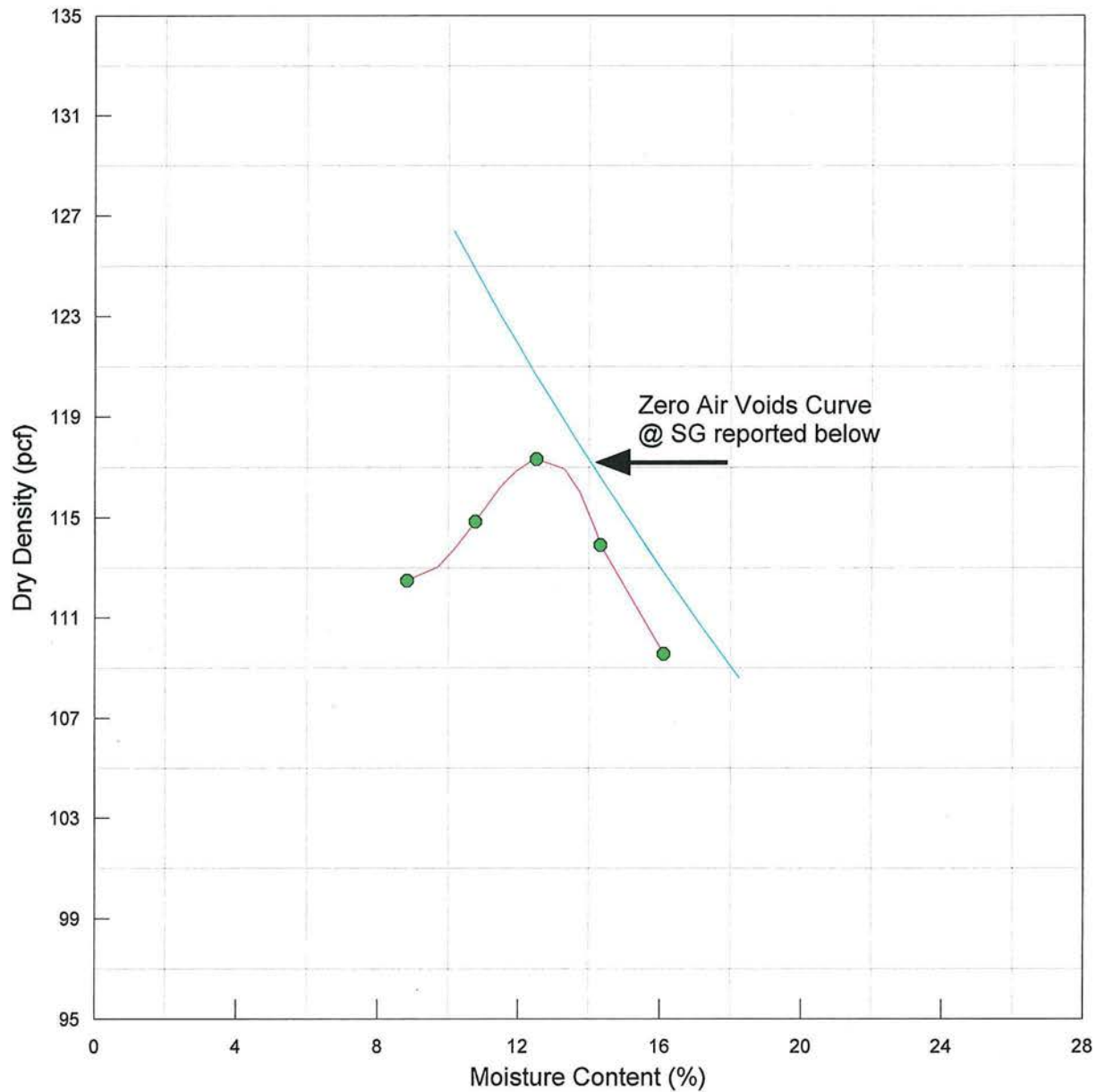
Wt of soil & mold (lb)	14.19	14.03	14.13	13.87	14.03
Wt. of mold (lb)	9.79	9.79	9.79	9.79	9.79
Net wt. of wet soil (lb)	4.40	4.24	4.34	4.08	4.24
Net wt of dry soil (lb)	3.91	3.83	3.80	3.75	3.65
Dry Density, (pcf)	117.31	114.83	113.90	112.46	109.55
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

Data entered by: TMR Date: 01/15/2014
 Data checked by: SH Date: 1/15/14
 FileName: PRB50507



Proctor Compaction Test

WB-B5-005, 0-10',



Best Fit Curve

● Actual Data

— Zero Air Voids Curve @ SG = 2.55

OPTIMUM MOISTURE CONTENT = 12.7 MAXIMUM DRY DENSITY = 117.3
ASTM D 698 A, Rock correction applied? N

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: SB-B1-04
Depth: 0-25'
Sample No.: --
Date Tested: 6/24/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 937.02g
Dry Weight Soil & Dish: 925.38g
Weight Of Water: 11.64g
Dish Weight: 813.49g
Dry Weight Soil: 111.89g
Moisture Content: 10.40%

Classification: ND1

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: More Than 2x The Size

Sample Type: Remolded



Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2723lbs, 123.53g
Wet Density: 106.36lbs/ft³, 1704kg/m³
Dry Density: 96.33lbs/ft³, 1543kg/m³

Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	30ml	60s	0.008gal/min, 0.5ml/s	Moderately Dark	Few Sediments
	30ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Few Sediments
	30ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Few Sediments
	28ml	60s	0.007gal/min, 0.5ml/s	Barely Visible	Few Sediments
	29ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	Few Sediments
	32ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	Few Sediments
	34ml	60s	0.009gal/min, 0.6ml/s	Barely Visible	Few Sediments
	37ml	60s	0.010gal/min, 0.6ml/s	Barely Visible	
	37ml	60s	0.010gal/min, 0.6ml/s	Barely Visible	
	38ml	60s	0.010gal/min, 0.6ml/s	Clear	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	88ml	60s	0.023gal/min, 1.5ml/s	Slightly Dark	Sediments
	76ml	60s	0.020gal/min, 1.3ml/s	Barely Visible	Sediments
	67ml	60s	0.018gal/min, 1.1ml/s	Barely Visible	Sediments
	66ml	60s	0.017gal/min, 1.1ml/s	Barely Visible	Sediments
	64ml	60s	0.017gal/min, 1.1ml/s	Barely Visible	
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	99ml	60s	0.026gal/min, 1.7ml/s	Barely Visible	Sediments
	102ml	60s	0.027gal/min, 1.7ml/s	Barely Visible	Sediments
	99ml	60s	0.026gal/min, 1.7ml/s	Barely Visible	Sediments
	106ml	60s	0.028gal/min, 1.8ml/s	Barely Visible	
	109ml	60s	0.029gal/min, 1.8ml/s	Barely Visible	
Forty Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	171ml	60s	0.045gal/min, 2.9ml/s	Slightly Dark	Sediments
	138ml	60s	0.036gal/min, 2.3ml/s	Barely Visible	Sediments
	141ml	60s	0.037gal/min, 2.4ml/s	Barely Visible	Few Sediments
	147ml	60s	0.039gal/min, 2.5ml/s	Barely Visible	Few Sediments
	137ml	60s	0.036gal/min, 2.3ml/s	Barely Visible	Few Sediments

File Name: 2512_77_pinhole-ASTMD-4647-R2_10.xls
Entered By: TBT

Date: 6/25/2014

Data Checked By: kr
Date: 6/26/14

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: --
Project: --
Location: Church Rock
Project No.: --

Boring No.: WB-B1-06
Depth: 5-10
Sample No.: --
Date Tested: 06/24/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 890.17g
Dry Weight Soil & Dish: 879.95g
Weight Of Water: 10.22g
Dish Weight: 770.67g
Dry Weight Soil: 109.28g
Moisture Content: 9.35%

Classification: **ND3**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: 2x The Size

Sample Type: Remolded



Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2635lbs, 119.50g
Wet Density: 102.89lbs/ft³, 1648kg/m³
Dry Density: 94.09lbs/ft³, 1507kg/m³

Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	19ml	60s	0.005gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
	17ml	60s	0.004gal/min, 0.3ml/s	Clear	
	16ml	60s	0.004gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
	17ml	60s	0.004gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	70ml	60s	0.018gal/min, 1.2ml/s	Barely Visible	
	72ml	60s	0.019gal/min, 1.2ml/s	Barely Visible	
	71ml	60s	0.019gal/min, 1.2ml/s	Barely Visible	
	71ml	60s	0.019gal/min, 1.2ml/s	Barely Visible	
	76ml	60s	0.020gal/min, 1.3ml/s	Clear	
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	135ml	60s	0.036gal/min, 2.3ml/s	Barely Visible	
	131ml	60s	0.035gal/min, 2.2ml/s	Barely Visible	
	143ml	60s	0.038gal/min, 2.4ml/s	Barely Visible	
	141ml	60s	0.037gal/min, 2.4ml/s	Barely Visible	
	162ml	60s	0.043gal/min, 2.7ml/s	Barely Visible	

File Name: 2512_77_pinhole-ASTMD-4647-R2_9.xls
Entered By: DAW Date: 6/25/2014

Data Checked By: vr
Date: 6/25/14

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: WB-B2-05
Depth: 10-20'
Sample No.: --
Date Tested: 06/23/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 948.04g
Dry Weight Soil & Dish: 939.05g
Weight Of Water: 8.99g
Dish Weight: 829.11g
Dry Weight Soil: 109.94g
Moisture Content: 8.18%

Classification: **ND3**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: 2x size

Sample Type: Remolded



Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2622lbs, 118.93g
Wet Density: 102.40lbs/ft³, 1640kg/m³
Dry Density: 94.66lbs/ft³, 1516kg/m³

Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	28ml	60s	0.007gal/min, 0.5ml/s	Clear	
	24ml	60s	0.006gal/min, 0.4ml/s	Clear	Few sediments
	24ml	60s	0.006gal/min, 0.4ml/s	Clear	Few sediments
	26ml	60s	0.007gal/min, 0.4ml/s	Clear	
	25ml	60s	0.007gal/min, 0.4ml/s	Clear	
	26ml	60s	0.007gal/min, 0.4ml/s	Clear	
	26ml	60s	0.007gal/min, 0.4ml/s	Clear	
	28ml	60s	0.007gal/min, 0.5ml/s	Clear	
	26ml	60s	0.007gal/min, 0.4ml/s	Clear	
	27ml	60s	0.007gal/min, 0.5ml/s	Clear	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	80ml	60s	0.021gal/min, 1.3ml/s	Clear	Few sediments
	78ml	60s	0.021gal/min, 1.3ml/s	Clear	
	79ml	60s	0.021gal/min, 1.3ml/s	Clear	
	76ml	60s	0.020gal/min, 1.3ml/s	Clear	
	84ml	60s	0.022gal/min, 1.4ml/s	Clear	
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	134ml	60s	0.035gal/min, 2.2ml/s	Clear	
	155ml	60s	0.041gal/min, 2.6ml/s	Clear	
	162ml	60s	0.043gal/min, 2.7ml/s	Clear	
	115ml	60s	0.030gal/min, 1.9ml/s	Clear	
	120ml	60s	0.032gal/min, 2.0ml/s	Clear	

File Name: 2512_77_pinhole-ASTMD-4647-R2_3.xls
Entered By: DAW Date: 6/25/2014

Data Checked By: KA
Date: 6/25/14

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: SB-B4-01
Depth: 0-15'
Sample No.: --
Date Tested: 06/23/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 917.08g
Dry Weight Soil & Dish: 903.00g
Weight Of Water: 14.08g
Dish Weight: 791.00g
Dry Weight Soil: 112.00g
Moisture Content: 12.57%

Classification: **ND3**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: 2x size

Sample Type: Remolded

Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2780lbs, 126.08g
Wet Density: 108.55lbs/ft³, 1739kg/m³
Dry Density: 96.43lbs/ft³, 1545kg/m³



Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	39ml	60s	0.010gal/min, 0.7ml/s	Clear	
	35ml	60s	0.009gal/min, 0.6ml/s	Clear	
	31ml	60s	0.008gal/min, 0.5ml/s	Clear	
	34ml	60s	0.009gal/min, 0.6ml/s	Clear	
	31ml	60s	0.008gal/min, 0.5ml/s	Clear	
	32ml	60s	0.008gal/min, 0.5ml/s	Clear	
	29ml	60s	0.008gal/min, 0.5ml/s	Clear	
	29ml	60s	0.008gal/min, 0.5ml/s	Clear	
	28ml	60s	0.007gal/min, 0.5ml/s	Clear	
	26ml	60s	0.007gal/min, 0.4ml/s	Clear	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	77ml	60s	0.020gal/min, 1.3ml/s	Clear	
	74ml	60s	0.020gal/min, 1.2ml/s	Clear	
	75ml	60s	0.020gal/min, 1.3ml/s	Clear	
	68ml	60s	0.018gal/min, 1.1ml/s	Clear	
	73ml	60s	0.019gal/min, 1.2ml/s	Clear	
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	120ml	60s	0.032gal/min, 2.0ml/s	Clear	
	115ml	60s	0.030gal/min, 1.9ml/s	Clear	
	108ml	60s	0.029gal/min, 1.8ml/s	Clear	
	114ml	60s	0.030gal/min, 1.9ml/s	Clear	
	115ml	60s	0.030gal/min, 1.9ml/s	Clear	

File Name: 2512_77_pinhole-ASTMD-4647-R2_4.xls
Entered By: DAW Date: 6/25/2014

Data Checked By: KA
Date: 6/25/14

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: DH-B1-10
Depth: 35-45'
Sample No.: --
Date Tested: 06/24/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 919.94g
Dry Weight Soil & Dish: 905.63g
Weight Of Water: 14.31g
Dish Weight: 789.49g
Dry Weight Soil: 116.14g
Moisture Content: 12.32%

Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2876lbs, 130.45g
Wet Density: 112.31lbs/ft³, 1799kg/m³
Dry Density: 99.99lbs/ft³, 1602kg/m³

Classification: ND3

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: Same

Sample Type: Remolded



Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	34ml	60s	0.009gal/min, 0.6ml/s	Slightly Dark	
	30ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	30ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	31ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	30ml	60s	0.008gal/min, 0.5ml/s	Clear	
	29ml	60s	0.008gal/min, 0.5ml/s	Clear	
	29ml	60s	0.008gal/min, 0.5ml/s	Clear	
	27ml	60s	0.007gal/min, 0.5ml/s	Clear	
	27ml	60s	0.007gal/min, 0.5ml/s	Clear	
	25ml	60s	0.007gal/min, 0.4ml/s	Clear	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	70ml	60s	0.018gal/min, 1.2ml/s	Clear	
	67ml	60s	0.018gal/min, 1.1ml/s	Clear	
	68ml	60s	0.018gal/min, 1.1ml/s	Clear	
	69ml	60s	0.018gal/min, 1.2ml/s	Clear	
	69ml	60s	0.018gal/min, 1.2ml/s	Clear	
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	114ml	60s	0.030gal/min, 1.9ml/s	Barely Visible	
	114ml	60s	0.030gal/min, 1.9ml/s	Clear	
	119ml	60s	0.031gal/min, 2.0ml/s	Clear	
	106ml	60s	0.028gal/min, 1.8ml/s	Clear	
	111ml	60s	0.029gal/min, 1.9ml/s	Clear	

File Name: 2512_77_pinhole-ASTMD-4647-R2_5.xls

Entered By: DAW

Date: 6/25/2014

Data Checked By: KA

Date: 6/25/14

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: NB-B2-04
Depth: 0-10'
Sample No.: --
Date Tested: 06/24/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 1144.93g
Dry Weight Soil & Dish: 1137.17g
Weight Of Water: 7.76g
Dish Weight: 1025.33g
Dry Weight Soil: 111.84g
Moisture Content: 6.94%

Classification: **ND3**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: Over 2x size

Sample Type: Remolded



Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2637lbs, 119.60g
Wet Density: 102.97lbs/ft³, 1649kg/m³
Dry Density: 96.29lbs/ft³, 1542kg/m³

Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	15ml	60s	0.004gal/min, 0.3ml/s	Barely Visible	Very few sediments
	14ml	60s	0.004gal/min, 0.2ml/s	Clear	
	15ml	60s	0.004gal/min, 0.3ml/s	Clear	
	15ml	60s	0.004gal/min, 0.3ml/s	Clear	
	15ml	60s	0.004gal/min, 0.3ml/s	Clear	
	17ml	60s	0.004gal/min, 0.3ml/s	Clear	
	17ml	60s	0.004gal/min, 0.3ml/s	Clear	
	17ml	60s	0.004gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
	18ml	60s	0.005gal/min, 0.3ml/s	Clear	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	55ml	60s	0.015gal/min, 0.9ml/s	Barely Visible	Very few sediments
	58ml	60s	0.015gal/min, 1.0ml/s	Barely Visible	
	53ml	60s	0.014gal/min, 0.9ml/s	Clear	
	66ml	60s	0.017gal/min, 1.1ml/s	Clear	
	59ml	60s	0.016gal/min, 1.0ml/s	Clear	
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	118ml	60s	0.031gal/min, 2.0ml/s	Clear	Very few sediments
	107ml	60s	0.028gal/min, 1.8ml/s	Barely Visible	Very few sediments
	111ml	60s	0.029gal/min, 1.9ml/s	Barely Visible	Very few sediments
	113ml	60s	0.030gal/min, 1.9ml/s	Barely Visible	Very few sediments
	119ml	60s	0.031gal/min, 2.0ml/s	Barely Visible	Very few sediments

File Name: 2512_77_pinhole-ASTMD-4647-R2_6.xls
Entered By: DAW Date: 6/25/2014

Data Checked By: KA
Date: 6/25/14

Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: EB-B6-03
Depth: 0-10'
Sample No.: --
Date Tested: 06/20/14

By: KR/TT

Before Test Moisture Content

Wet Weight Soil & Dish: 127.79g
Dry Weight Soil & Dish: 117.00g
Weight Of Water: 10.79g
Dish Weight: 4.45g
Dry Weight Soil: 112.55g
Moisture Content: 9.59%

Classification: **ND3**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: Unable to measure

Sample Type: Remolded



Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2719lbs, 123.34g
Wet Density: 106.19lbs/ft³, 1701kg/m³
Dry Density: 96.90lbs/ft³, 1552kg/m³

Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	40ml	60s	0.011gal/min, 0.7ml/s	Barely Visible	
	31ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	30ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	31ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	30ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	29ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	30ml	60s	0.008gal/min, 0.5ml/s	Barely Visible	
	28ml	60s	0.007gal/min, 0.5ml/s	Clear	
	28ml	60s	0.007gal/min, 0.5ml/s	Clear	
	27ml	60s	0.007gal/min, 0.5ml/s	Slightly Dark	
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	70ml	60s	0.018gal/min, 1.2ml/s	Slightly Dark	Particles Present
	76ml	60s	0.020gal/min, 1.3ml/s	Barely Visible	Particles Present
	80ml	60s	0.021gal/min, 1.3ml/s	Barely Visible	Particles Present
	72ml	60s	0.019gal/min, 1.2ml/s	Barely Visible	Particles Present
	75ml	60s	0.020gal/min, 1.3ml/s	Barely Visible	Particles Present
Fifteen Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	93ml	45s	0.033gal/min, 2.1ml/s	Moderately Dark	Particles Visible
	93ml	45s	0.033gal/min, 2.1ml/s	Slightly Dark	Particles Visible
	93ml	45s	0.033gal/min, 2.1ml/s	Moderately Dark	Particles Visible
	94ml	45s	0.033gal/min, 2.1ml/s	Moderately Dark	Particles Visible
	96ml	45s	0.034gal/min, 2.1ml/s	Moderately Dark	Particles Visible

File Name: 2512_77_pinhole-ASTMD-4647-R2_0.xls
Entered By: DAW Date: 6/23/2014

Data Checked By: KR
Date: 6/23/14

**Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647**

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: EB-B4-06
Depth: 10-20'
Sample No.: --
Date Tested: 06/20/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 130.00g
Dry Weight Soil & Dish: 119.95g
Weight Of Water: 10.05g
Dish Weight: 4.37g
Dry Weight Soil: 115.58g
Moisture Content: 8.70%

Classification: **ND3**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: Unable to measure

Sample Type: Remolded



Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2770lbs, 125.63g
Wet Density: 108.16lbs/ft³, 1733kg/m³
Dry Density: 99.51lbs/ft³, 1594kg/m³

Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	30ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Particles Present
	42ml	60s	0.011gal/min, 0.7ml/s	Slightly Dark	Particles Present
	38ml	60s	0.010gal/min, 0.6ml/s	Slightly Dark	Particles Present
	37ml	60s	0.010gal/min, 0.6ml/s	Slightly Dark	Particles Present
	34ml	60s	0.009gal/min, 0.6ml/s	Slightly Dark	Particles Present
	32ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Particles Present
	30ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Particles Present
	28ml	60s	0.007gal/min, 0.5ml/s	Slightly Dark	Particles Present
	31ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Particles Present
	26ml	60s	0.007gal/min, 0.4ml/s	Slightly Dark	Particles Present
Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	79ml	50s	0.025gal/min, 1.6ml/s	Slightly Dark	Particles - Sample collapsed
	100ml	20s	0.079gal/min, 5.0ml/s	Slightly Dark	Particles - Sample collapsed

NOTE: Sample collapsed and flow dramatically increased causing particles to be released.

File Name: 2512_77_pinhole-ASTMD-4647-R2_1.xls
Entered By: DAW Date: 6/23/2014

Data Checked By: KR
Date: 6/23/14

Identification and Classification of Dispersive Clay Soils by the Pinhole Test
ASTM D 4647

Client: MWH
Job No.: 2512-77
Project: --
Location: Church Rock
Project No.: --

Boring No.: DH-B1-03
Depth: 0-10'
Sample No.: --
Date Tested: 06/23/14

By: TBT

Before Test Moisture Content

Wet Weight Soil & Dish: 958.64g
Dry Weight Soil & Dish: 942.89g
Weight Of Water: 15.75g
Dish Weight: 843.20g
Dry Weight Soil: 99.69g
Moisture Content: 15.80%

Before Test Density

Height: 1.50in, 0.0381m
Diameter: 1.94in, 0.0492m
Weight: 0.2685lbs, 121.79g
Wet Density: 104.86lbs/ft³, 1680kg/m³
Dry Density: 90.55lbs/ft³, 1451kg/m³

Classification: **ND4**

Original Pinhole Diameter: 0.04in, 0.0010m
Final Pinhole Diameter: Could not measure

Sample Type: Remolded



Test Data

Two Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	16ml	60s	0.004gal/min, 0.3ml/s	Clear	
	13ml	60s	0.003gal/min, 0.2ml/s	Clear	
	9ml	60s	0.002gal/min, 0.2ml/s	Slightly Dark	
	55ml	60s	0.015gal/min, 0.9ml/s	Slightly Dark	Sediments present
	43ml	60s	0.011gal/min, 0.7ml/s	Slightly Dark	Sediments present
	30ml	60s	0.008gal/min, 0.5ml/s	Slightly Dark	Sediments present
	14ml	60s	0.004gal/min, 0.2ml/s	Slightly Dark	Sediments present
	7ml	60s	0.002gal/min, 0.1ml/s	Barely Visible	Sediments present

Seven Inch Head Height	Flow	Elapsed Time	Flow Rate	Turbidity	Observations
	86ml	60s	0.023gal/min, 1.4ml/s	Dark	Sediments present
	95ml	60s	0.025gal/min, 1.6ml/s	Dark	Sediments present
	200ml	60s	0.053gal/min, 3.3ml/s	Dark	Sediments present

File Name: 2512_77_pinhole-ASTMD-4647-R2_8.xls
Entered By: DAW Date: 6/25/2014

Data Checked By: Ka
Date: 6/25/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	West Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	WB-B2-05 80%	TEST FINISHED	05/12/14 CAL
LOCATION	Church Rock	CELL NUMBER	2P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	345.8	402.1
Wt. Wet Soil & Pan (g)	352.7	409.1
Wt. Dry Soil & Pan (g)	330.4	330.4
Wt. Lost Moisture (g)	22.3	78.6
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	323.5	323.5
Moisture Content %	6.9	24.3
Wet Density PCF	98.0	129.3
Dry Density PCF	91.7	104.0

Init. Diameter (in)	2.407	(cm)	6.114
Init. Area (sq in)	4.550	(sq cm)	29.359
Init. Height (in)	2.953	(cm)	7.501
Vol. Bef. Consol. (cu ft)	0.00778		
Vol. After Consol. (cu ft)	0.00685		
Porosity %	40.51		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	2.683
Diameter	2.371
Pressure (psi)	0.233
Area after consol. (cm*cm)	28.480
Gradient	2.404
Permeability k (cm/s)	8.5E-05
Permeability k (m/s)	8.5E-07
Back Pressure (psi)	78.0
Cell Pressure (psi)	81.0
Ave. Effective Stress (psi)	2.884

Average temperature degree C: 21.7

NOTE: Unable to achieve 80% compaction as sample was falling apart.

Data entry by: DAW Date: 05/15/2014
 Checked by: ca Date: 5/14/15
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_33.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	West Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	WB-B2-05 80%	TEST FINISHED	05/12/14 CAL
LOCATION	Church Rock	SETUP NO.	2P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	5.0	28.7				
50.0	48.0	33.0	35.9	38.4	47.0	8.6	0.86
60.0	58.0	36.9	38.7	48.1	56.5	8.4	0.84
70.0	68.0	39.5	40.8	57.9	66.8	8.9	0.89
80.0	78.0	41.3	42.5	67.7	77.1	9.4	0.94
90.0		42.7	42.8	78.2	87.8	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	1.30	0.00
0.25	0.50	1.80	-0.50
0.5	0.71	1.80	-0.50
1	1.00	1.80	-0.50
2	1.41	1.90	-0.60
4	2.00	1.90	-0.60
9	3.00	1.90	-0.60
16	4.00	1.90	-0.60
30	5.48	1.90	-0.60
60	7.75	1.95	-0.65
120	10.95	2.00	-0.70
240	15.49	2.00	-0.70
360	18.97	2.10	-0.80

Initial Height (in)	2.953	Init. Vol. (CC)	220.234
Height Change (in)	0.270	Vol. Change (CC)	40.100
Ht. After Cons. (in)	2.683	Cell Exp. (CC)	13.989
Initial Area (sq in)	4.550	Net Change (CC)	26.112
Area After Cons. (sq in)	4.414	Cons. Vol. (CC)	194.123

Data entry by: DAW Date: 05/15/2014

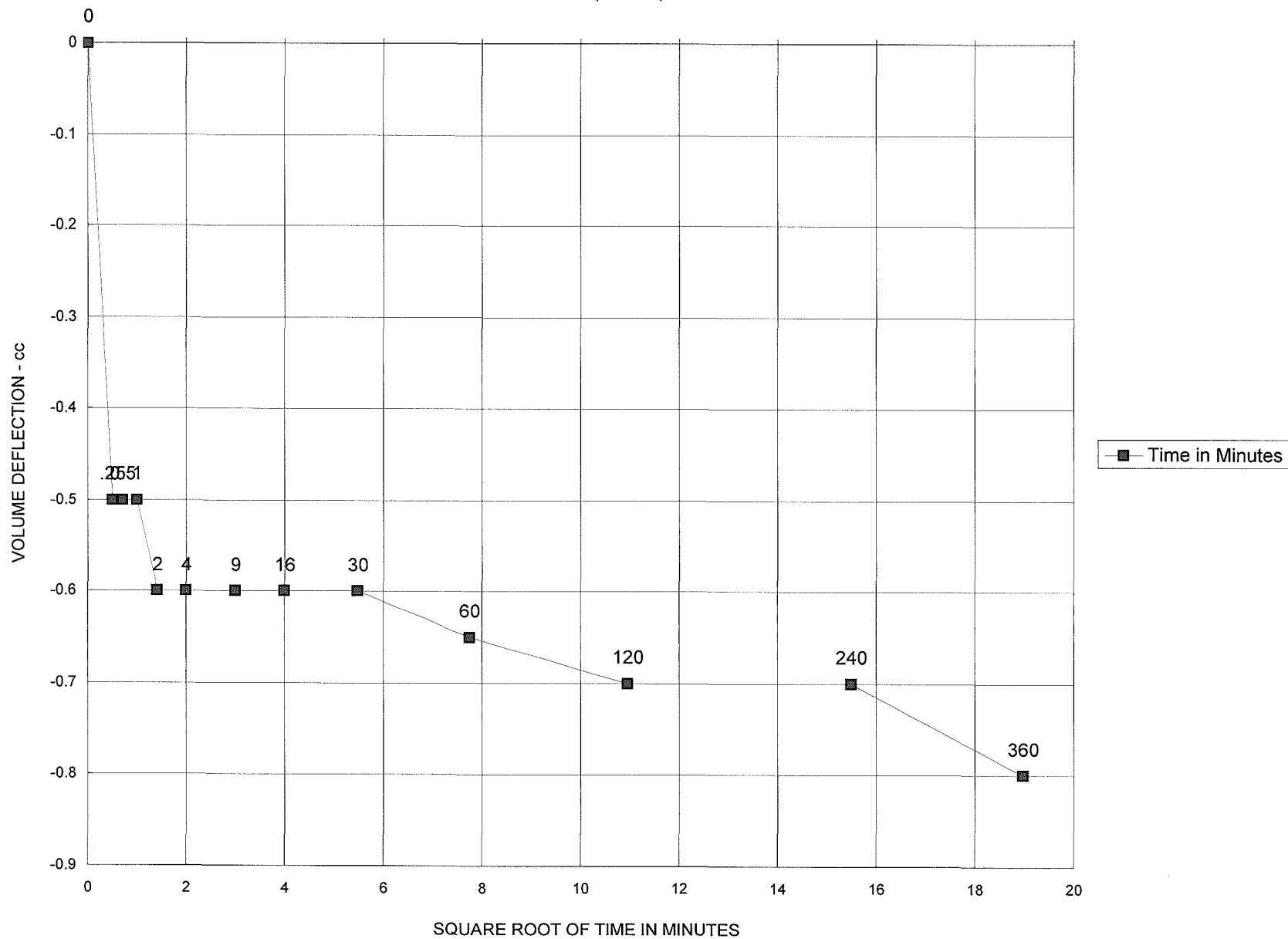
Checked by: cm Date: 5/14/15

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_33.xls



CONSOLIDATION DATA

West Borrow, 10-20', WB-B2-05 80%



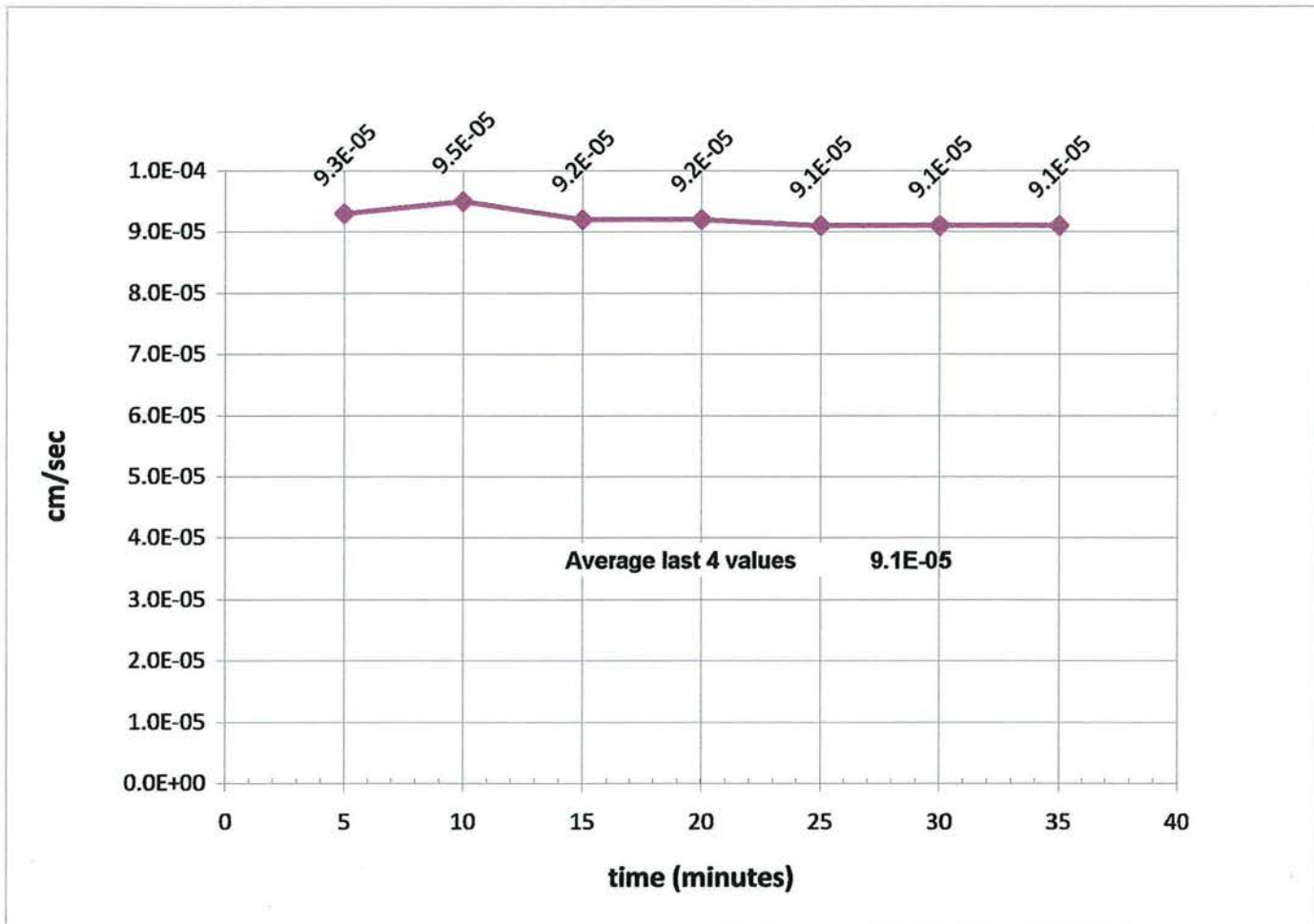


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

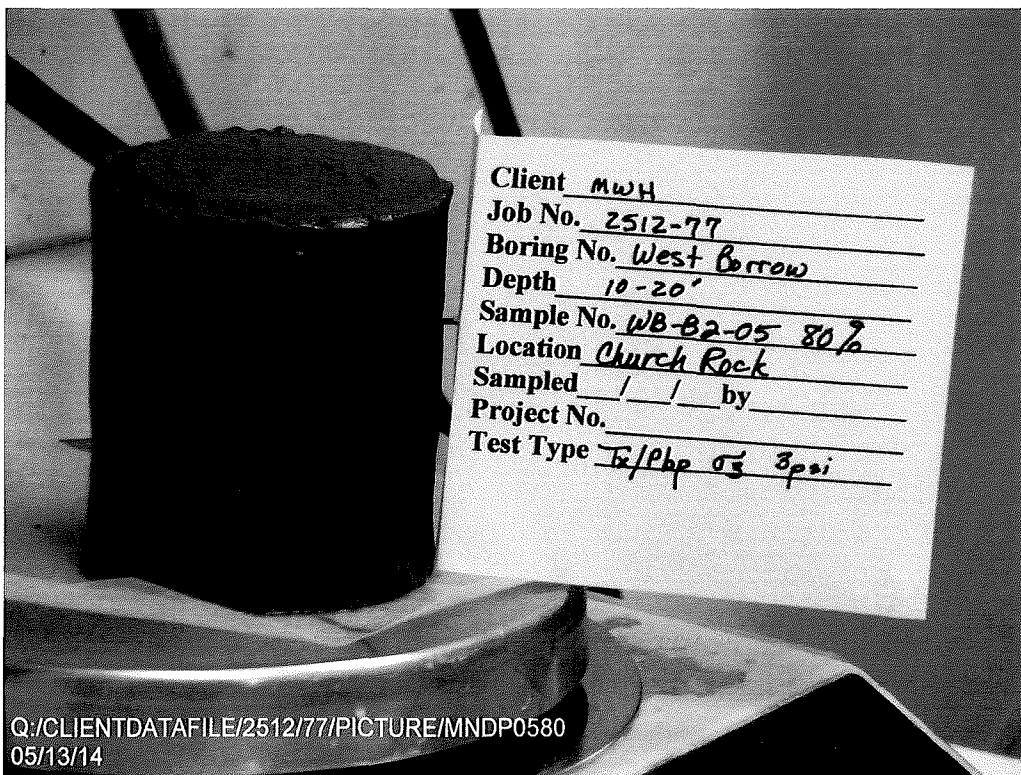
Boring Number: West Borrow
Depth: 10-20'
Sample Number: WB-B2-05 80%
Sampled Date: --
Test Date: 5/12/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/12/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_33.xls

Checked By: BYU
Date: 05/13/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP0580
05/13/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	North Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/29/14 CAL
SAMPLE NO.	NB-B2-04 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	CELL NUMBER	11P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	348.2	421.2
Wt. Wet Soil & Pan (g)	356.4	429.3
Wt. Dry Soil & Pan (g)	335.7	335.7
Wt. Lost Moisture (g)	20.7	93.6
Wt. of Pan Only (g)	8.2	8.2
Wt. of Dry Soil (g)	327.5	327.5
Moisture Content %	6.3	28.6
Wet Density PCF	96.8	123.0
Dry Density PCF	91.1	95.7

Init. Diameter (in)	2.406	(cm)	6.111
Init. Area (sq in)	4.547	(sq cm)	29.334
Init. Height (in)	3.014	(cm)	7.656
Vol. Bef. Consol. (cu ft)	0.00793		
Vol. After Consol. (cu ft)	0.00755		
Porosity %	43.80		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	3.002
Diameter	2.352
Pressure (psi)	0.224
Area after consol. (cm*cm)	28.026
Gradient	2.065
Permeability k (cm/s)	4.0E-04
Permeability k (m/s)	4.0E-06
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.888

Average temperature degree C: 21.9

Data entry by: DAW Date: 05/15/2014
 Checked by: CM Date: 5/15/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_36.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	North Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/29/14 CAL
SAMPLE NO.	NB-B2-04 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	SETUP NO.	11P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
		3.6	18.9				
40.0	38.0	19.4	22.0	38.7	46.2	7.5	0.75
50.0	48.0	22.1	24.0	48.7	56.2	7.5	0.75
60.0	58.0	23.8	24.6	58.8	67.2	8.4	0.84
70.0	68.0	24.7	25.6	69.1	77.8	8.7	0.87
80.0	78.0	25.4	26.2	79.2	88.1	8.9	0.89
90.0	88.0	26.8	27.5	89.0	98.3	9.3	0.93
100.0	98.0	27.9	27.9	98.7	108.2	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.20	0.00
0.25	0.50	0.70	-0.50
0.5	0.71	0.70	-0.50
1	1.00	0.70	-0.50
2	1.41	0.70	-0.50
4	2.00	0.80	-0.60
9	3.00	0.80	-0.60
16	4.00	0.80	-0.60
30	5.48	0.85	-0.65
60	7.75	0.85	-0.65
120	10.95	0.90	-0.70
240	15.49	0.95	-0.75
360	18.97	0.95	-0.75

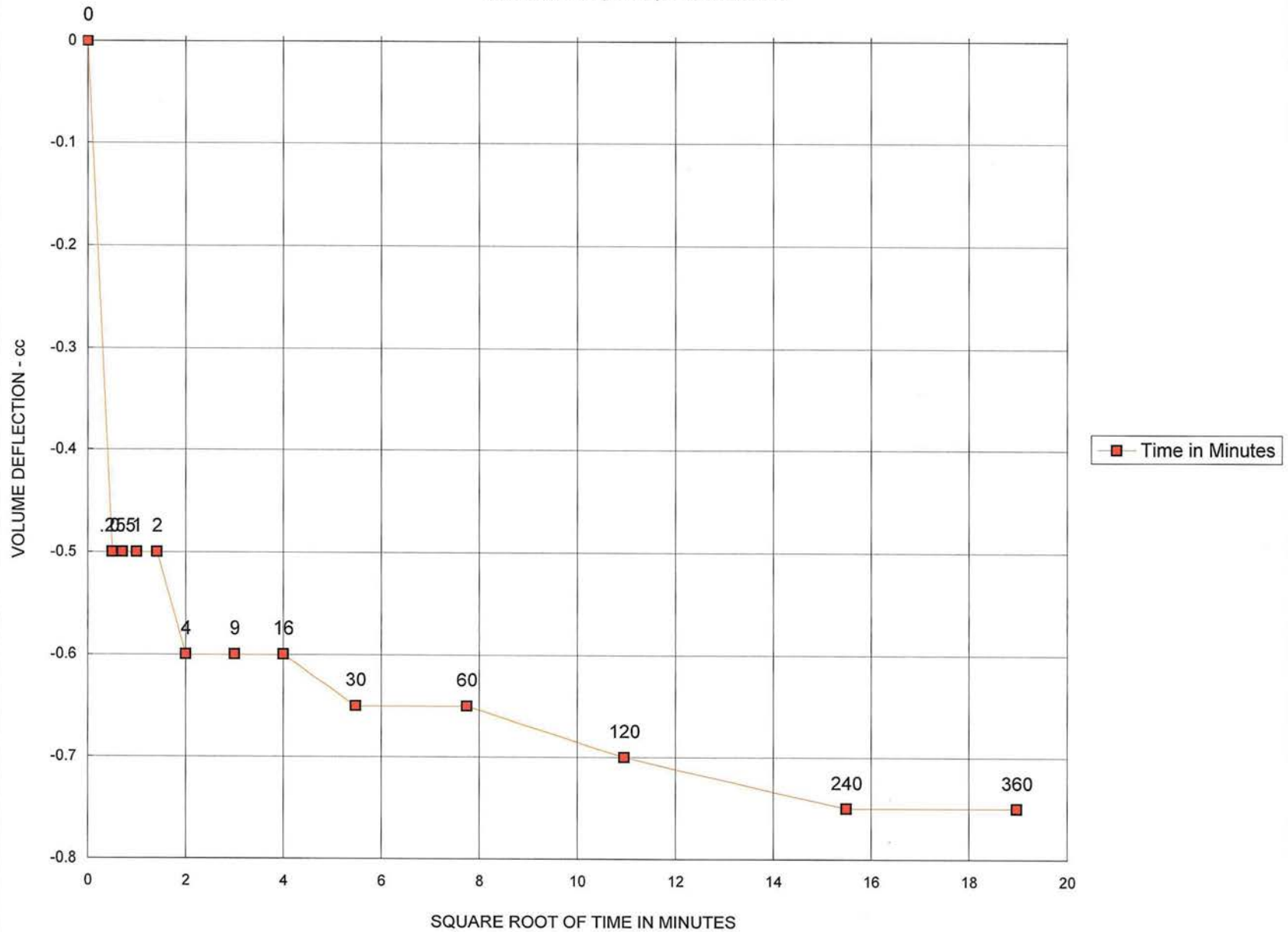
Initial Height (in)	3.014	Init. Vol. (CC)	224.597
Height Change (in)	0.012	Vol. Change (CC)	25.300
Ht. After Cons. (in)	3.002	Cell Exp. (CC)	14.441
Initial Area (sq in)	4.547	Net Change (CC)	10.860
Area After Cons. (sq in)	4.344	Cons. Vol. (CC)	213.737

Data entry by: DAW Date: 05/15/2014
 Checked by: CA Date: 5/14/15
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_36.xls



CONSOLIDATION DATA

North Borrow, 0-10', NB-B2-04 80%



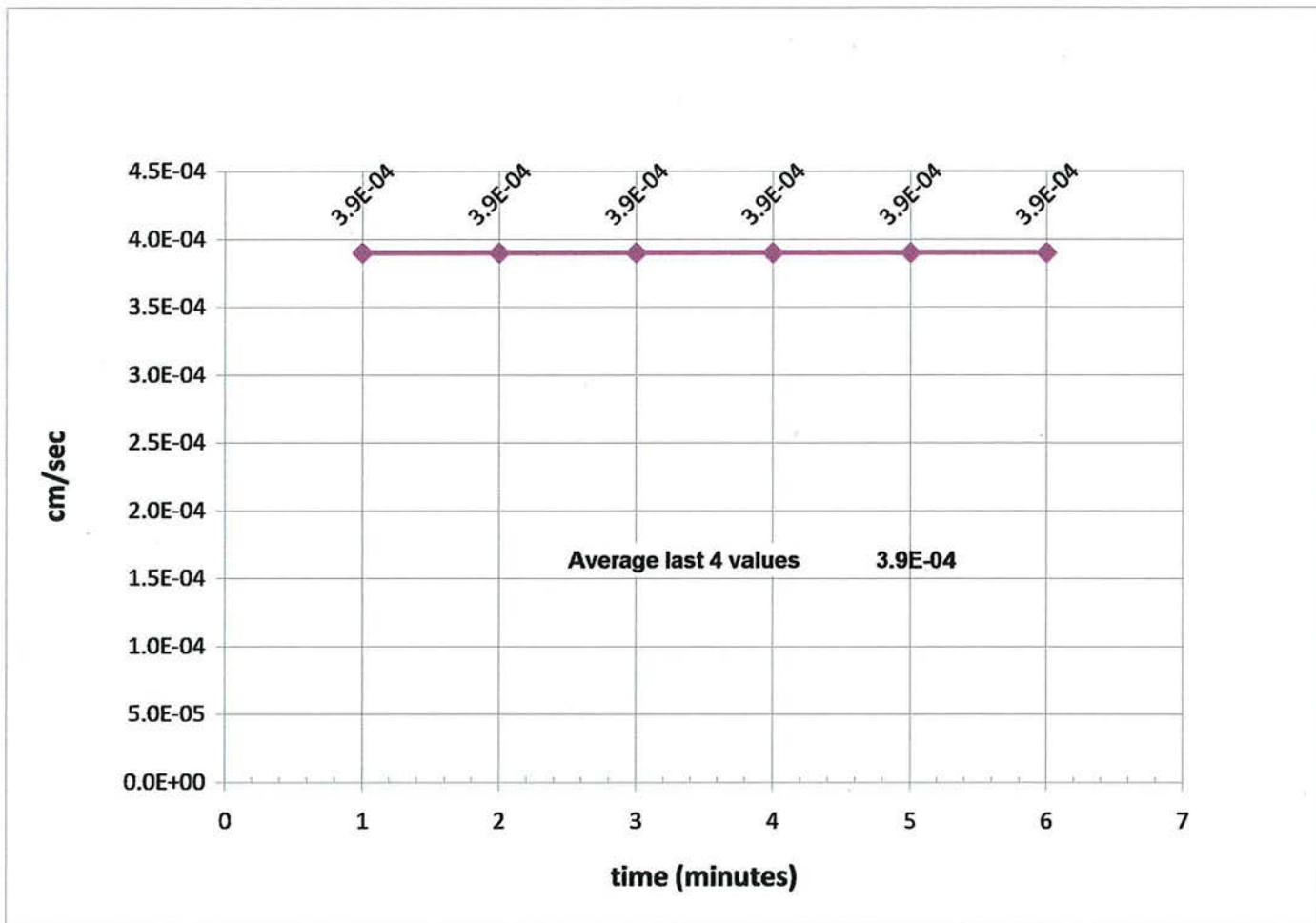


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

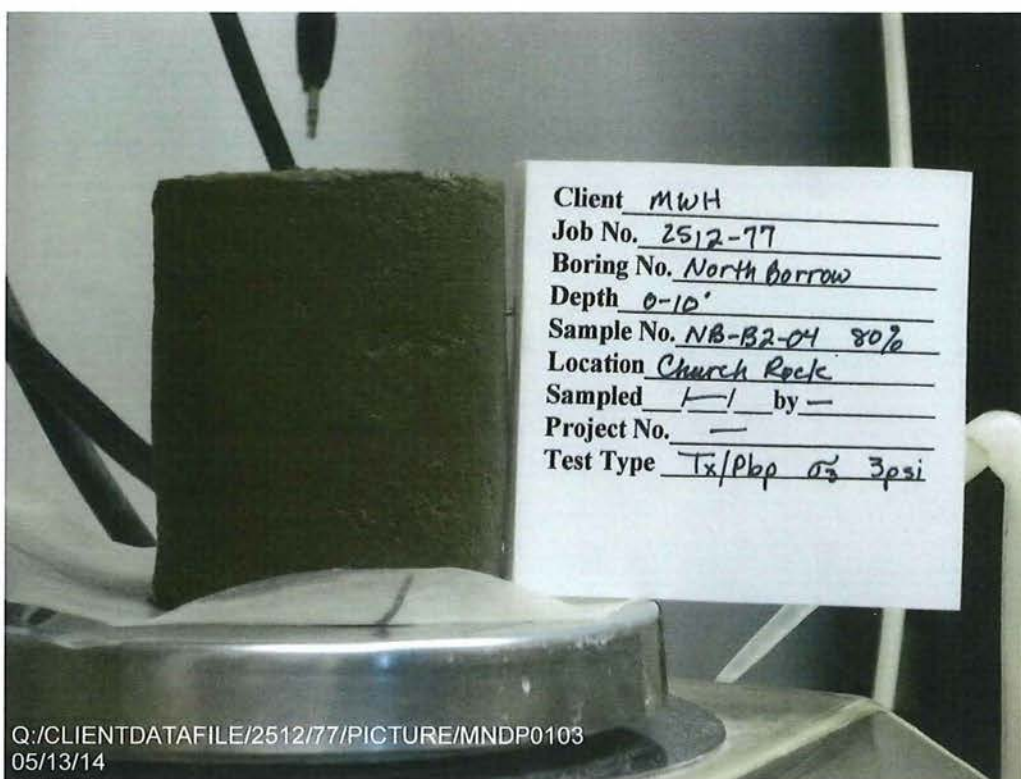
Boring Number: North Borrow
Depth: 0-10'
Sample Number: NB-B2-04 80%
Sampled Date: --
Test Date: 5/13/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/13/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_38.xls

Checked By: DAP
Date: 05/14/14



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05/13/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO. South Borrow
DEPTH 0-25'
SAMPLE NO. SB-B-1-04 80%
LOCATION Church Rock
PROJECT NO. --
SOIL DESCR. Remolded -#4

SAMPLED --
TEST STARTED 04/29/14 CAL
TEST FINISHED 05/13/14 CAL
CELL NUMBER 19S
SATURATED TEST Yes
TEST TYPE TX/Pbp/Tap Water
CONF. PRES. PSF 432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	358.5	420.3
Wt. Wet Soil & Pan (g)	365.4	427.2
Wt. Dry Soil & Pan (g)	336.9	336.9
Wt. Lost Moisture (g)	28.5	90.3
Wt. of Pan Only (g)	6.9	6.9
Wt. of Dry Soil (g)	330.0	330.0
Moisture Content %	8.6	27.4
Wet Density PCF	99.7	127.0
Dry Density PCF	91.8	99.7

Init. Diameter (in)	2.403	(cm)	6.104
Init. Area (sq in)	4.535	(sq cm)	29.261
Init. Height (in)	3.021	(cm)	7.673
Vol. Bef. Consol. (cu ft)	0.00793		
Vol. After Consol. (cu ft)	0.00730		
Porosity %	43.69		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	2.997
Diameter	2.315
Pressure (psi)	0.408
Area after consol. (cm*cm)	27.150
Gradient	3.768
Permeability k (cm/s)	2.3E-04
Permeability k (m/s)	2.3E-06
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.796

Average temperature degree C: 21.0

Data entry by: DAW Date: 05/14/2014
Checked by: CA Date: 5/14/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_34.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-25'	TEST STARTED	04/29/14 CAL
SAMPLE NO.	SB-B-1-04 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	SETUP NO.	19S
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded #4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	3.3	25.9				
50.0	48.0	23.5	26.3	38.1	46.4	8.3	0.83
60.0	58.0	27.4	28.8	48.1	56.7	8.6	0.86
70.0	68.0	28.9	29.9	58.4	67.2	8.8	0.88
80.0	78.0	29.9	30.8	68.7	78.0	9.3	0.93
90.0	88.0	30.9	31.6	78.4	87.7	9.3	0.93
100.0	98.0	32.1	32.8	88.6	98.0	9.4	0.94
110.0		33.1	33.2	97.7	107.4	9.7	0.97

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.60	0.00
0.25	0.50	1.05	-0.45
0.5	0.71	1.05	-0.45
1	1.00	1.05	-0.45
2	1.41	1.10	-0.50
4	2.00	1.10	-0.50
9	3.00	1.10	-0.50
16	4.00	1.10	-0.50
30	5.48	1.15	-0.55
60	7.75	1.15	-0.55
120	10.95	1.15	-0.55
240	15.49	1.20	-0.60
360	18.97	1.30	-0.70

Initial Height (in)	3.021	Init. Vol. (CC)	224.557
Height Change (in)	0.024	Vol. Change (CC)	30.900
Ht. After Cons. (in)	2.997	Cell Exp. (CC)	13.055
Initial Area (sq in)	4.535	Net Change (CC)	17.845
Area After Cons. (sq in)	4.208	Cons. Vol. (CC)	206.713

Data entry by: DAW Date: 05/14/2014

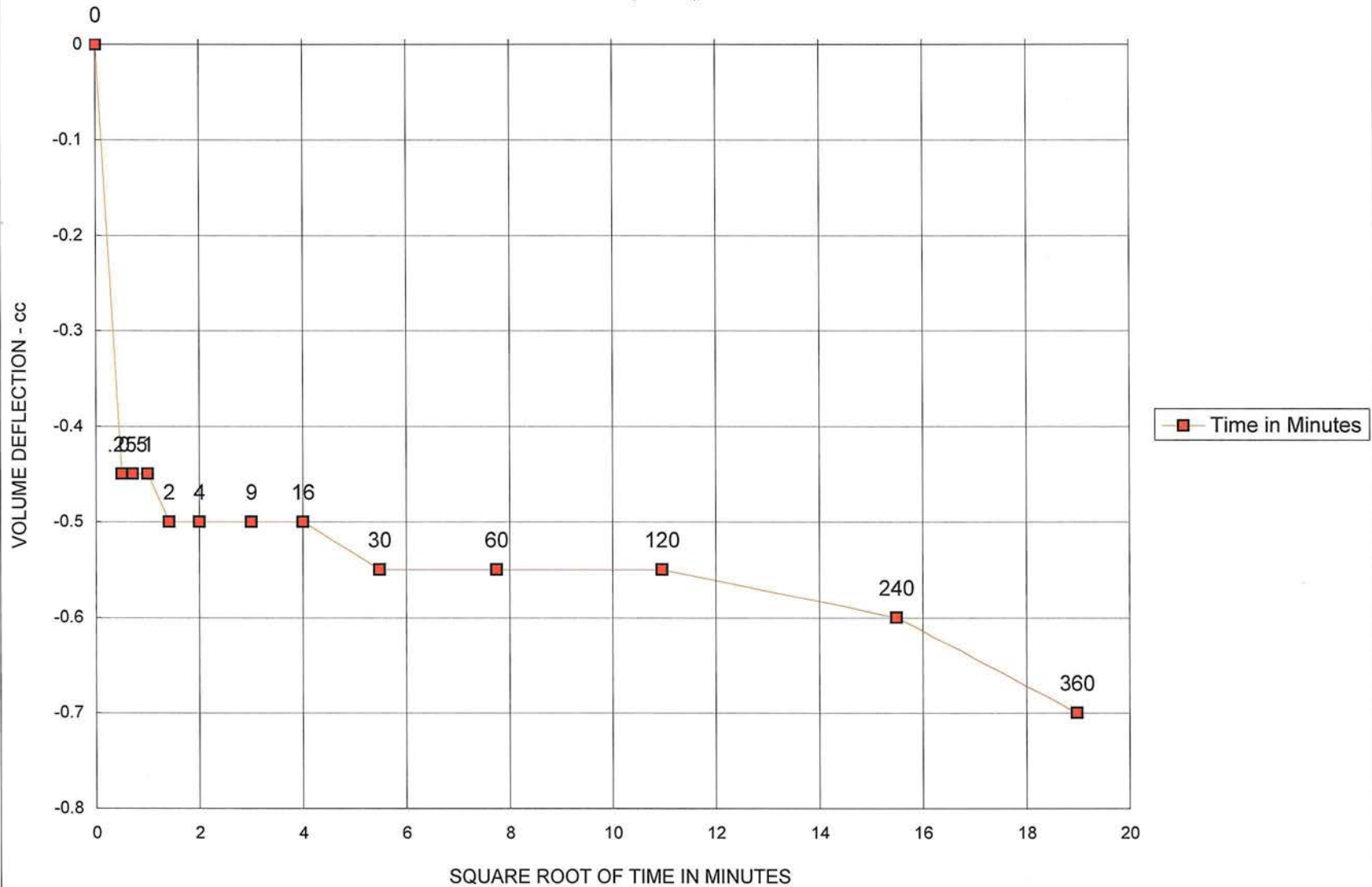
Checked by: aw Date: 5/14/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_34.xls



CONSOLIDATION DATA

South Borrow, 0-25', SB-B-1-04 80%



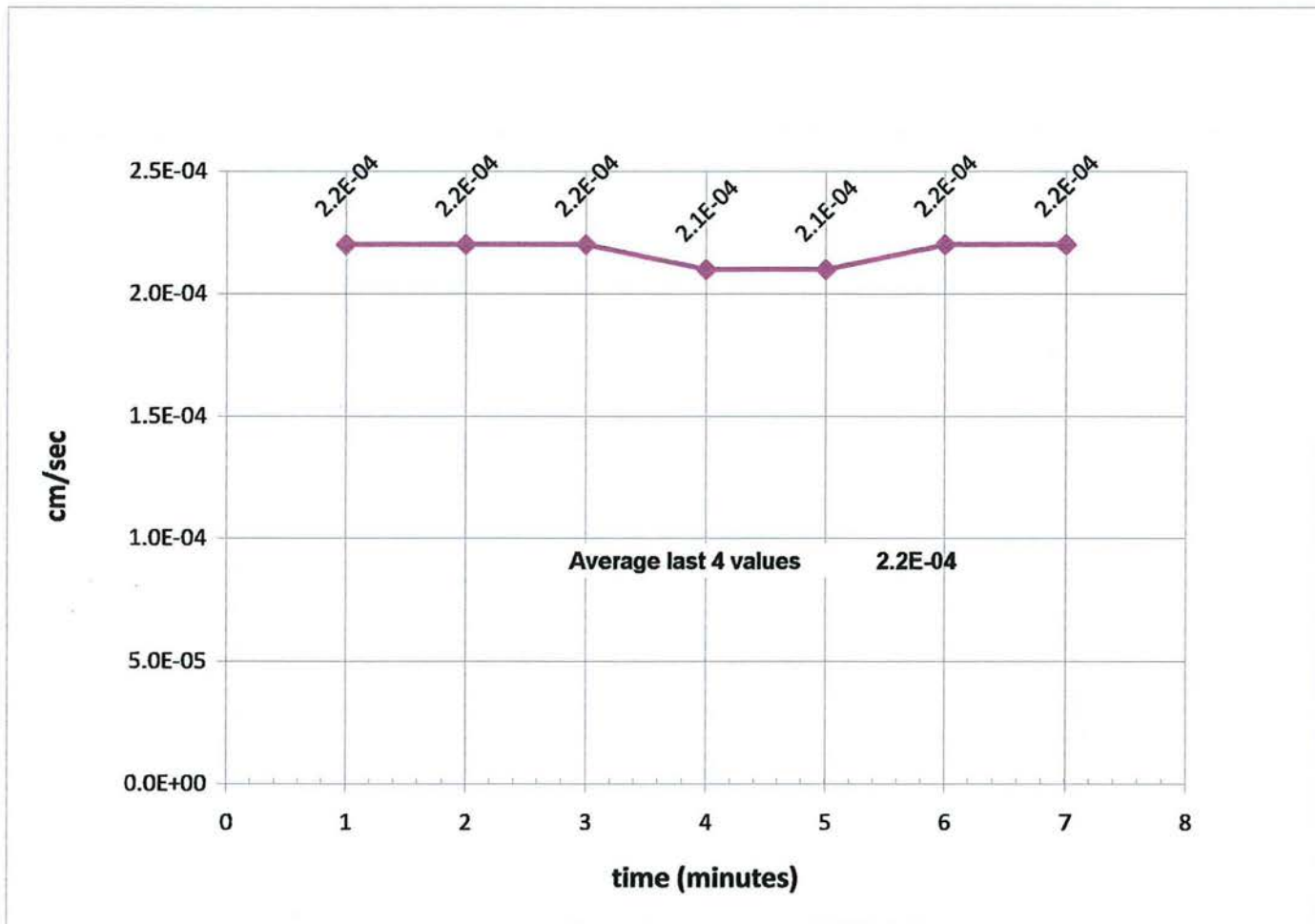


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

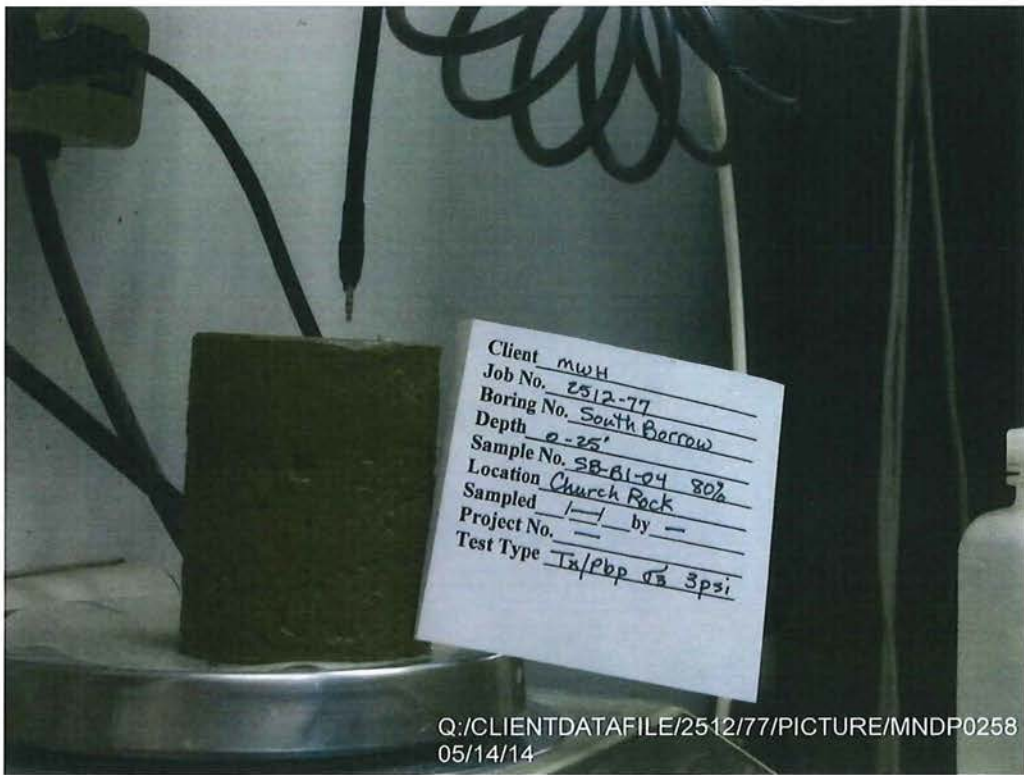
Boring Number: South Borrow
Depth: 0-25'
Sample Number: SB-B1-04 80%
Sampled Date: --
Test Date: 5/13/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/13/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_35.xls

Checked By: DAW
Date: 05/14/14



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05/14/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO. Dilco Hill
DEPTH 0-10'
SAMPLE NO. DH-B1-03 80%
LOCATION Church Rock
PROJECT NO. --
SOIL DESCR. Remolded -#4

SAMPLED --
TEST STARTED 04/24/14 CAL
TEST FINISHED 05/12/14 CAL
CELL NUMBER 5P
SATURATED TEST Yes
TEST TYPE TX/Pbp/Tap Water
CONF. PRES. PSF 432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	354.6	423.2
Wt. Wet Soil & Pan (g)	361.6	430.2
Wt. Dry Soil & Pan (g)	345.3	345.3
Wt. Lost Moisture (g)	16.3	84.9
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	338.3	338.3
Moisture Content %	4.8	25.1
Wet Density PCF	98.5	129.8
Dry Density PCF	94.0	103.8

Init. Diameter (in)	2.400	(cm)	6.096
Init. Area (sq in)	4.524	(sq cm)	29.188
Init. Height (in)	3.030	(cm)	7.696
Vol. Bef. Consol. (cu ft)	0.00793		
Vol. After Consol. (cu ft)	0.00719		
Porosity %	41.70		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	2.922
Diameter	2.326
Pressure (psi)	0.142
Area after consol. (cm*cm)	27.420
Gradient	1.345
Permeability k (cm/s)	6.3E-04
Permeability k (m/s)	6.3E-06
Back Pressure (psi)	78.0
Cell Pressure (psi)	81.0
Ave. Effective Stress (psi)	2.929

Average temperature degree C: 21.8

Data entry by: DAW Date: 05/13/2014
Checked by: cal Date: 5/14/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_32.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	DH-B1-03 80%	TEST FINISHED	05/12/14 CAL
LOCATION	Church Rock	SETUP NO.	5P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded #4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.8	28.3				
50.0	48.0	30.4	31.5	38.3	45.6	7.3	0.73
60.0	58.0	32.1	33.0	48.3	56.3	8.0	0.80
70.0	68.0	33.7	34.5	58.2	67.0	8.8	0.88
80.0	78.0	35.0	35.6	67.9	77.1	9.2	0.92
90.0		36.0	36.0	78.0	87.6	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.40	0.00
0.25	0.50	0.80	-0.40
0.5	0.71	0.80	-0.40
1	1.00	0.80	-0.40
2	1.41	0.80	-0.40
4	2.00	0.85	-0.45
9	3.00	0.85	-0.45
16	4.00	0.90	-0.50
30	5.48	0.90	-0.50
60	7.75	0.90	-0.50
120	10.95	0.90	-0.50
240	15.49	0.95	-0.55
360	18.97	1.05	-0.65

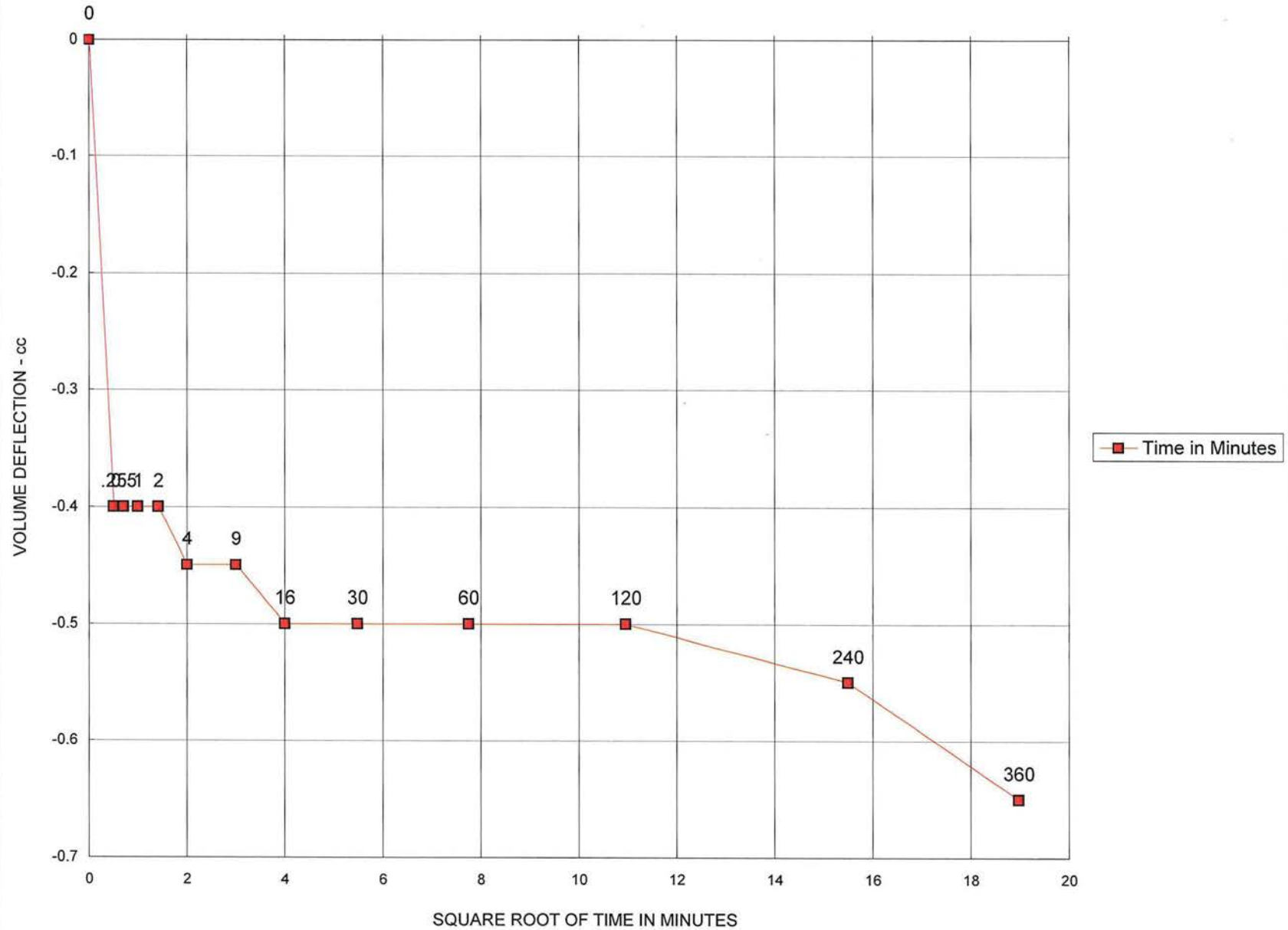
Initial Height (in)	3.030	Init. Vol. (CC)	224.664
Height Change (in)	0.108	Vol. Change (CC)	35.100
Ht. After Cons. (in)	2.922	Cell Exp. (CC)	13.980
Initial Area (sq in)	4.524	Net Change (CC)	21.120
Area After Cons. (sq in)	4.250	Cons. Vol. (CC)	203.544

Data entry by: DAW Date: 05/13/2014
 Checked by: CAK Date: 5/14/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_32.xls



CONSOLIDATION DATA

Dilco Hill, 0-10', DH-B1-03 80%

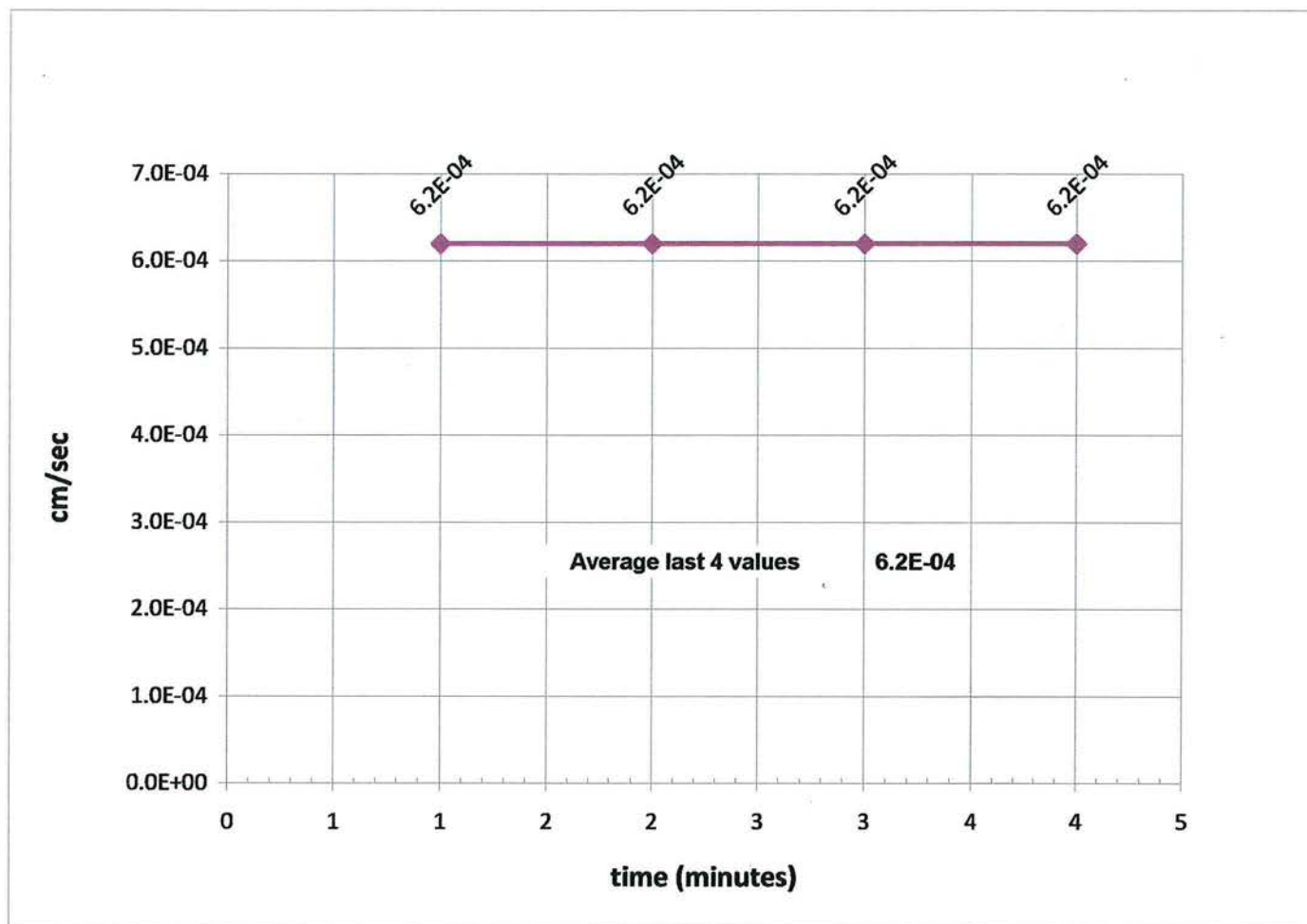


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

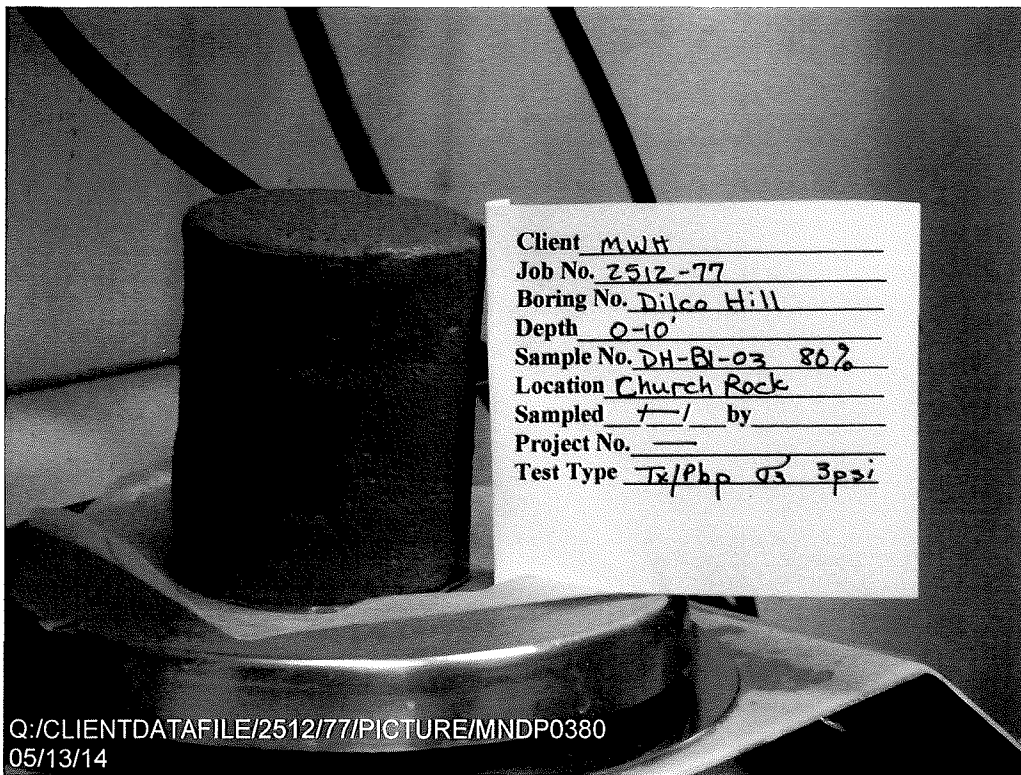
Boring Number: Dilco Hill
Depth: 0-10'
Sample Number: DH-B1-03 80%
Sampled Date: --
Test Date: 5/12/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/12/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_34.xls

Checked By: DW
Date: 05/13/14



Client MWH
Job No. 2512-77
Boring No. Dilco Hill
Depth 0-10'
Sample No. DH-B1-03 80%
Location Church Rock
Sampled 7-1 by
Project No.
Test Type Tx/Php 03 3psi

Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP0380
05/13/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-15'	TEST STARTED	04/29/14 CAL
SAMPLE NO.	SB-B4-01 80%	TEST FINISHED	05/12/14 CAL
LOCATION	Church Rock	CELL NUMBER	1P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	366.3	419.6
Wt. Wet Soil & Pan (g)	373.3	426.6
Wt. Dry Soil & Pan (g)	334.8	334.8
Wt. Lost Moisture (g)	38.5	91.8
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	327.8	327.8
Moisture Content %	11.8	28.0
Wet Density PCF	103.0	129.2
Dry Density PCF	92.2	101.0

Init. Diameter (in)	2.402	(cm)	6.101
Init. Area (sq in)	4.531	(sq cm)	29.237
Init. Height (in)	2.989	(cm)	7.592
Vol. Bef. Consol. (cu ft)	0.00784		
Vol. After Consol. (cu ft)	0.00716		
Porosity %	45.27		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	4
Percentage of Pump setting	100
Q (cc/s)	1.16E-02
Height	2.957
Diameter	2.308
Pressure (psi)	0.135
Area after consol. (cm*cm)	26.988
Gradient	1.264
Permeability k (cm/s)	3.4E-04
Permeability k (m/s)	3.4E-06
Back Pressure (psi)	88.0
Cell Pressure (psi)	91.0
Ave. Effective Stress (psi)	2.933
Average temperature degree C:	22.0

Data entry by: DAW Date: 05/13/2014
 Checked by: cm Date: 5/14/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_31.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-15'	TEST STARTED	04/29/14 CAL
SAMPLE NO.	SB-B4-01 80%	TEST FINISHED	05/12/14 CAL
LOCATION	Church Rock	SETUP NO.	1P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.5	22.4				
50.0	48.0	25.6	27.4	38.2	46.1	7.9	0.79
60.0	58.0	28.2	29.7	48.4	56.7	8.3	0.83
70.0	68.0	29.8	31.0	58.2	67.2	9.0	0.90
80.0	78.0	31.1	32.3	68.5	77.8	9.3	0.93
90.0	88.0	32.4	33.6	78.5	87.9	9.4	0.94
100.0		34.0	34.2	88.3	98.0	9.7	0.97

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.90	0.00
0.25	0.50	1.40	-0.50
0.5	0.71	1.50	-0.60
1	1.00	1.50	-0.60
2	1.41	1.50	-0.60
4	2.00	1.50	-0.60
9	3.00	1.50	-0.60
16	4.00	1.50	-0.60
30	5.48	1.60	-0.70
60	7.75	1.60	-0.70
120	10.95	1.60	-0.70
240	15.49	1.60	-0.70
360	18.97	1.70	-0.80

Initial Height (in)	2.989	Init. Vol. (CC)	221.994
Height Change (in)	0.032	Vol. Change (CC)	33.700
Ht. After Cons. (in)	2.957	Cell Exp. (CC)	14.446
Initial Area (sq in)	4.531	Net Change (CC)	19.255
Area After Cons. (sq in)	4.183	Cons. Vol. (CC)	202.739

Data entry by: DAW Date: 05/13/2014

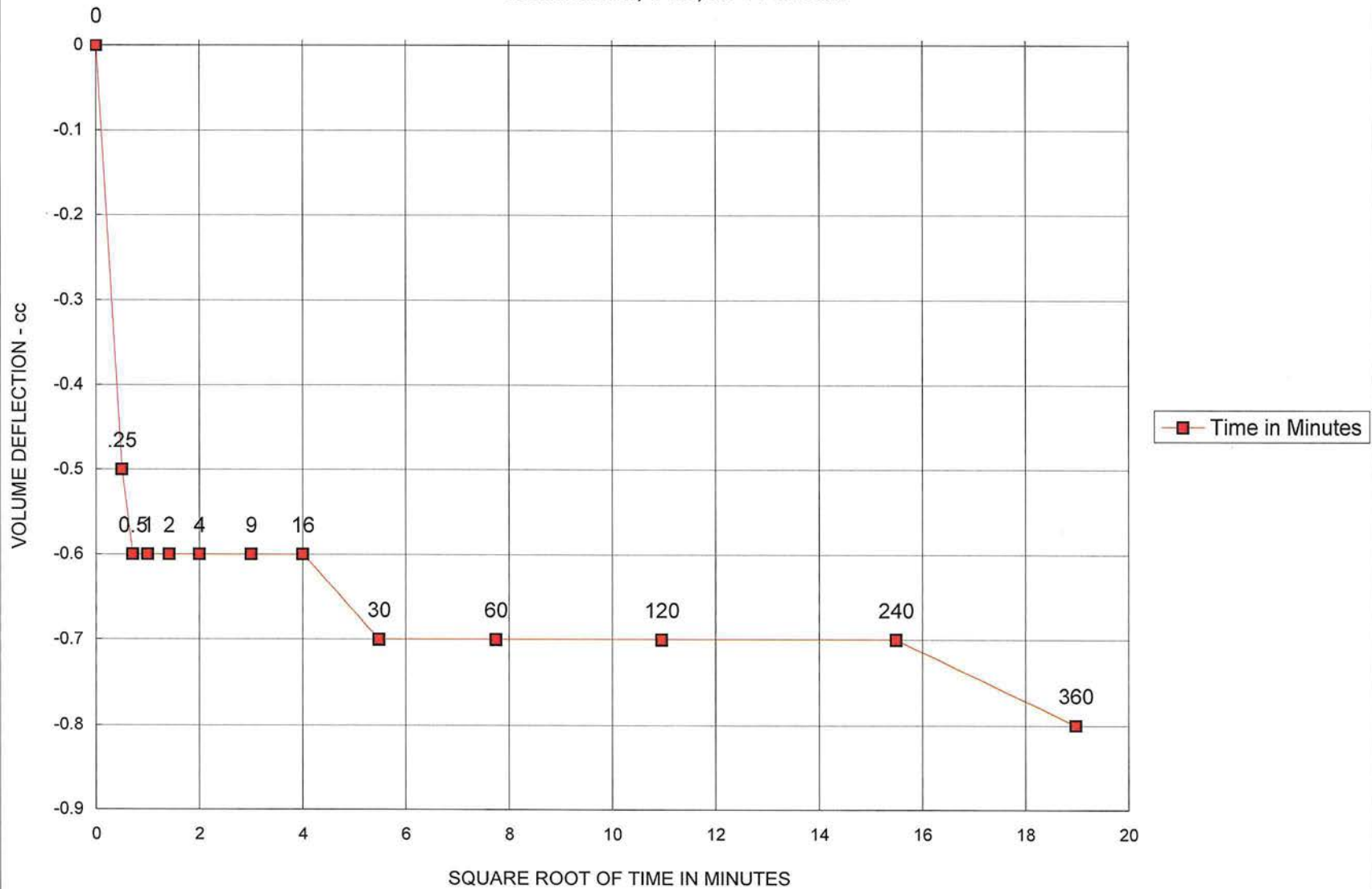
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FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_31.xls



CONSOLIDATION DATA

South Borrow, 0-15', SB-B4-01 80%

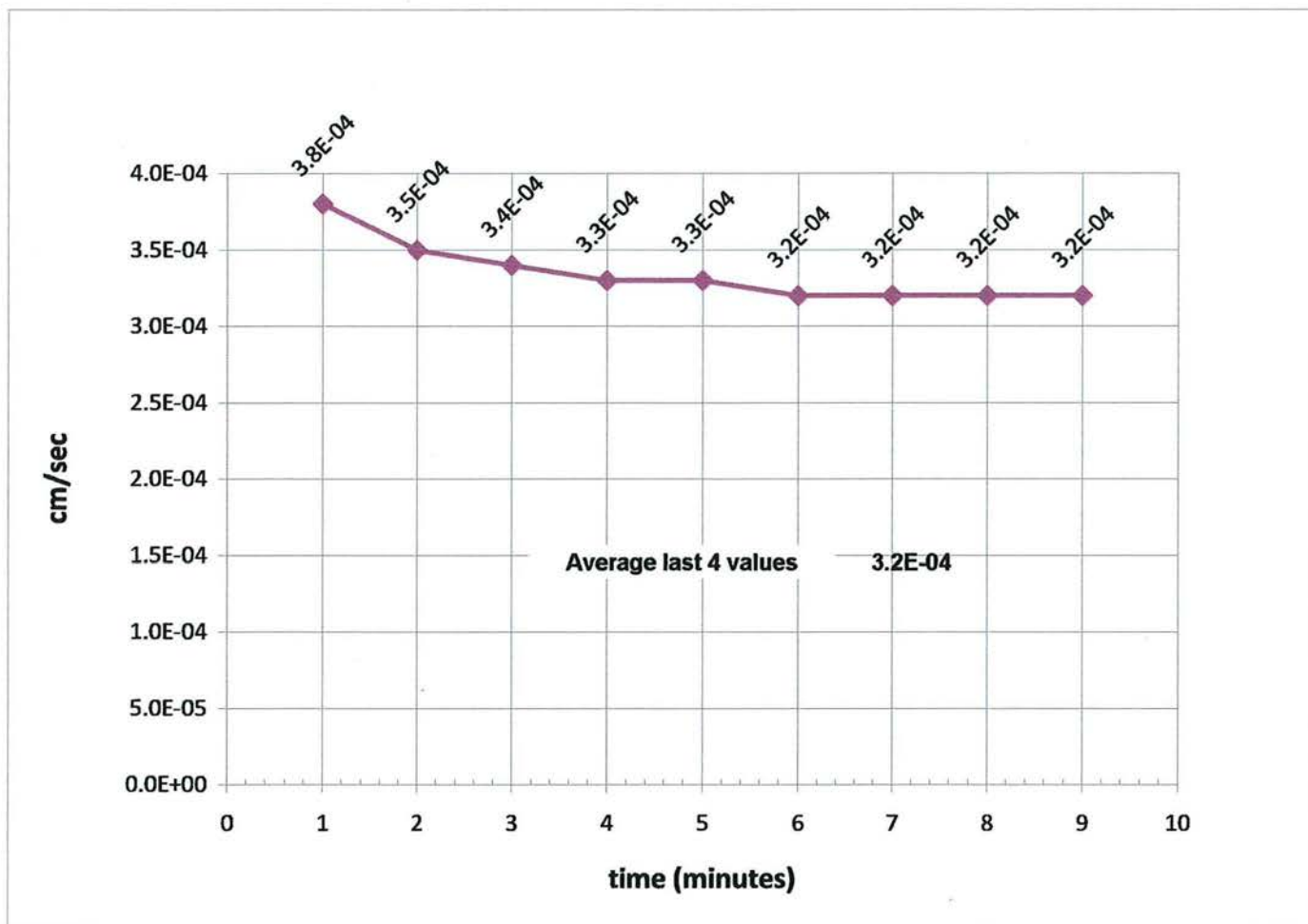


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

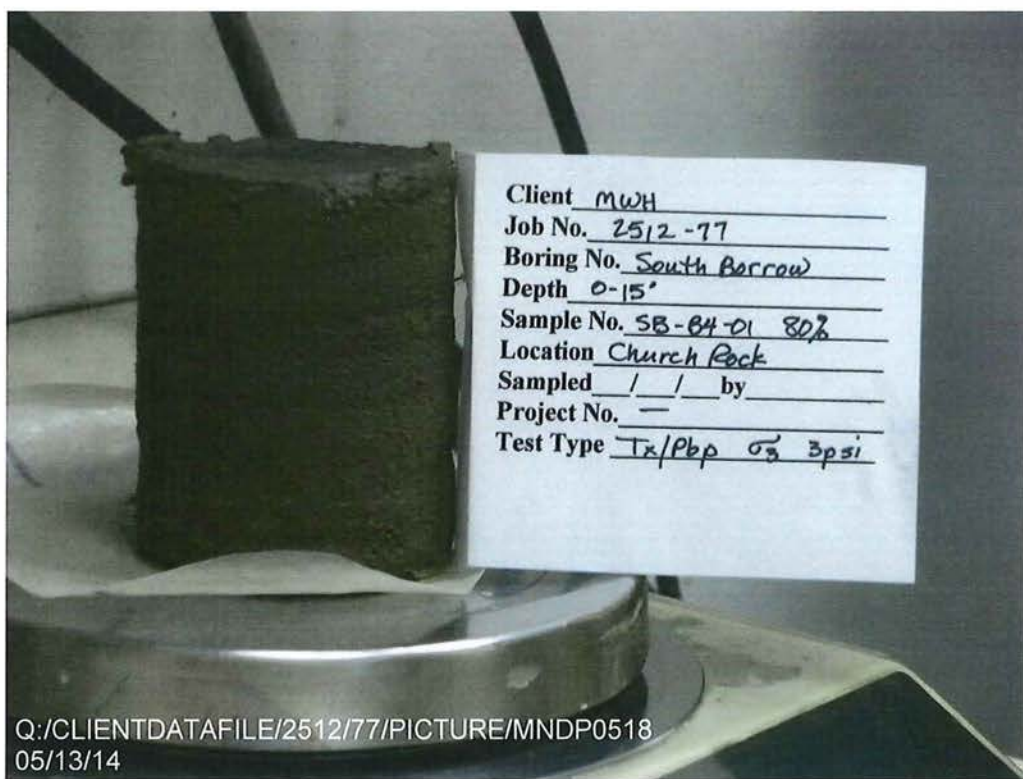
Boring Number: South Borrow
Depth: 0-15'
Sample Number: SB-B4-01 80%
Sampled Date: --
Test Date: 5/12/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/12/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_32.xls

Checked By: DAW
Date: 05/13/14



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05/13/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	East Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	EB-B6-03 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	CELL NUMBER	12P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	--	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	360.0	420.6
Wt. Wet Soil & Pan (g)	367.0	427.6
Wt. Dry Soil & Pan (g)	338.7	338.7
Wt. Lost Moisture (g)	28.3	88.9
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	331.7	331.7
Moisture Content %	8.5	26.8
Wet Density PCF	100.9	128.7
Dry Density PCF	92.9	101.5

Init. Diameter (in)	2.407	(cm)	6.114
Init. Area (sq in)	4.550	(sq cm)	29.359
Init. Height (in)	2.988	(cm)	7.590
Vol. Bef. Consol. (cu ft)	0.00787		
Vol. After Consol. (cu ft)	0.00720		
Porosity %	43.59		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	4
Percentage of Pump setting	100
Q (cc/s)	1.16E-02
Height	2.879
Diameter	2.346
Pressure (psi)	0.192
Area after consol. (cm*cm)	27.897
Gradient	1.846
Permeability k (cm/s)	2.3E-04
Permeability k (m/s)	2.3E-06
Back Pressure (psi)	88.0
Cell Pressure (psi)	91.0
Ave. Effective Stress (psi)	2.904
Average temperature degree C:	21.1

Data entry by: DAW Date: 05/14/2014
 Checked by: DAW Date: 5/14/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_35.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	East Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	EB-B6-03 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	SETUP NO.	12P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	--	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	3.2	24.7				
50.0	48.0	23.4	25.6	38.2	46.1	7.9	0.79
60.0	58.0	26.0	27.4	48.0	56.0	8.0	0.80
70.0	68.0	27.8	28.8	57.9	66.7	8.8	0.88
80.0	78.0	28.7	29.6	68.2	77.3	9.1	0.91
90.0	88.0	29.8	30.7	78.4	87.5	9.1	0.91
100.0		30.7	30.8	88.0	97.5	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	1.20	0.00
0.25	0.50	1.35	-0.15
0.5	0.71	1.40	-0.20
1	1.00	1.40	-0.20
2	1.41	1.40	-0.20
4	2.00	1.40	-0.20
9	3.00	1.40	-0.20
16	4.00	1.45	-0.25
30	5.48	1.60	-0.40
60	7.75	1.60	-0.40
120	10.95	1.65	-0.45
240	15.49	1.65	-0.45
360	18.97	1.70	-0.50

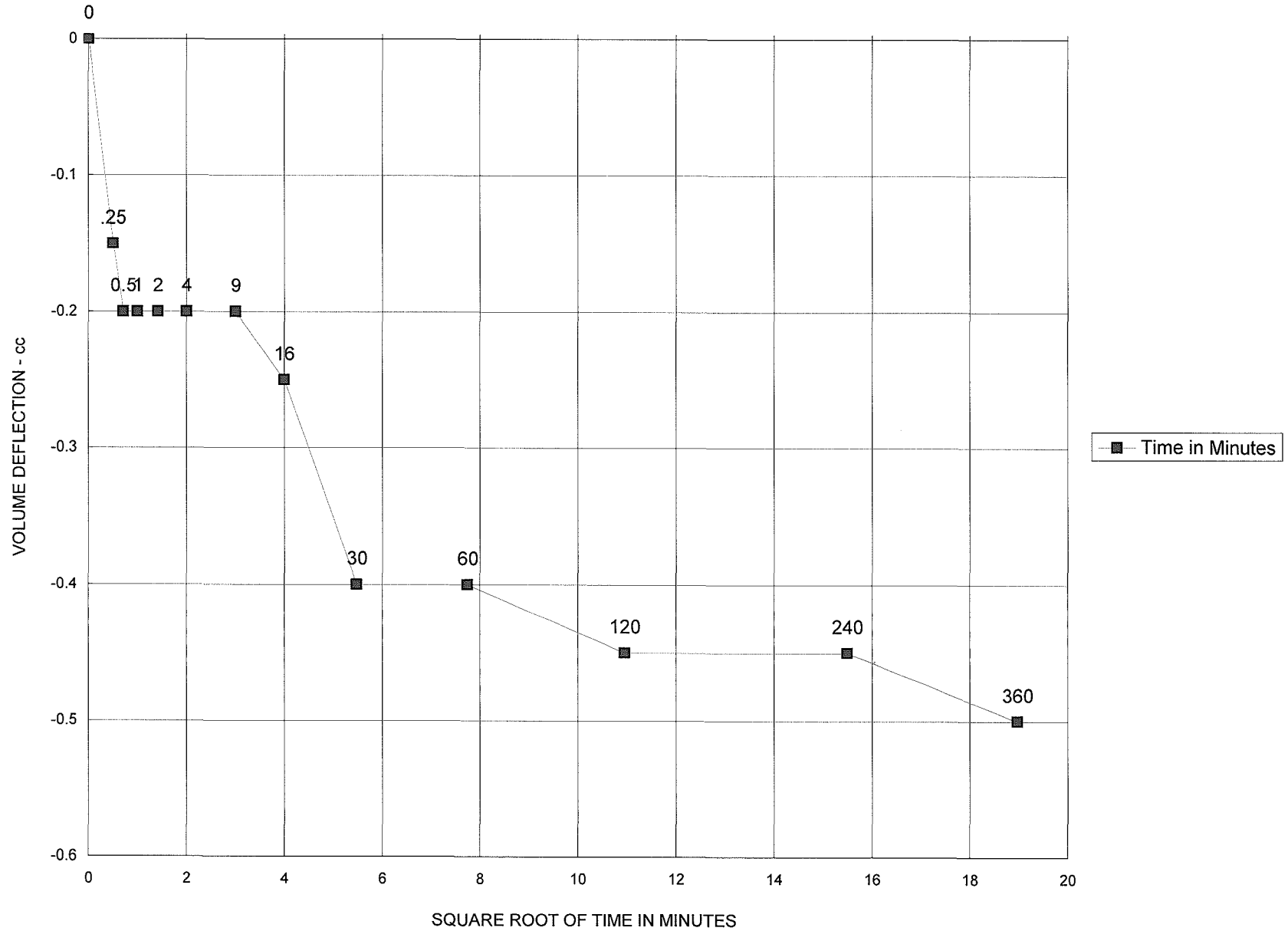
Initial Height (in)	2.988	Init. Vol. (CC)	222.844
Height Change (in)	0.109	Vol. Change (CC)	29.700
Ht. After Cons. (in)	2.879	Cell Exp. (CC)	10.893
Initial Area (sq in)	4.550	Net Change (CC)	18.808
Area After Cons. (sq in)	4.324	Cons. Vol. (CC)	204.037

Data entry by: DAW Date: 05/14/2014
 Checked by: CAC Date: 5/14/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_35.xls



CONSOLIDATION DATA

East Borrow, 0-10', EB-B6-03 80%



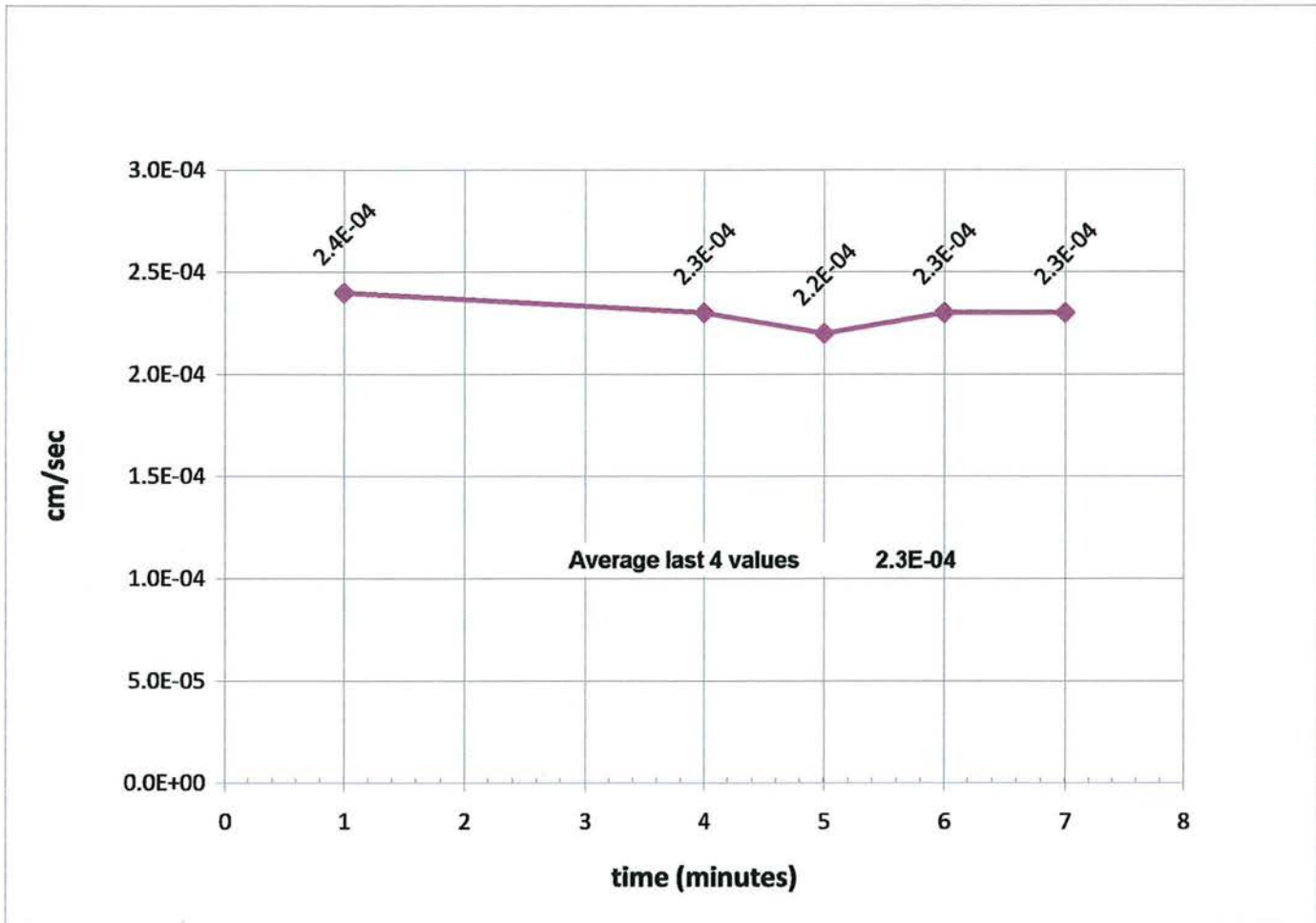


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

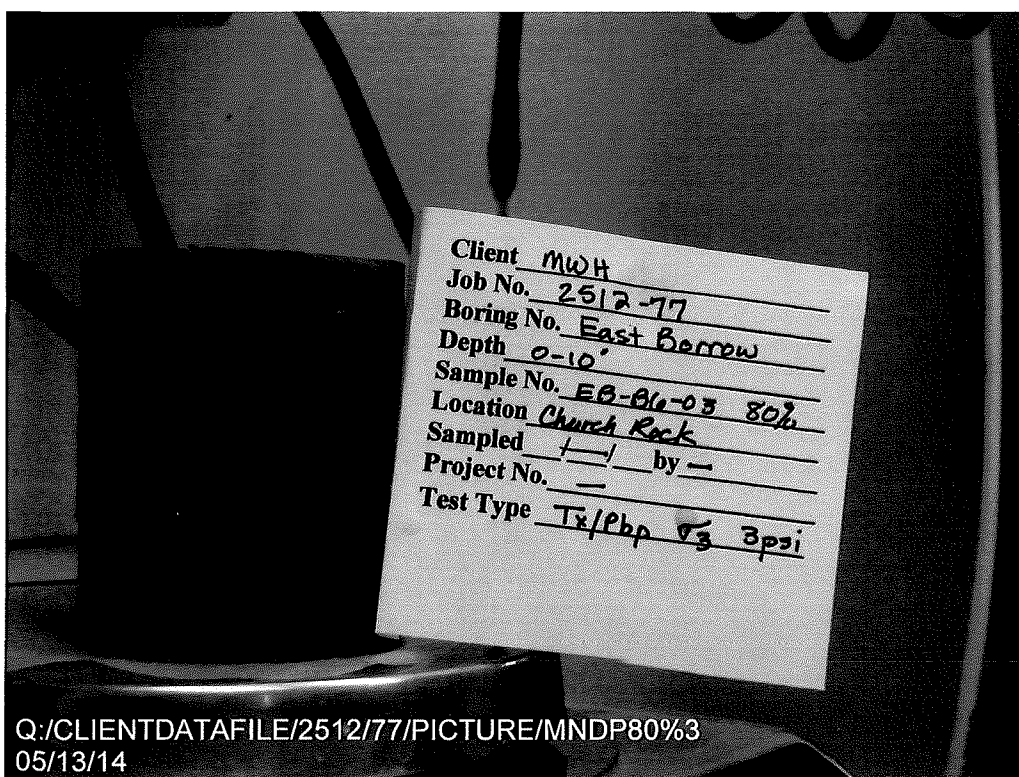
Boring Number: East Borrow
Depth: 0-10'
Sample Number: EB-B6-03 80%
Sampled Date: --
Test Date: 5/13/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/13/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_36.xls

Checked By: DAW
Date: 05/14/14



Client MWH
Job No. 2512-77
Boring No. East Borrow
Depth 0-10'
Sample No. EB-01-03 80%
Location Church Rock
Sampled 1-1 by —
Project No. —
Test Type Tx/Php σ_3 3psi

Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP80%3
05/13/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	West Borrow	SAMPLED	--
DEPTH	5-10'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	WB-B1-06 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	CELL NUMBER	9P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	--	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	348.3	413.4
Wt. Wet Soil & Pan (g)	356.7	421.7
Wt. Dry Soil & Pan (g)	332.5	332.5
Wt. Lost Moisture (g)	24.2	89.2
Wt. of Pan Only (g)	8.3	8.3
Wt. of Dry Soil (g)	324.2	324.2
Moisture Content %	7.5	27.5
Wet Density PCF	97.4	123.0
Dry Density PCF	90.6	96.5

Init. Diameter (in)	2.406	(cm)	6.111
Init. Area (sq in)	4.547	(sq cm)	29.334
Init. Height (in)	2.998	(cm)	7.615
Vol. Bef. Consol. (cu ft)	0.00789		
Vol. After Consol. (cu ft)	0.00741		
Porosity %	42.53		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	2.966
Diameter	2.344
Pressure (psi)	0.124
Area after consol. (cm*cm)	27.845
Gradient	1.157
Permeability k (cm/s)	7.2E-04
Permeability k (m/s)	7.2E-06
Back Pressure (psi)	88.0
Cell Pressure (psi)	91.0
Ave. Effective Stress (psi)	2.938
Average temperature degree C:	21.7

Data entry by: DAW Date: 05/14/2014
 Checked by: cal Date: 5/14/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_37.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	West Borrow	SAMPLED	--
DEPTH	5-10'	TEST STARTED	04/24/14 CAL
SAMPLE NO.	WB-B1-06 80%	TEST FINISHED	05/13/14 CAL
LOCATION	Church Rock	SETUP NO.	9P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	--	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)	Pore Pressure (PSI)	Change	B
		Close Open	Close Open		
40.0	38.0	4.9	20.8		
50.0	48.0	21.9	24.5	38.7	45.1
60.0	58.0	25.1	26.1	48.5	55.4
70.0	68.0	28.0	28.8	58.6	67.0
80.0	78.0	29.1	29.9	68.4	77.6
90.0	88.0	30.2	30.9	78.4	87.7
100.0		31.2	31.2	88.5	98.0

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.00	0.00
0.25	0.50	0.40	-0.40
0.5	0.71	0.40	-0.40
1	1.00	0.40	-0.40
2	1.41	0.40	-0.40
4	2.00	0.40	-0.40
9	3.00	0.40	-0.40
16	4.00	0.40	-0.40
30	5.48	0.40	-0.40
60	7.75	0.40	-0.40
120	10.95	0.40	-0.40
240	15.49	0.40	-0.40
360	18.97	0.40	-0.40

Initial Height (in)	2.998	Init. Vol. (CC)	223.404
Height Change (in)	0.032	Vol. Change (CC)	28.200
Ht. After Cons. (in)	2.966	Cell Exp. (CC)	14.611
Initial Area (sq in)	4.547	Net Change (CC)	13.589
Area After Cons. (sq in)	4.316	Cons. Vol. (CC)	209.815

Data entry by: DAW Date: 05/14/2014

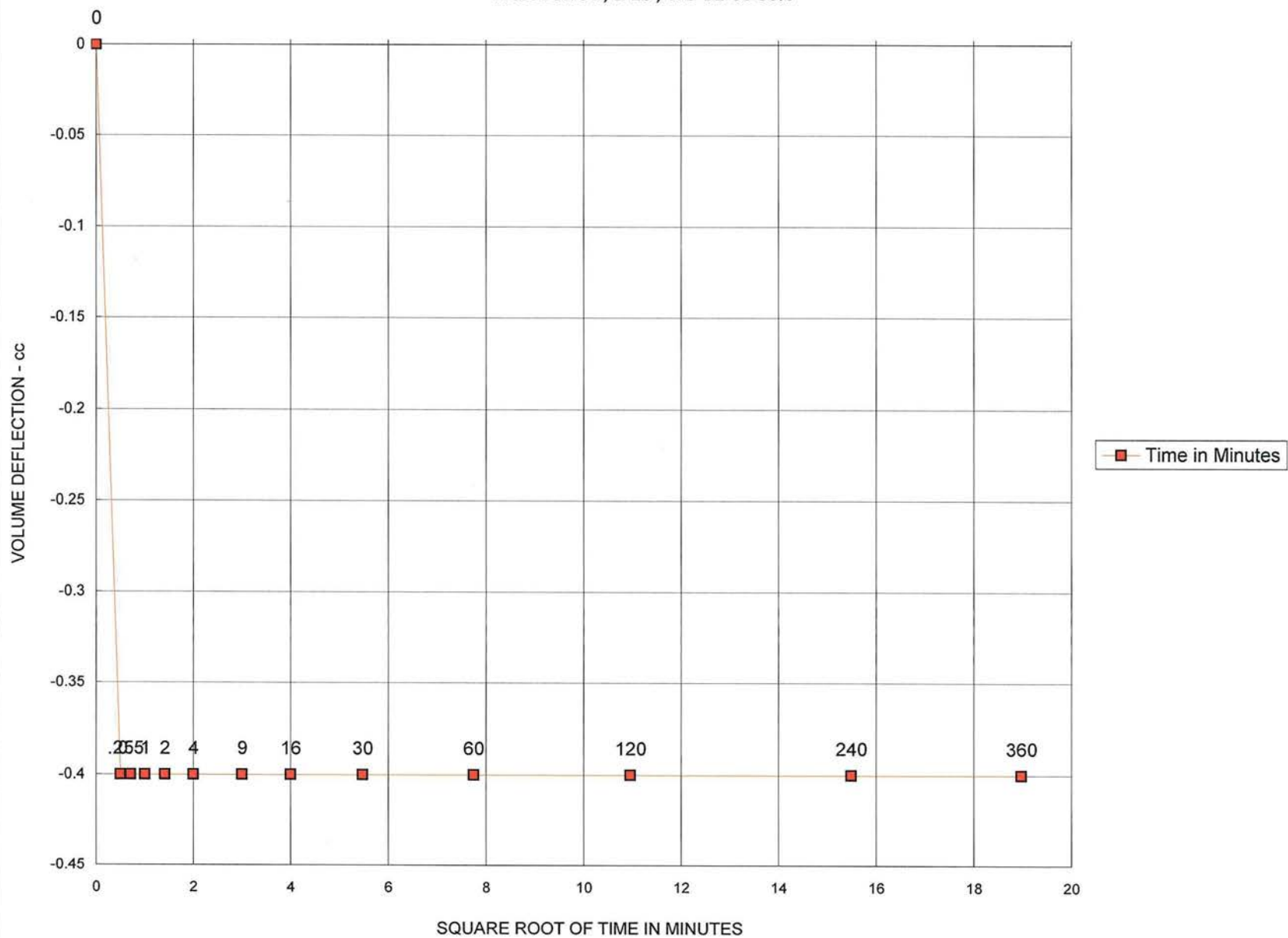
Checked by: CAL Date: 5/14/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_37.xls



CONSOLIDATION DATA

West Borrow, 5-10', WB-B1-06 80%



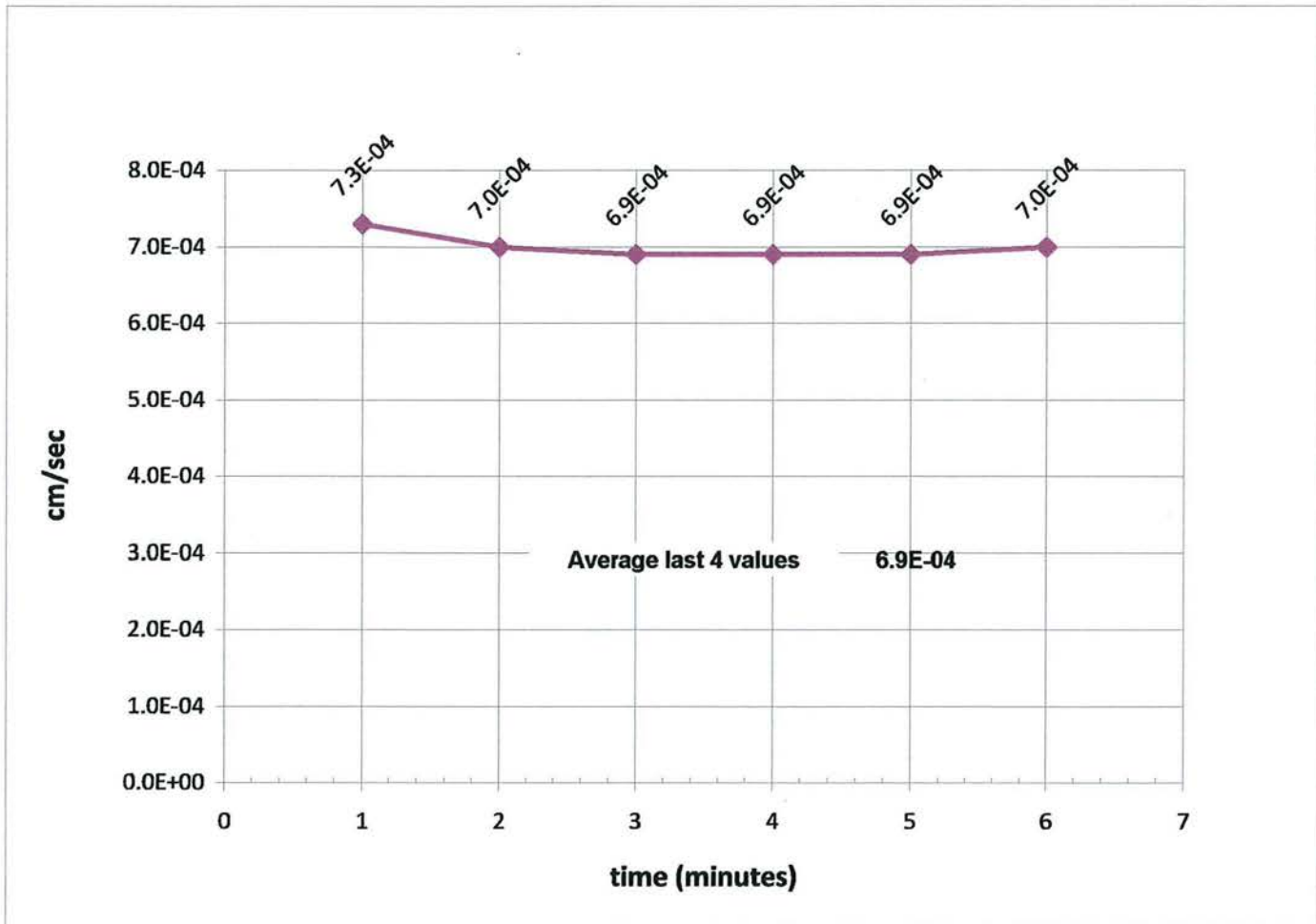


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

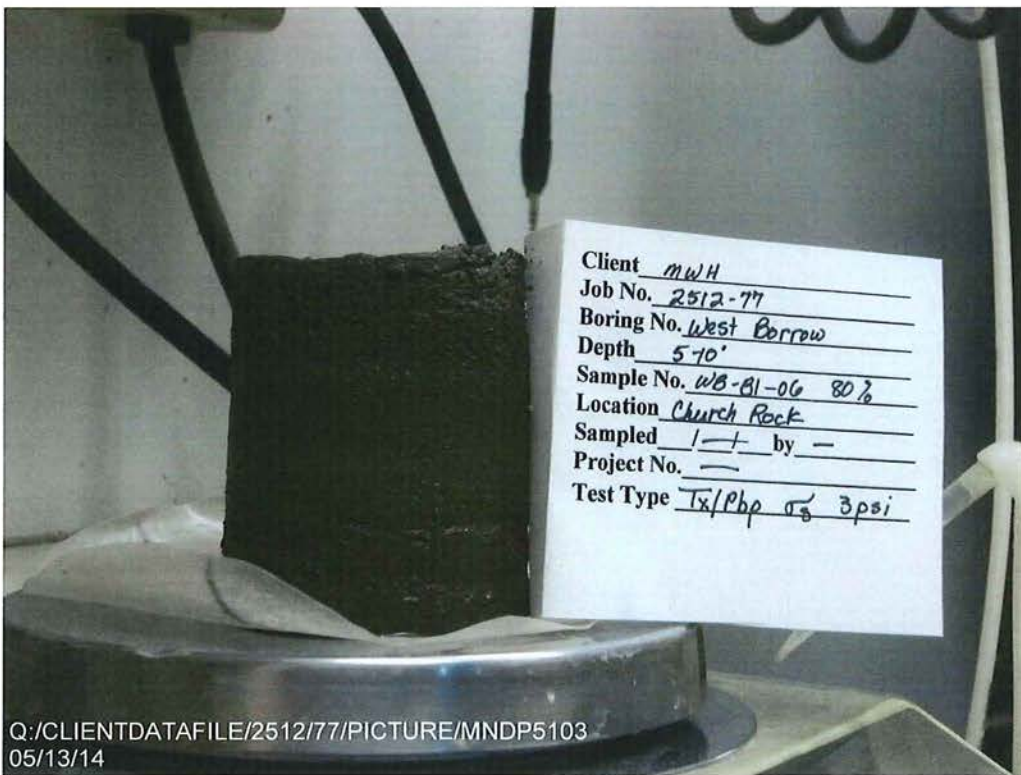
Boring Number: West Borrow
Depth: 5-10'
Sample Number: WB-B1-06 80%
Sampled Date: --
Test Date: 5/13/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/13/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_37.xls

Checked By: DAW
Date: 05/14/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP5103
05/13/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	35-45'	TEST STARTED	04/18/14 CAL
SAMPLE NO.	DH-B1-10 80%	TEST FINISHED	05/06/14 CAL
LOCATION	Church Rock	CELL NUMBER	8P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded #4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	378.3	419.8
Wt. Wet Soil & Pan (g)	385.3	426.8
Wt. Dry Soil & Pan (g)	345.6	345.6
Wt. Lost Moisture (g)	39.7	81.3
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	338.6	338.6
Moisture Content %	11.7	24.0
Wet Density PCF	106.2	119.6
Dry Density PCF	95.0	96.5

Init. Diameter (in)	2.403	(cm)	6.104
Init. Area (sq in)	4.535	(sq cm)	29.261
Init. Height (in)	2.993	(cm)	7.602
Vol. Bef. Consol. (cu ft)	0.00786		
Vol. After Consol. (cu ft)	0.00774		
Porosity %	37.08		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	2.981
Diameter	2.390
Pressure (psi)	0.134
Area after consol. (cm*cm)	28.936
Gradient	1.244
Permeability k (cm/s)	1.6E-04
Permeability k (m/s)	1.6E-06
Back Pressure (psi)	68.0
Cell Pressure (psi)	71.0
Ave. Effective Stress (psi)	2.933

Average temperature degree C: 21.9

Data entry by: DAW Date: 05/08/2014
 Checked by: CAL Date: 5/08/13
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_30.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	35-45'	TEST STARTED	04/18/14 CAL
SAMPLE NO.	DH-B1-10 80%	TEST FINISHED	05/06/14 CAL
LOCATION	Church Rock	SETUP NO.	8P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	3.6	15.5				
50.0	48.0	15.5	16.8	38.8	46.4	7.6	0.76
60.0	58.0	17.0	17.9	48.6	57.1	8.5	0.85
70.0	68.0	18.2	19.0	58.5	67.7	9.2	0.92
80.0		19.6	19.8	68.6	78.1	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.70	0.00
0.25	0.50	1.25	-0.55
0.5	0.71	1.30	-0.60
1	1.00	1.35	-0.65
2	1.41	1.40	-0.70
4	2.00	1.40	-0.70
9	3.00	1.45	-0.75
16	4.00	1.45	-0.75
30	5.48	1.50	-0.80
60	7.75	1.50	-0.80
120	10.95	1.50	-0.80
240	15.49	1.60	-0.90
360	18.97	1.60	-0.90

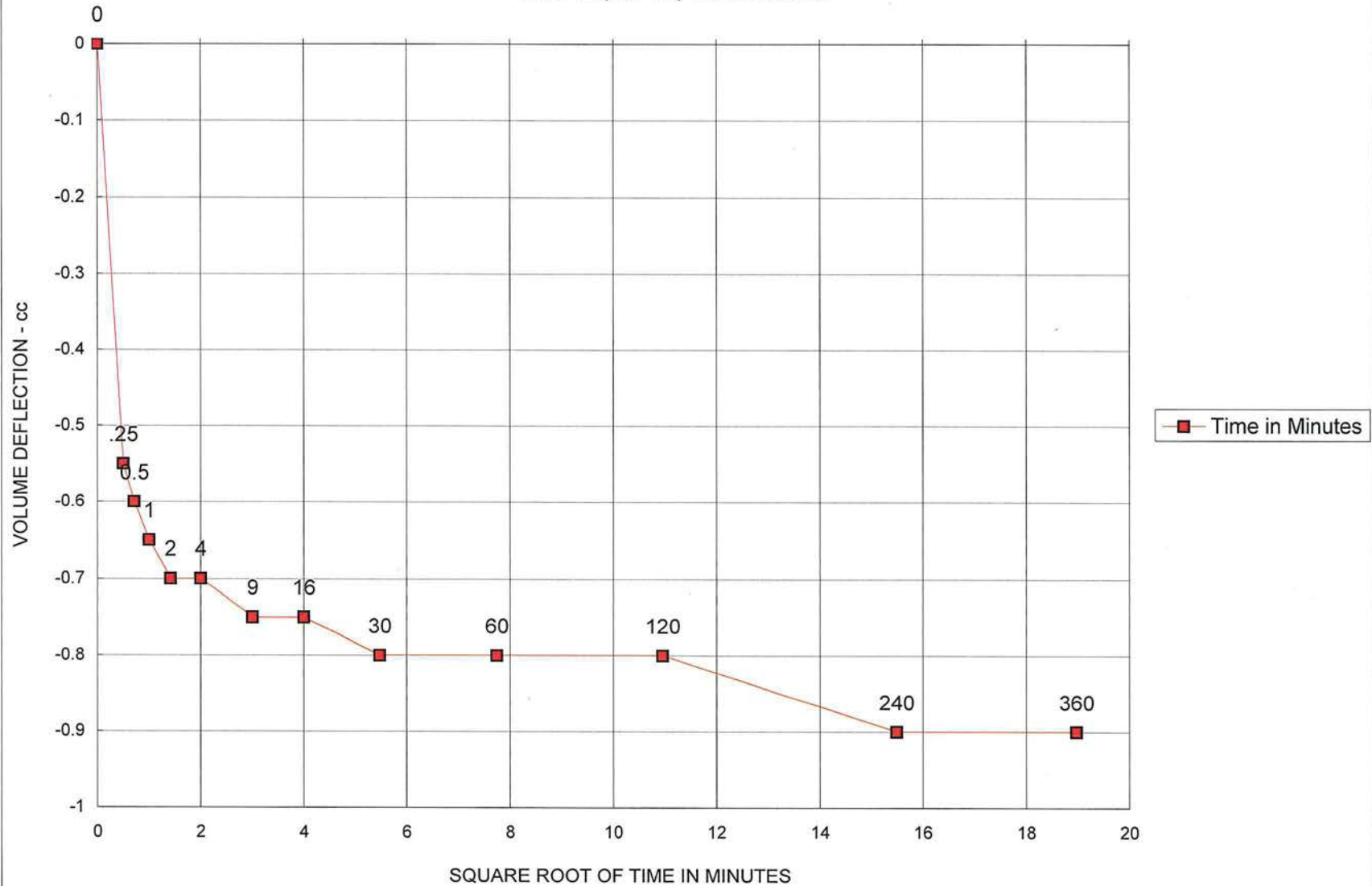
Initial Height (in)	2.993	Init. Vol. (CC)	222.476
Height Change (in)	0.012	Vol. Change (CC)	17.900
Ht. After Cons. (in)	2.981	Cell Exp. (CC)	14.560
Initial Area (sq in)	4.535	Net Change (CC)	3.340
Area After Cons. (sq in)	4.485	Cons. Vol. (CC)	219.136

Data entry by: DAW Date: 05/08/2014
 Checked by: CH Date: 5/08/13
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_30.xls



CONSOLIDATION DATA

Dilco Hill, 35-45', DH-B1-10 80%

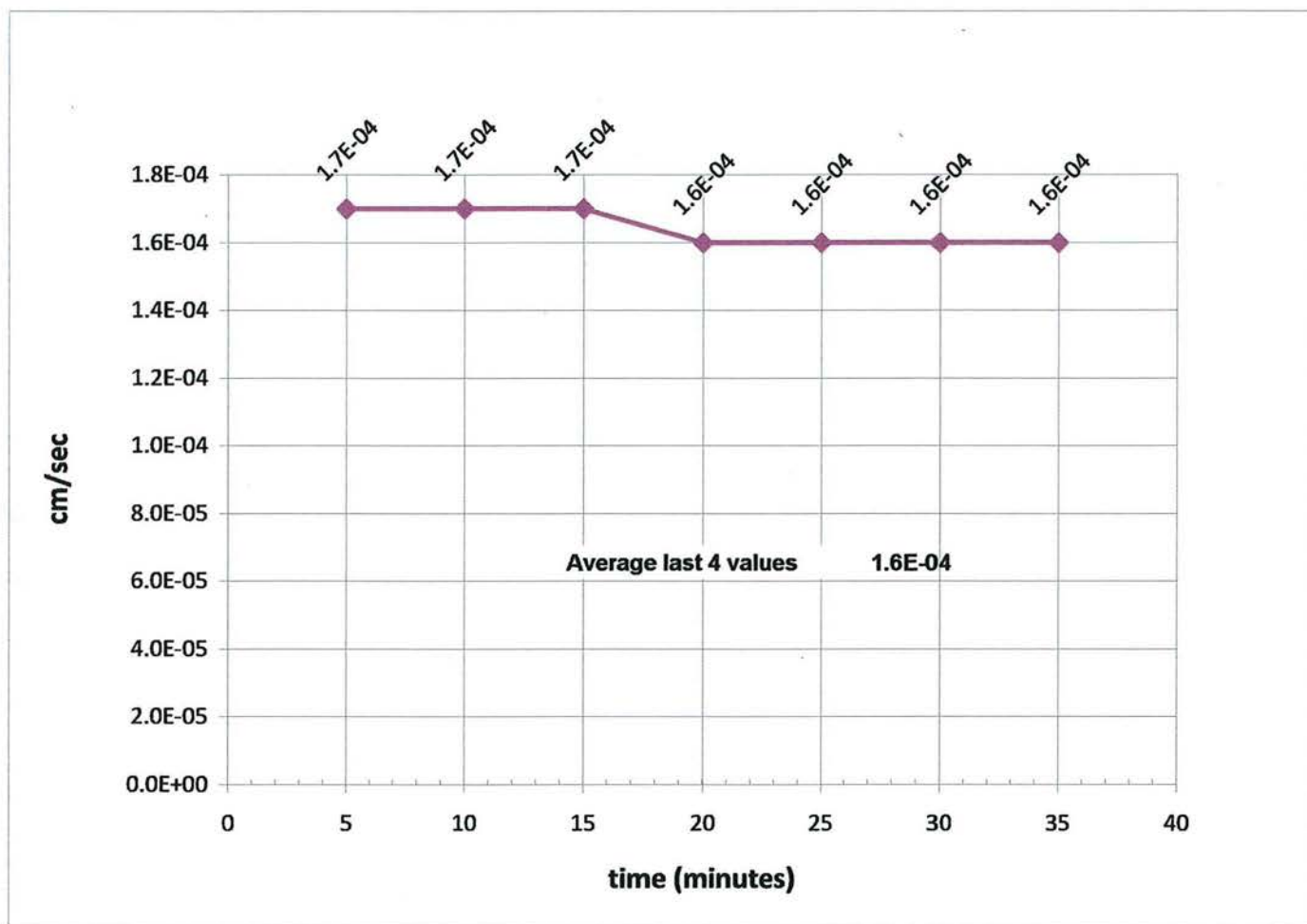


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

Boring Number: Dilco Hill
Depth: 35-45'
Sample Number: DH-B1-10 80%
Sampled Date: --
Test Date: 5/6/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/6/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_30.xls

Checked By: DTW
Date: 05/06/14

Client MWH
Job No. 2512-77
Boring No. Dilco Hill
Depth 35-45'
Sample No. DH-81-10 80%
Location Church Rock
Sampled 1-1 by -
Project No. -
Test Type Tx/Pbp 0% 3 psi

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05/08/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO. East Borrow
DEPTH 10-20'
SAMPLE NO. EB-B4-06 80%
LOCATION Church Rock
PROJECT NO. --
SOIL DESCR. Remolded -#4

SAMPLED --
TEST STARTED 04/18/14 CAL
TEST FINISHED 05/06/14 CAL
CELL NUMBER 10P
SATURATED TEST Yes
TEST TYPE TX/Pbp/Tap Water
CONF. PRES. PSF 432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	364.1	426.3
Wt. Wet Soil & Pan (g)	371.1	433.3
Wt. Dry Soil & Pan (g)	343.9	343.9
Wt. Lost Moisture (g)	27.2	89.4
Wt. of Pan Only (g)	6.9	6.9
Wt. of Dry Soil (g)	337.0	337.0
Moisture Content %	8.1	26.5
Wet Density PCF	102.1	128.4
Dry Density PCF	94.5	101.5

Init. Diameter (in)	2.406	(cm)	6.111
Init. Area (sq in)	4.547	(sq cm)	29.334
Init. Height (in)	2.988	(cm)	7.590
Vol. Bef. Consol. (cu ft)	0.00786		
Vol. After Consol. (cu ft)	0.00732		
Porosity %	43.12		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	2.971
Diameter	2.328
Pressure (psi)	0.105
Area after consol. (cm*cm)	27.462
Gradient	0.978
Permeability k (cm/s)	8.7E-04
Permeability k (m/s)	8.7E-06
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.948
Average temperature degree C:	23.4

Data entry by: DAW Date: 05/08/2014
Checked by: cm Date: 5/08/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_29.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	East Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	04/18/14 CAL
SAMPLE NO.	EB-B4-06 80%	TEST FINISHED	05/06/14 CAL
LOCATION	Church Rock	SETUP NO.	10P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	3.0	21.0				
50.0	48.0	22.3	23.7	38.3	45.1	6.8	0.68
60.0	58.0	23.8	24.8	48.6	55.7	7.1	0.71
70.0	68.0	25.1	26.0	58.5	66.3	7.8	0.78
80.0	78.0	26.5	27.3	68.7	77.4	8.7	0.87
90.0	88.0	27.4	28.1	78.8	87.7	8.9	0.89
100.0	98.0	28.3	29.0	88.7	97.9	9.2	0.92
110.0		29.3	29.4	98.2	107.8	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.30	0.00
0.25	0.50	0.75	-0.45
0.5	0.71	0.75	-0.45
1	1.00	0.80	-0.50
2	1.41	0.80	-0.50
4	2.00	0.80	-0.50
9	3.00	0.80	-0.50
16	4.00	0.80	-0.50
30	5.48	0.80	-0.50
60	7.75	0.80	-0.50
120	10.95	0.80	-0.50
240	15.49	0.80	-0.50
360	18.97	0.80	-0.50

Initial Height (in)	2.988	Init. Vol. (CC)	222.659
Height Change (in)	0.017	Vol. Change (CC)	27.100
Ht. After Cons. (in)	2.971	Cell Exp. (CC)	11.717
Initial Area (sq in)	4.547	Net Change (CC)	15.383
Area After Cons. (sq in)	4.257	Cons. Vol. (CC)	207.276

Data entry by: DAW Date: 05/08/2014

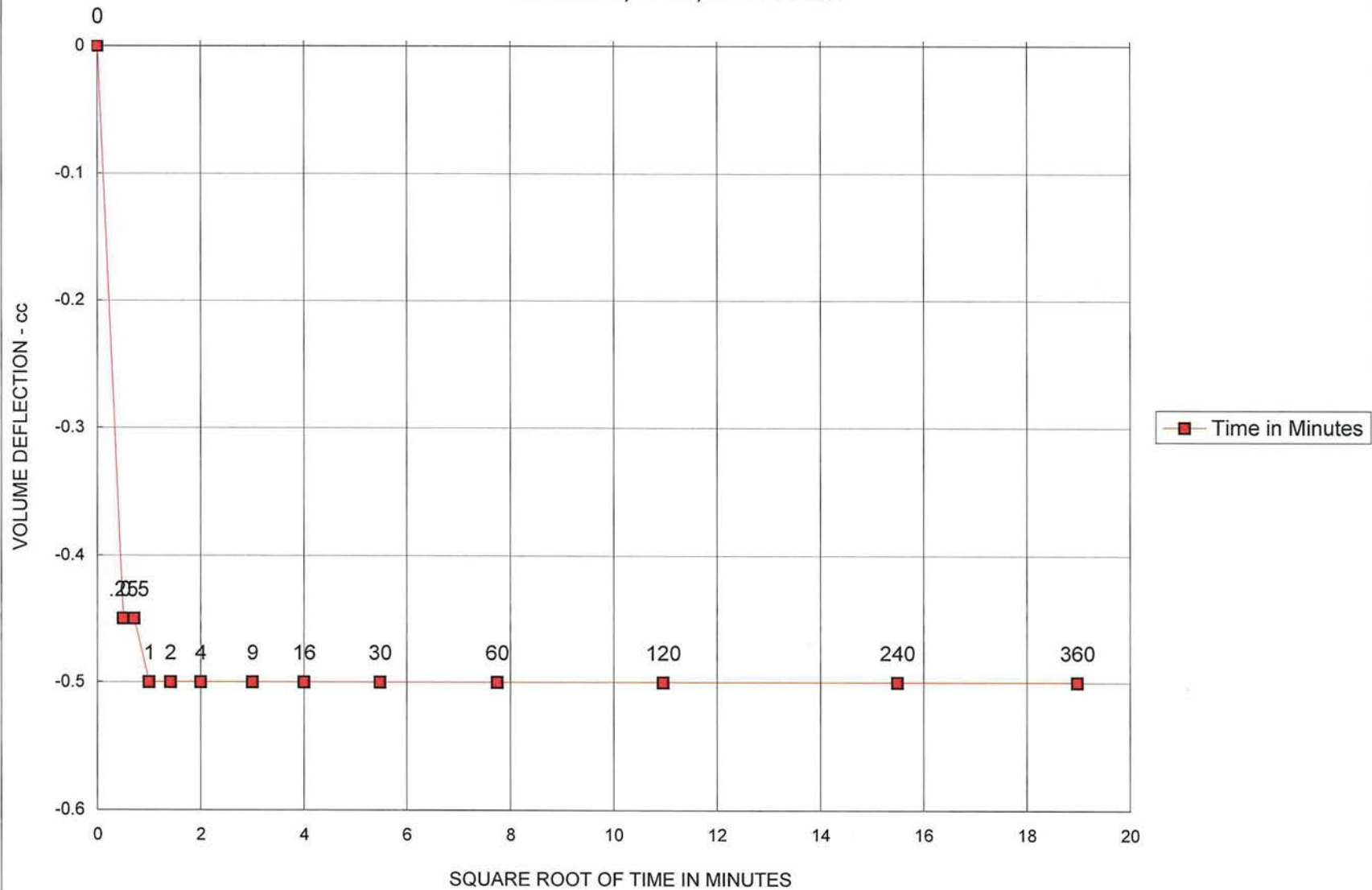
Checked by: CAW Date: 5/08/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_29.xls



CONSOLIDATION DATA

East Borrow, 10-20', EB-B4-06 80%



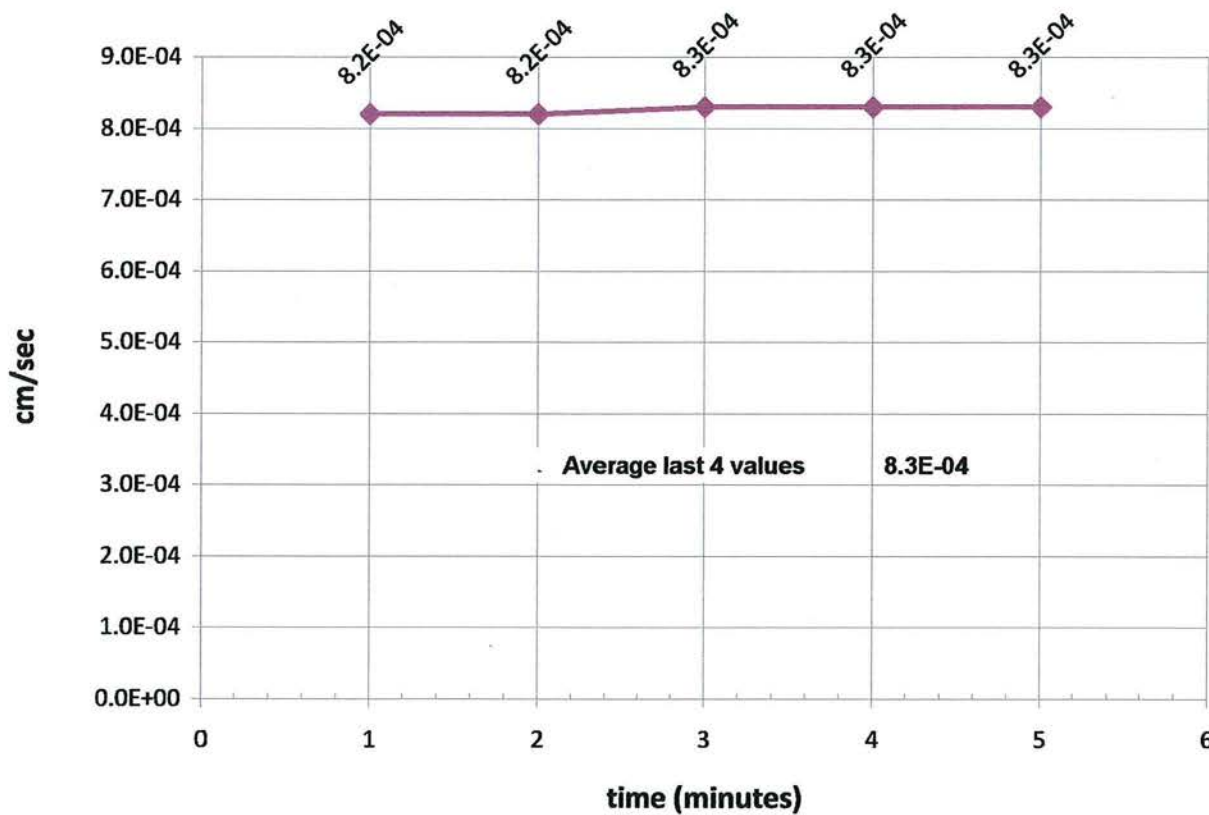


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

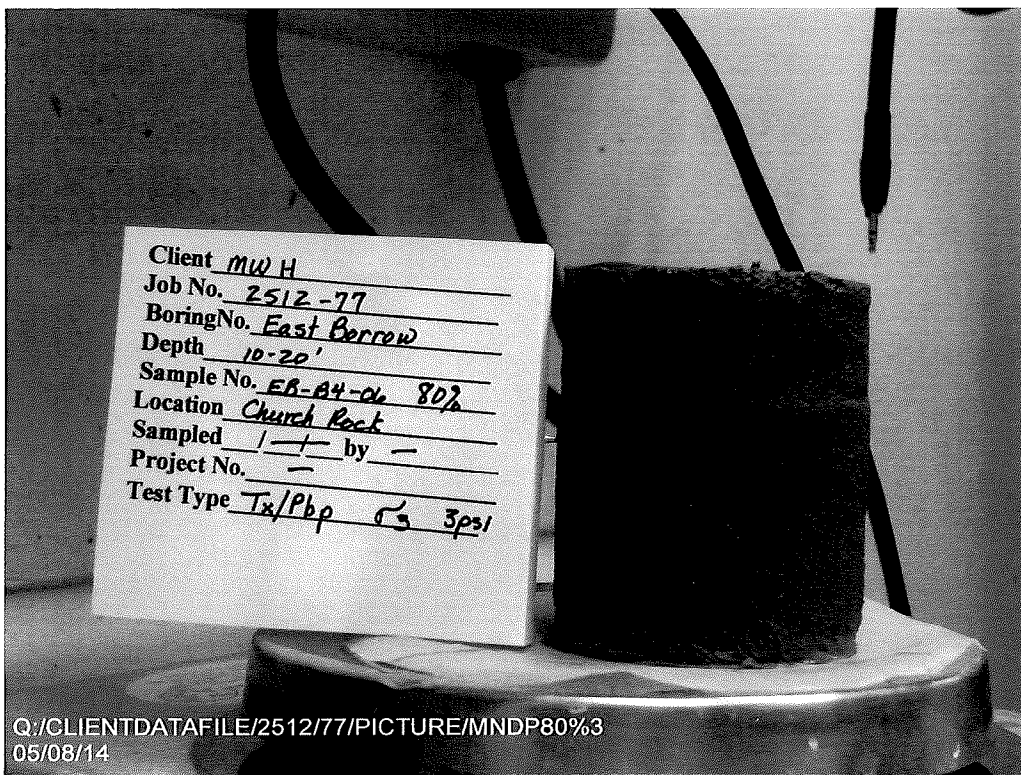
Boring Number: East Borrow
Depth: 10-20'
Sample Number: EB-B4-06 80%
Sampled Date: --
Test Date: 5/6/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 5/6/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_31.xls

Checked By: DM
Date: 05/06/14



Client MWH
Job No. 2512-77
Boring No. East Borrow
Depth 10-20'
Sample No. EB-A4-06 80%
Location Church Rock
Sampled 1-1 by -
Project No. -
Test Type Tx/Pbp 63 3psi

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	0-10'	TEST STARTED	03/20/14 CAL
SAMPLE NO.	DH-B1-03 85%	TEST FINISHED	04/07/14 DPM
LOCATION	Church Rock	CELL NUMBER	2P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	376.8	448.0
Wt. Wet Soil & Pan (g)	390.6	461.7
Wt. Dry Soil & Pan (g)	371.6	371.6
Wt. Lost Moisture (g)	19.0	90.2
Wt. of Pan Only (g)	13.7	13.7
Wt. of Dry Soil (g)	357.8	357.8
Moisture Content %	5.3	25.2
Wet Density PCF	104.7	129.9
Dry Density PCF	99.4	103.8

Init. Diameter (in)	2.407	(cm)	6.114
Init. Area (sq in)	4.550	(sq cm)	29.359
Init. Height (in)	3.013	(cm)	7.653
Vol. Bef. Consol. (cu ft)	0.00793		
Vol. After Consol. (cu ft)	0.00760		
Porosity %	41.87		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	2.995
Diameter	2.363
Pressure (psi)	0.126
Area after consol. (cm*cm)	28.302
Gradient	1.165
Permeability k (cm/s)	7.1E-04
Permeability k (m/s)	7.1E-06
Back Pressure (psi)	118.0
Cell Pressure (psi)	121.0
Ave. Effective Stress (psi)	2.937
Average temperature degree C:	22.2

Data entry by: DAW Date: 04/08/2014
 Checked by: *DDM* Date: *4/18/14*
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_13.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	0-10'	TEST STARTED	03/20/14 CAL
SAMPLE NO.	DH-B1-03 85%	TEST FINISHED	04/07/14 DPM
LOCATION	Church Rock	SETUP NO.	2P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.5	13.1				
50.0	48.0	17.8	19.4	37.0	43.1	6.1	0.61
60.0	58.0	19.4	20.7	47.9	54.3	6.4	0.64
70.0	68.0	20.8	21.9	58.0	65.1	7.1	0.71
80.0	78.0	22.2	23.4	68.5	76.2	7.7	0.77
90.0	88.0	23.6	24.6	77.7	86.0	8.3	0.83
100.0	98.0	25.6	26.7	88.2	96.8	8.6	0.86
110.0	108.0	27.0	27.9	98.4	107.3	8.9	0.89
120.0	118.0	28.3	29.3	108.4	117.6	9.2	0.92
130.0		29.7	29.9	118.4	127.9	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	29.90	0.00
0.25	0.50	30.10	-0.20
0.5	0.71	30.10	-0.20
1	1.00	30.10	-0.20
2	1.41	30.10	-0.20
4	2.00	30.10	-0.20
9	3.00	30.15	-0.25
16	4.00	30.15	-0.25
30	5.48	30.15	-0.25
60	7.75	30.15	-0.25
120	10.95	30.15	-0.25
240	15.49	30.15	-0.25
360	18.97	30.20	-0.30

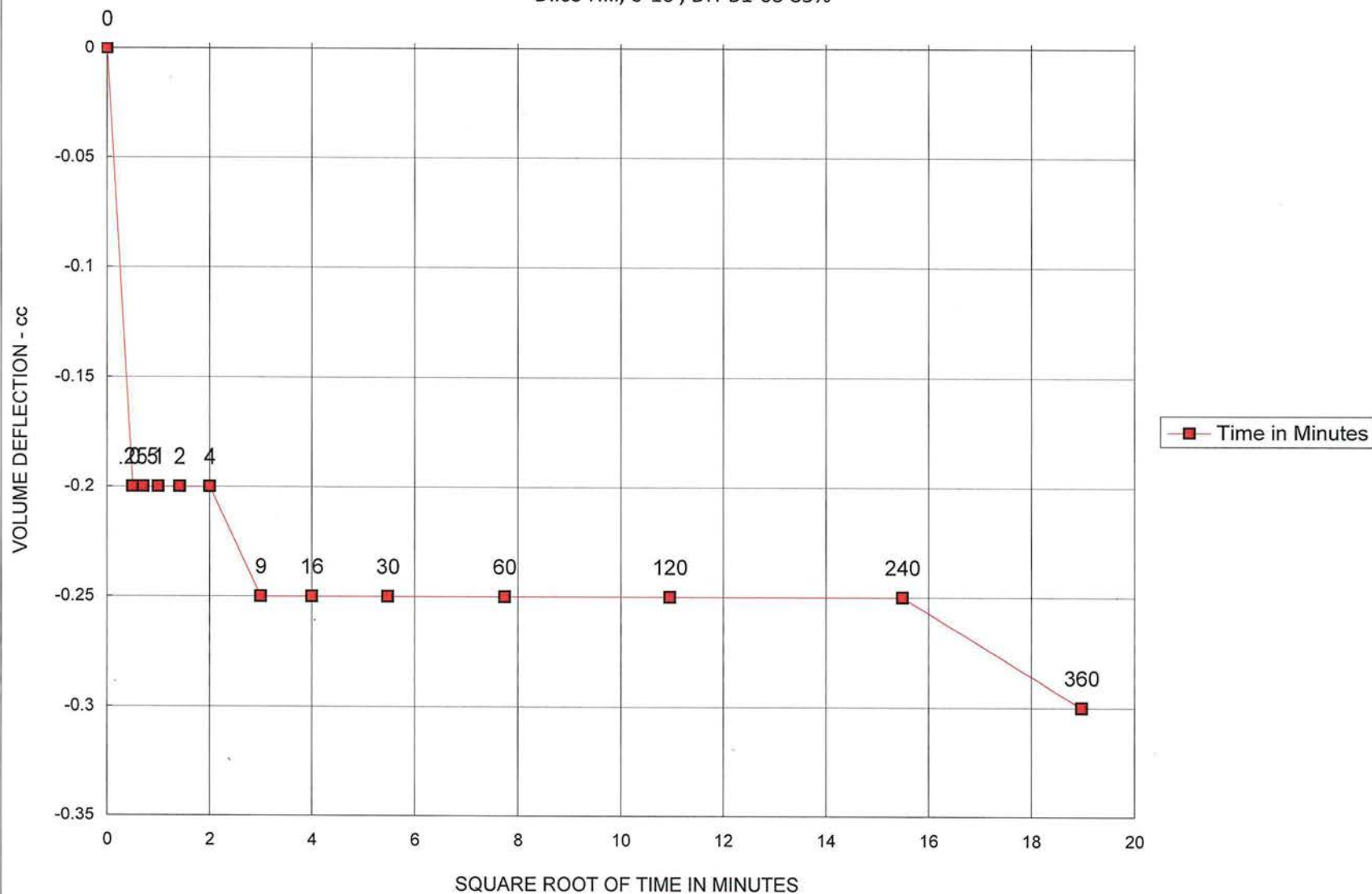
Initial Height (in)	3.013	Init. Vol. (CC)	224.709
Height Change (in)	0.018	Vol. Change (CC)	29.300
Ht. After Cons. (in)	2.995	Cell Exp. (CC)	19.929
Initial Area (sq in)	4.550	Net Change (CC)	9.372
Area After Cons. (sq in)	4.387	Cons. Vol. (CC)	215.337

Data entry by: DAW Date: 04/08/2014
 Checked by: DDM Date: 4/8/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_13.xls



CONSOLIDATION DATA

Dilco Hill, 0-10', DH-B1-03 85%



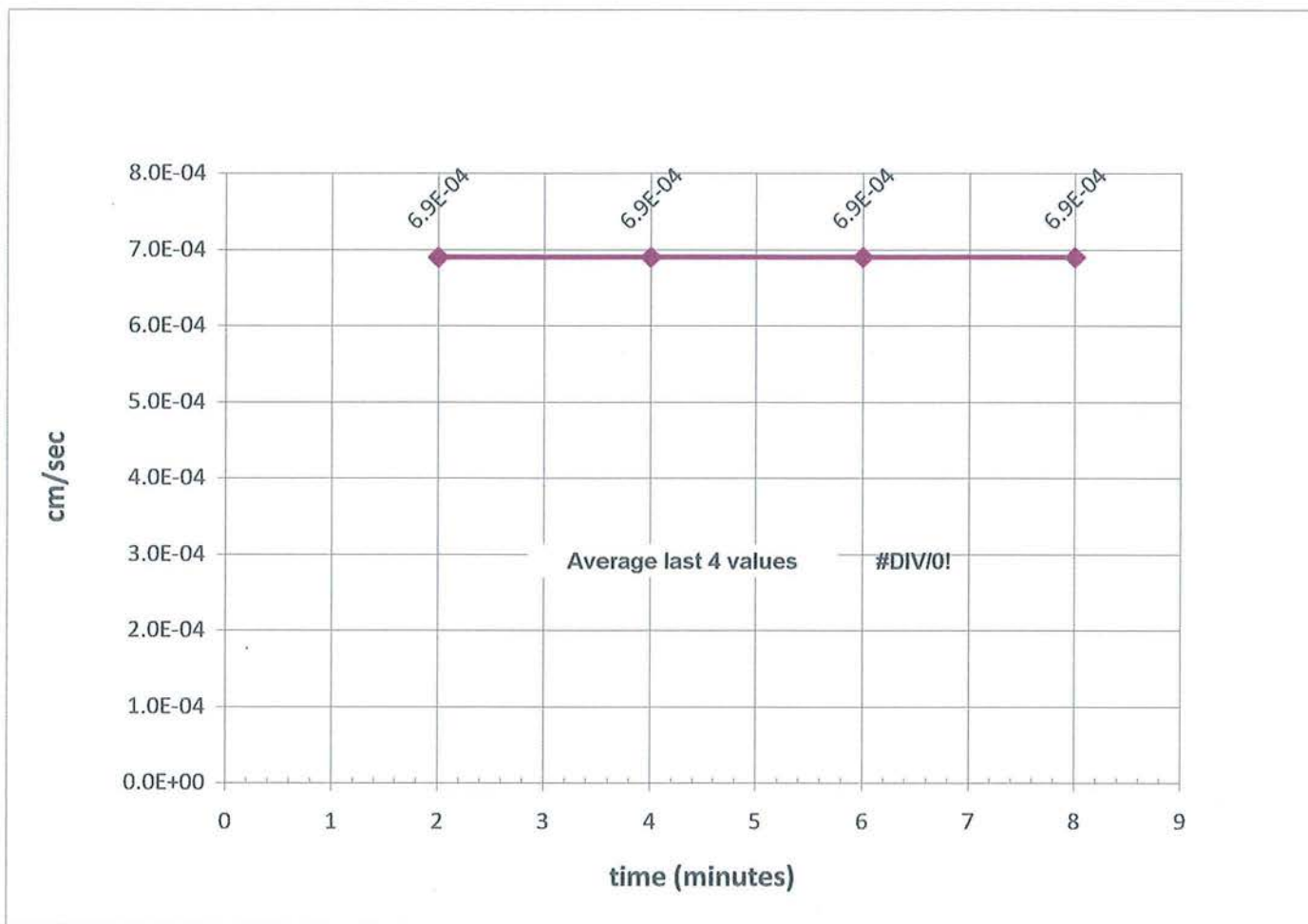


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

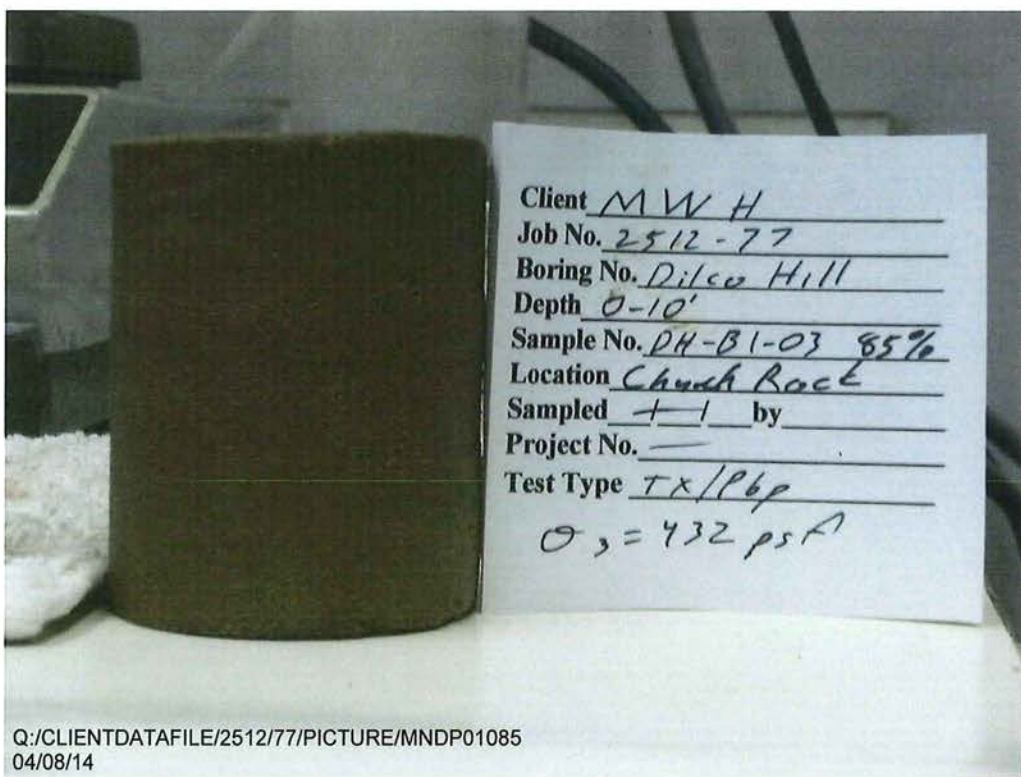
Boring Number: Dilco Hill
Depth: 0-10'
Sample Number: DH-B1-03 85%
Sampled Date: --
Test Date: 4/7/2014

Sampled By: --
Technician: DPM



Data Entered By: DPM
Date: 4/7/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_16.xls

Checked By: DAW
Date: 04/08/14



Client M W H
Job No. 2512-77
Boring No. Dilco Hill
Depth 0-10'
Sample No. DH-B1-03 85%
Location Church Rock
Sampled 1 by
Project No.
Test Type TX/P6p
 $\sigma_3 = 432 \text{ psf}$

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	East Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	03/20/14 CAL
SAMPLE NO.	EB-B6-03 85%	TEST FINISHED	04/07/14 DPM
LOCATION	Church Rock	CELL NUMBER	5P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	382.7	438.0
Wt. Wet Soil & Pan (g)	396.5	451.7
Wt. Dry Soil & Pan (g)	363.3	363.3
Wt. Lost Moisture (g)	33.2	88.5
Wt. of Pan Only (g)	13.8	13.8
Wt. of Dry Soil (g)	349.5	349.5
Moisture Content %	9.5	25.3
Wet Density PCF	106.8	132.9
Dry Density PCF	97.5	106.1

Init. Diameter (in)	2.405	(cm)	6.109
Init. Area (sq in)	4.543	(sq cm)	29.310
Init. Height (in)	3.005	(cm)	7.633
Vol. Bef. Consol. (cu ft)	0.00790		
Vol. After Consol. (cu ft)	0.00726		
Porosity %	43.01		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	6
Percentage of Pump setting	100
Q (cc/s)	2.31E-03
Height	2.992
Diameter	2.311
Pressure (psi)	0.254
Area after consol. (cm*cm)	27.064
Gradient	2.350
Permeability k (cm/s)	3.6E-05
Permeability k (m/s)	3.6E-07
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.873

Average temperature degree C: 21.8

Data entry by: DAW Date: 04/08/2014
 Checked by: OPM Date: 4/8/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_14.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	East Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	03/20/14 CAL
SAMPLE NO.	EB-B6-03 85%	TEST FINISHED	04/07/14 DPM
LOCATION	Church Rock	SETUP NO.	5P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.0	23.2				
50.0	48.0	25.8	27.8	37.3	45.6	8.3	0.83
60.0	58.0	27.9	29.1	47.6	55.8	8.2	0.82
70.0	68.0	29.1	30.2	57.9	66.4	8.5	0.85
80.0	78.0	30.2	31.2	68.4	77.2	8.8	0.88
90.0	88.0	31.5	33.0	77.7	86.9	9.2	0.92
100.0	98.0	33.0	33.7	88.3	97.7	9.4	0.94
110.0		33.9	34.0	98.5	108.1	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.20	0.00
0.25	0.50	0.60	-0.40
0.5	0.71	0.70	-0.50
1	1.00	0.70	-0.50
2	1.41	0.75	-0.55
4	2.00	0.80	-0.60
9	3.00	0.80	-0.60
16	4.00	0.80	-0.60
30	5.48	0.85	-0.65
60	7.75	0.85	-0.65
120	10.95	0.90	-0.70
240	15.49	0.90	-0.70
360	18.97	0.90	-0.70

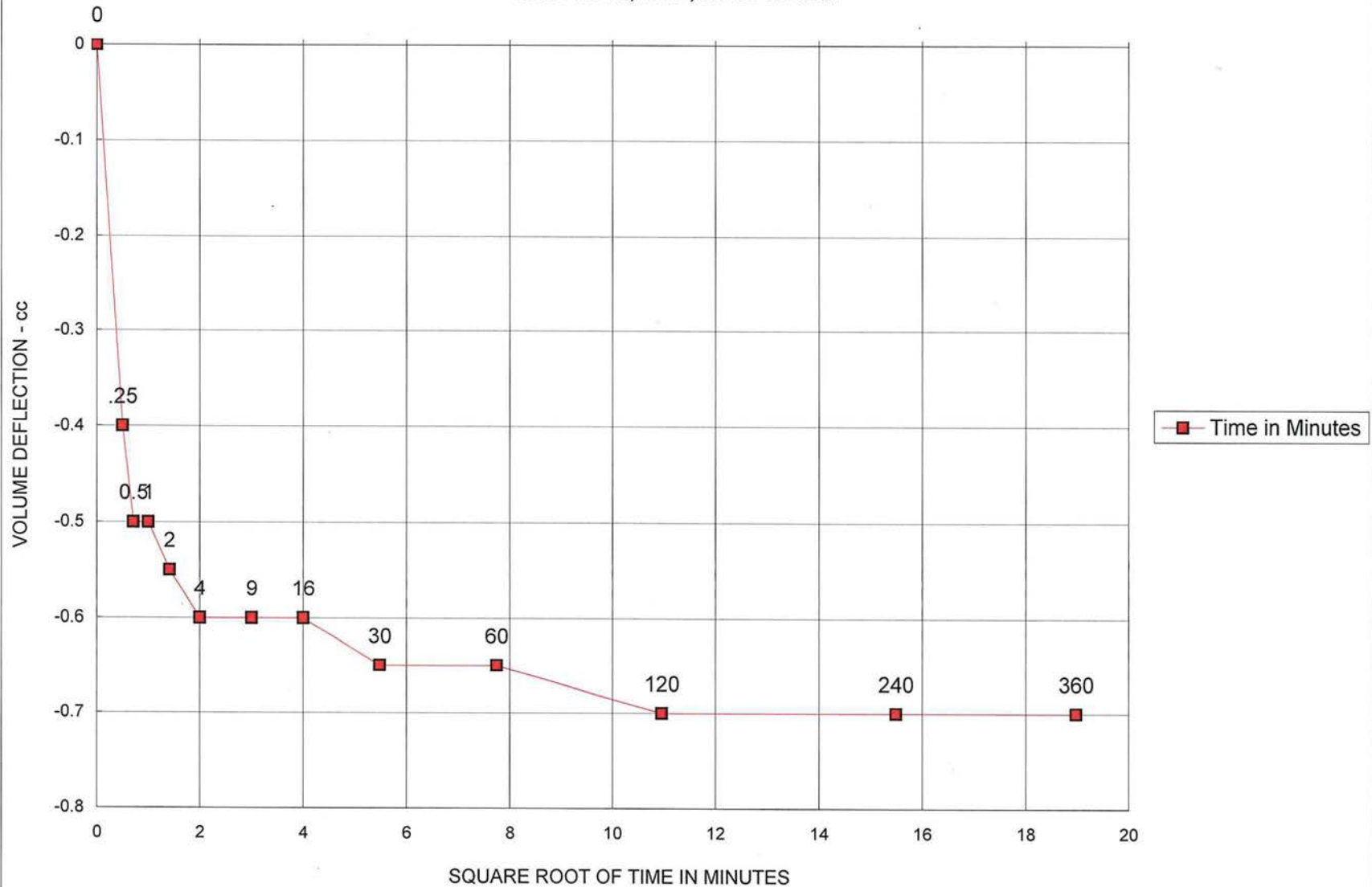
Initial Height (in)	3.005	Init. Vol. (CC)	223.740
Height Change (in)	0.013	Vol. Change (CC)	33.900
Ht. After Cons. (in)	2.992	Cell Exp. (CC)	15.877
Initial Area (sq in)	4.543	Net Change (CC)	18.023
Area After Cons. (sq in)	4.195	Cons. Vol. (CC)	205.717

Data entry by: DAW Date: 04/08/2014
 Checked by: DPM Date: 4/8/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_14.xls



CONSOLIDATION DATA

East Borrow, 0-10', EB-B6-03 85%



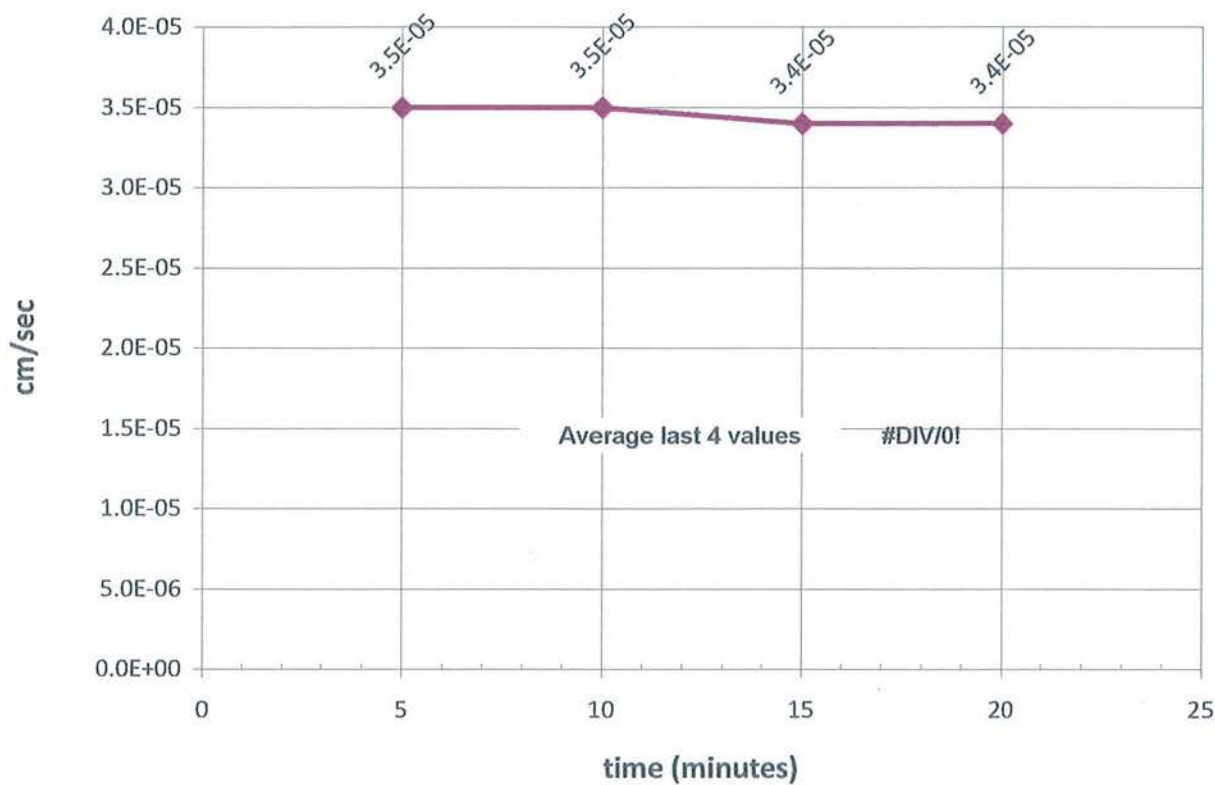


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

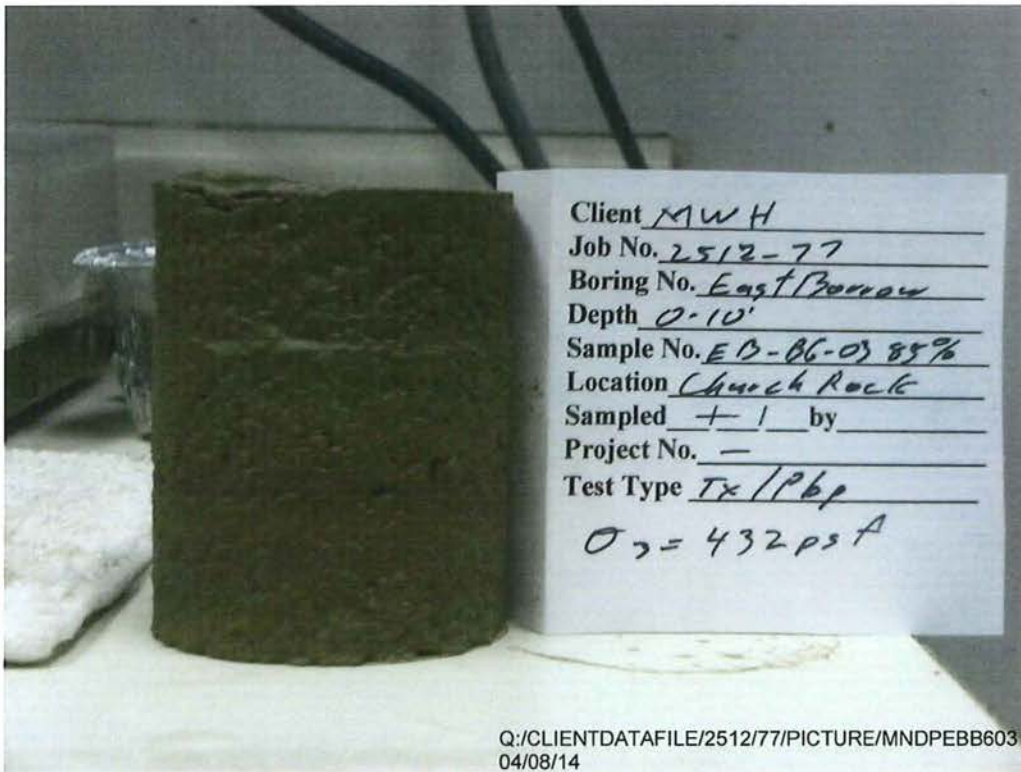
Boring Number: East Borrow
Depth: 0-10'
Sample Number: EB-B6-03 85%
Sampled Date: --
Test Date: 4/7/2014

Sampled By: --
Technician: DPM



Data Entered By: DPM
Date: 4/7/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_15.xls

Checked By: DAW
Date: 04/08/14



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04/08/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-15'	TEST STARTED	03/19/14 CAL
SAMPLE NO.	SB-B4-01 85%	TEST FINISHED	04/09/14 CAL
LOCATION	Church Rock	CELL NUMBER	17S
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	389.3	442.1
Wt. Wet Soil & Pan (g)	396.0	448.7
Wt. Dry Soil & Pan (g)	353.7	353.7
Wt. Lost Moisture (g)	42.3	95.0
Wt. of Pan Only (g)	6.7	6.7
Wt. of Dry Soil (g)	347.0	347.0
Moisture Content %	12.2	27.4
Wet Density PCF	108.5	127.2
Dry Density PCF	96.8	99.9

Init. Diameter (in)	2.406	(cm)	6.111
Init. Area (sq in)	4.547	(sq cm)	29.334
Init. Height (in)	3.005	(cm)	7.633
Vol. Bef. Consol. (cu ft)	0.00791		
Vol. After Consol. (cu ft)	0.00766		
Porosity %	43.81		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	2.993
Diameter	2.373
Pressure (psi)	0.110
Area after consol. (cm*cm)	28.530
Gradient	1.017
Permeability k (cm/s)	2.0E-04
Permeability k (m/s)	2.0E-06
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.945
Average temperature degree C:	23.0

Data entry by: DAW Date: 04/10/2014
 Checked by: OK Date: 4/11/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_19.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-15'	TEST STARTED	03/19/14 CAL
SAMPLE NO.	SB-B4-01 85%	TEST FINISHED	04/09/14 CAL
LOCATION	Church Rock	SETUP NO.	17S
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.1	15.9				
50.0	48.0	15.9	17.4	38.0	45.3	7.3	0.73
60.0	58.0	16.8	17.9	47.8	55.8	8.0	0.80
70.0	68.0	17.8	18.6	58.2	66.4	8.2	0.82
80.0	78.0	18.6	19.4	68.1	76.9	8.8	0.88
90.0	88.0	19.5	20.2	78.2	87.1	8.9	0.89
100.0	98.0	20.3	21.0	88.3	97.6	9.3	0.93
110.0		21.3	21.3	98.0	107.5	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	21.30	0.00
0.25	0.50	21.65	-0.35
0.5	0.71	21.65	-0.35
1	1.00	21.65	-0.35
2	1.41	21.65	-0.35
4	2.00	21.65	-0.35
9	3.00	21.65	-0.35
16	4.00	21.65	-0.35
30	5.48	21.65	-0.35
60	7.75	21.70	-0.40
120	10.95	21.70	-0.40
240	15.49	21.70	-0.40
360	18.97	21.70	-0.40

Initial Height (in)	3.005	Init. Vol. (CC)	223.926
Height Change (in)	0.012	Vol. Change (CC)	20.200
Ht. After Cons. (in)	2.993	Cell Exp. (CC)	13.204
Initial Area (sq in)	4.547	Net Change (CC)	6.996
Area After Cons. (sq in)	4.422	Cons. Vol. (CC)	216.930

Data entry by: DAW Date: 04/10/2014

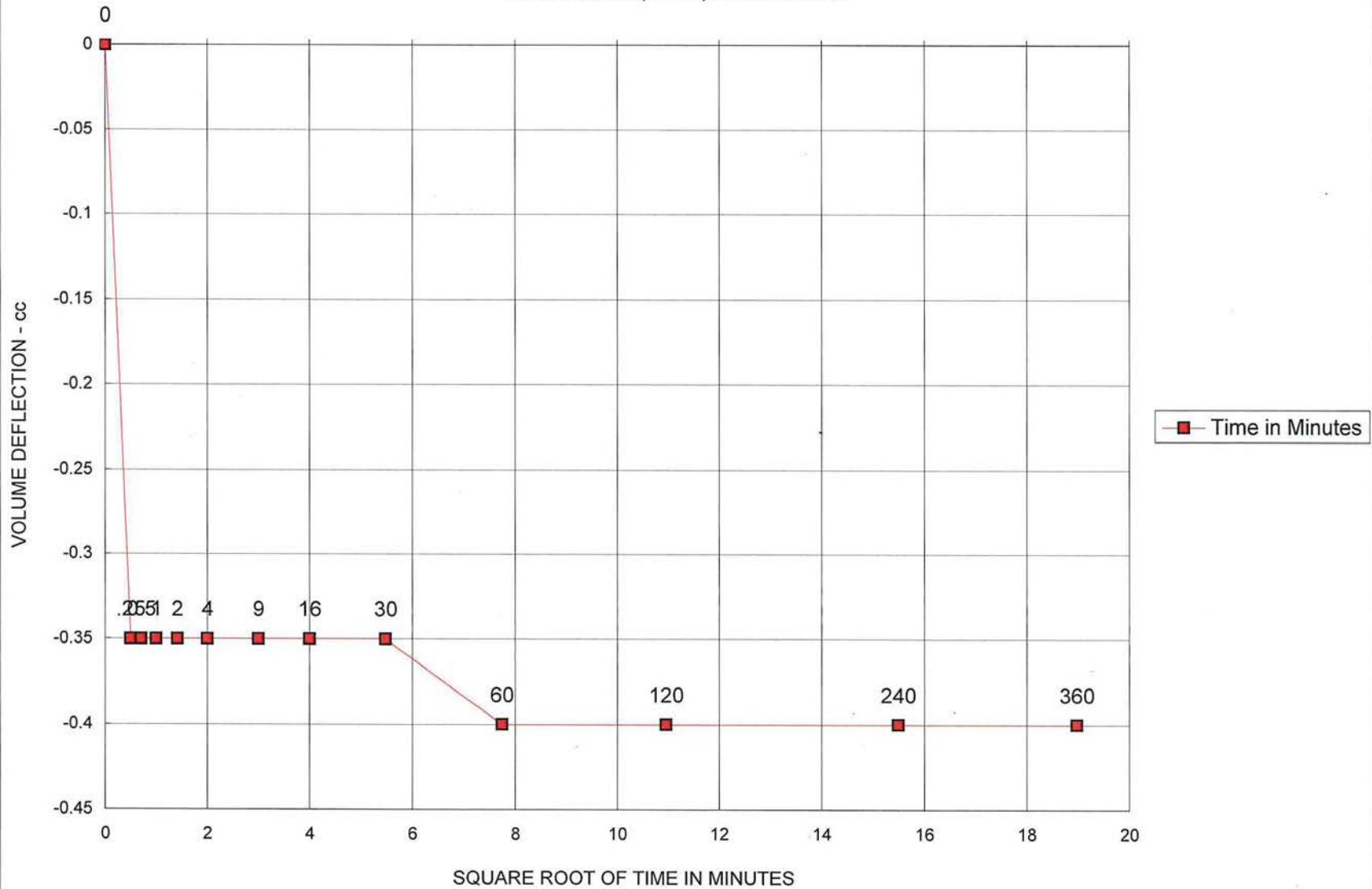
Checked by: DAW Date: 4/11/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_19.xls



CONSOLIDATION DATA

South Borrow, 0-15', SB-B4-01 85%

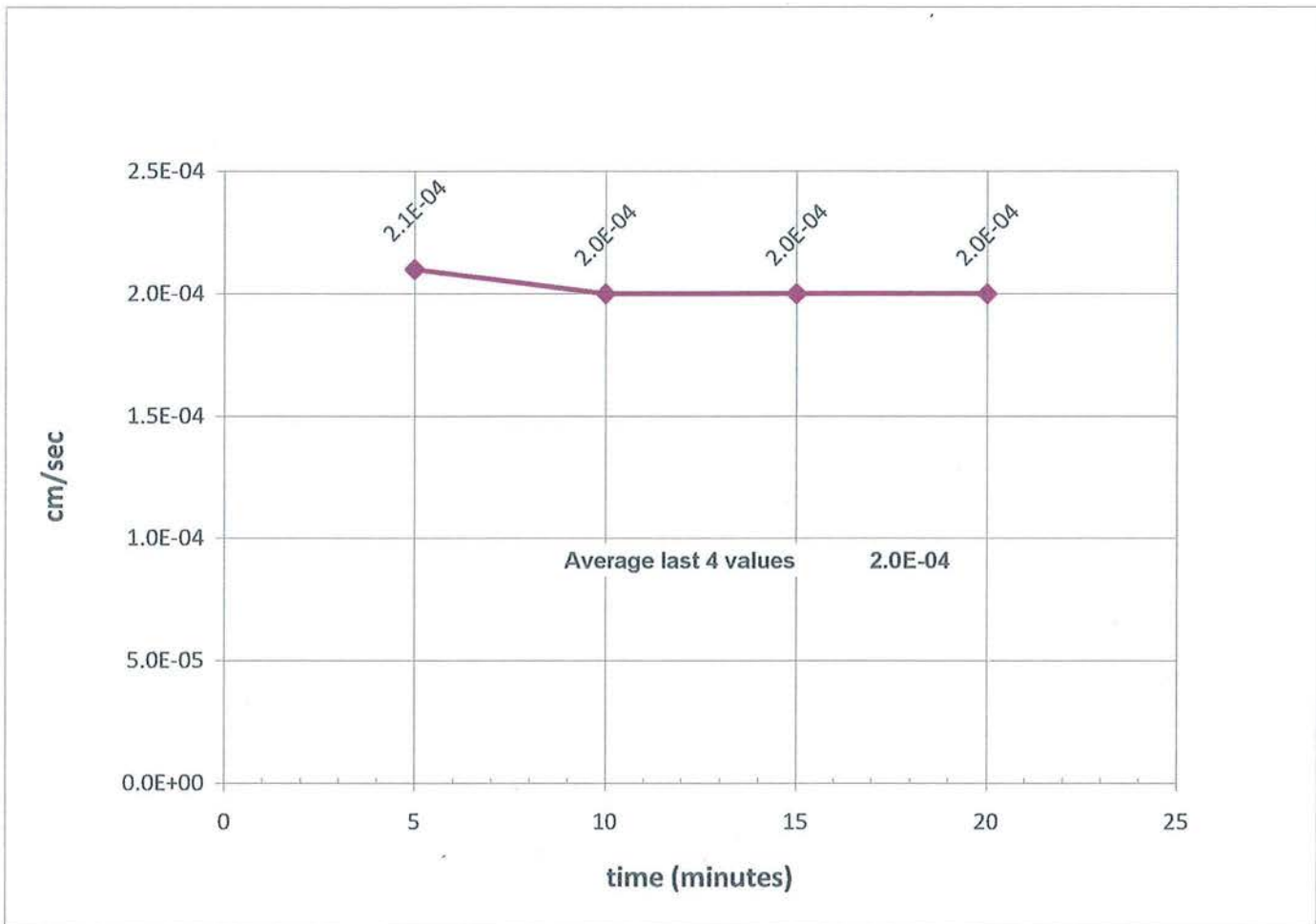


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

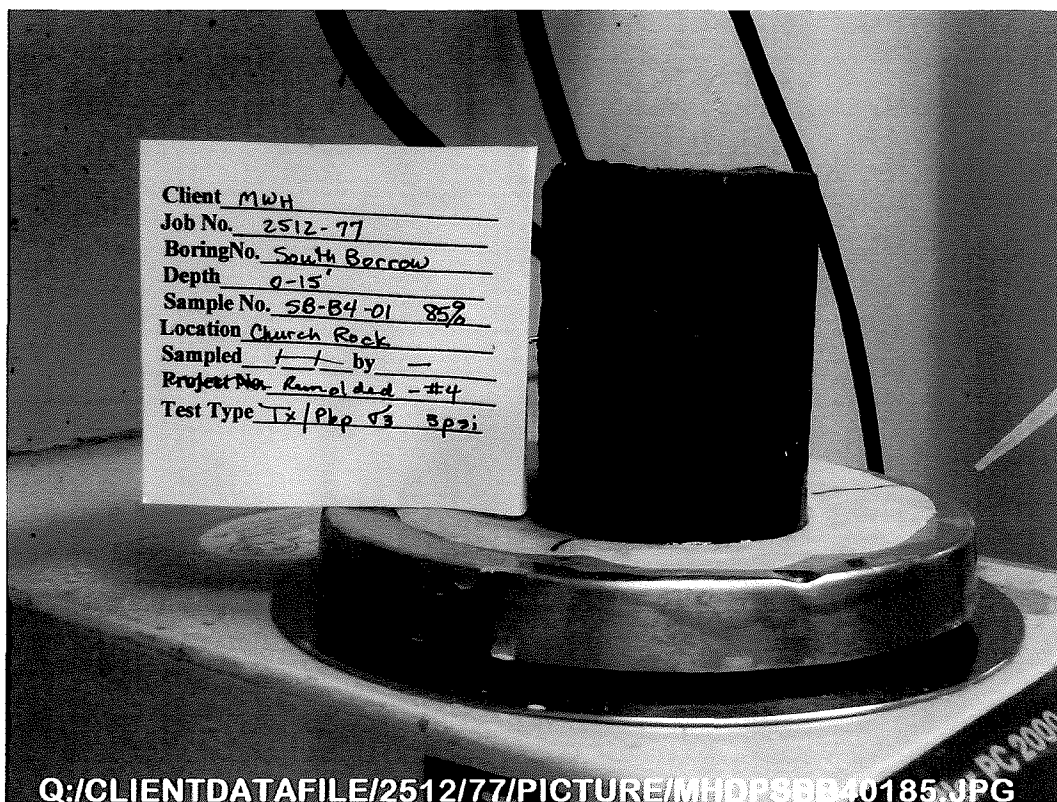
Boring Number: South Borrow
Depth: 0-15'
Sample Number: SB-B4-01 85%
Sampled Date: --
Test Date: 4/9/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 4/9/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_20.xls

Checked By: DAW
Date: 04/10/14



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PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO. South Borrow
DEPTH 0-25'
SAMPLE NO. SB-B1-04 (85%)
LOCATION Church Rock
PROJECT NO. --
SOIL DESCR. Remolded -#4

SAMPLED --
TEST STARTED 03/18/14 CAL
TEST FINISHED 04/09/14 CAL
CELL NUMBER 9P
SATURATED TEST Yes
TEST TYPE TX/Pbp/Tap Water
CONF. PRES. PSF 432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	381.5	443.8
Wt. Wet Soil & Pan (g)	389.8	452.2
Wt. Dry Soil & Pan (g)	360.0	360.0
Wt. Lost Moisture (g)	29.8	92.2
Wt. of Pan Only (g)	8.4	8.4
Wt. of Dry Soil (g)	351.7	351.7
Moisture Content %	8.5	26.2
Wet Density PCF	106.3	134.0
Dry Density PCF	98.0	106.2

Init. Diameter (in)	2.403	(cm)	6.104
Init. Area (sq in)	4.535	(sq cm)	29.261
Init. Height (in)	3.015	(cm)	7.658
Vol. Bef. Consol. (cu ft)	0.00791		
Vol. After Consol. (cu ft)	0.00730		
Porosity %	44.58		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	6
Percentage of Pump setting	100
Q (cc/s)	2.31E-03
Height	3.006
Diameter	2.312
Pressure (psi)	0.163
Area after consol. (cm*cm)	27.075
Gradient	1.501
Permeability k (cm/s)	5.7E-05
Permeability k (m/s)	5.7E-07
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.919
Average temperature degree C:	22.8

Data entry by: DAW Date: 04/10/2014
Checked by: cm Date: 4/11/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_17.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-25'	TEST STARTED	03/18/14 CAL
SAMPLE NO.	SB-B1-04 (85%)	TEST FINISHED	04/09/14 CAL
LOCATION	Church Rock	SETUP NO.	9P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.2	17.2				
50.0	48.0	19.6	21.6	38.6	46.5	7.9	0.79
60.0	58.0	24.3	25.3	47.9	56.3	8.4	0.84
70.0	68.0	25.8	26.7	58.7	67.4	8.7	0.87
80.0	78.0	27.1	28.0	68.7	77.6	8.9	0.89
90.0	88.0	28.3	29.1	78.6	87.8	9.2	0.92
100.0	98.0	29.4	30.3	88.6	97.9	9.3	0.93
110.0		32.1	32.3	98.5	108.1	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	32.30	0.00
0.25	0.50	32.65	-0.35
0.5	0.71	32.70	-0.40
1	1.00	32.70	-0.40
2	1.41	32.70	-0.40
4	2.00	32.70	-0.40
9	3.00	32.70	-0.40
16	4.00	32.70	-0.40
30	5.48	32.70	-0.40
60	7.75	32.75	-0.45
120	10.95	32.75	-0.45
240	15.49	32.75	-0.45
360	18.97	32.75	-0.45

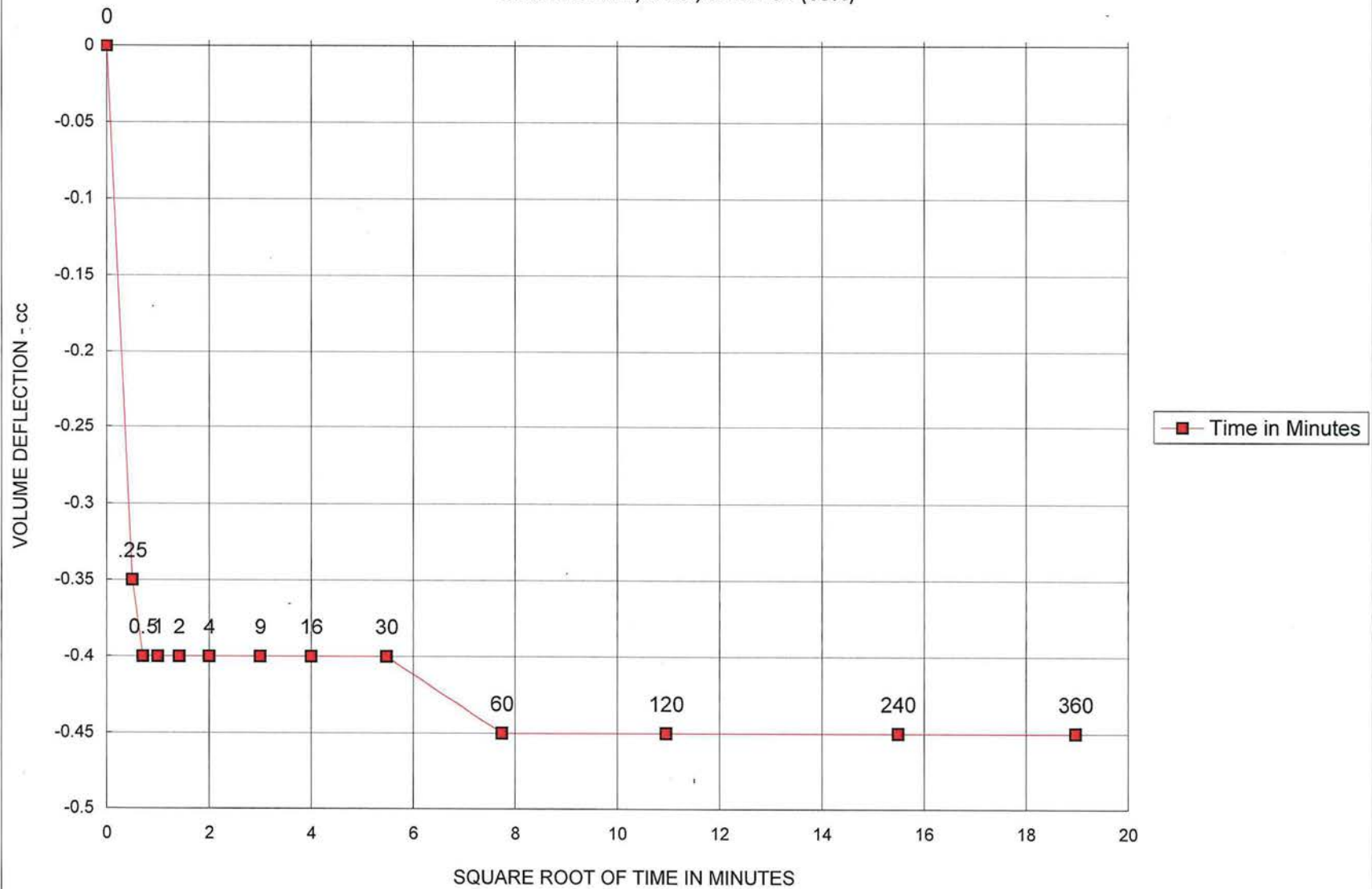
Initial Height (in)	3.015	Init. Vol. (CC)	224.111
Height Change (in)	0.009	Vol. Change (CC)	33.200
Ht. After Cons. (in)	3.006	Cell Exp. (CC)	15.850
Initial Area (sq in)	4.535	Net Change (CC)	17.350
Area After Cons. (sq in)	4.197	Cons. Vol. (CC)	206.761

Data entry by: DAW Date: 04/10/2014
 Checked by: CW Date: 4/11/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_17.xls



CONSOLIDATION DATA

South Borrow, 0-25', SB-B1-04 (85%)

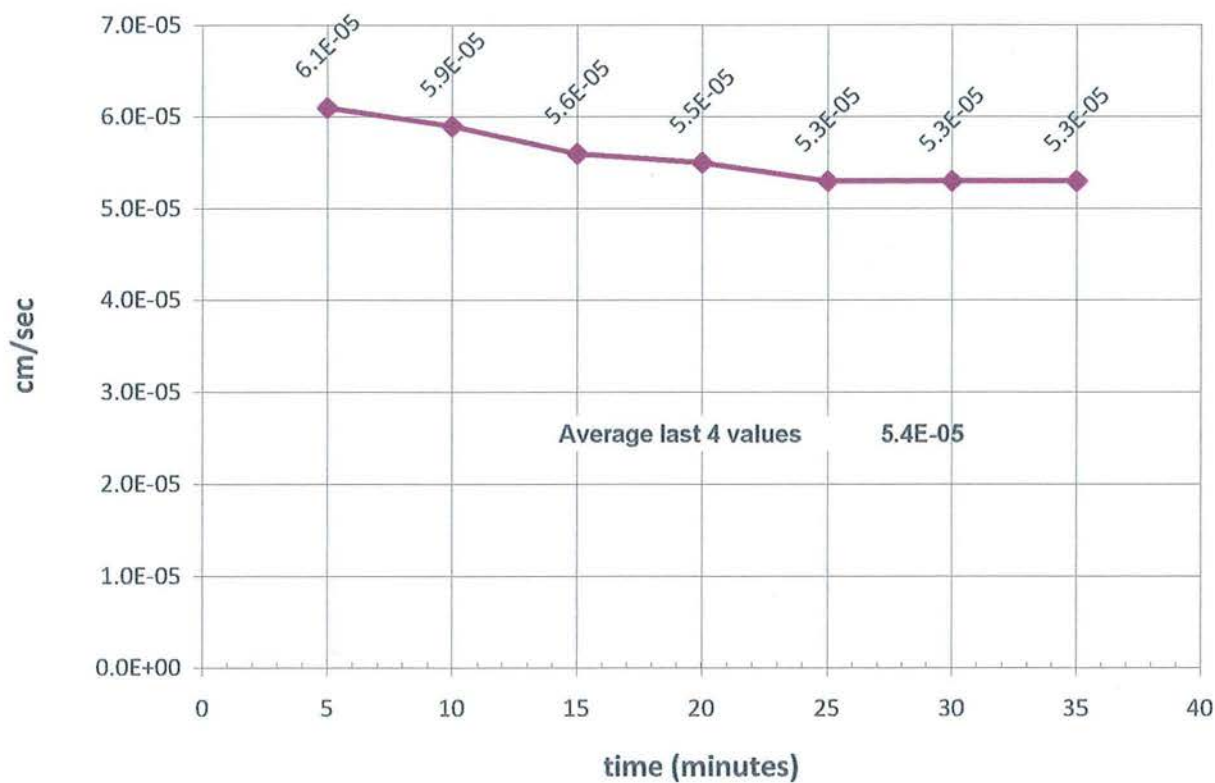


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

Boring Number: South Borrow
Depth: 0-25'
Sample Number: SB-B1-04 85%
Sampled Date: --
Test Date: 4/9/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 4/9/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_18.xls

Checked By: DAU
Date: 04/10/14



Client MWH
Job No. 2512-77
Boring No. South Borrow
Depth 0-25'
Sample No. SB-B1-04 85%
Location Church Rock
Sampled 1/1 by
Project No.
Test Type T_x/P_bp σ₃ 3psi

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PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	West Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	03/18/14 CAL
SAMPLE NO.	WB-B2-05 85%	TEST FINISHED	04/09/14 CAL
LOCATION	Church Rock	CELL NUMBER	11P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	367.8	427.6
Wt. Wet Soil & Pan (g)	374.8	434.6
Wt. Dry Soil & Pan (g)	349.5	349.5
Wt. Lost Moisture (g)	25.3	85.1
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	342.5	342.5
Moisture Content %	7.4	24.8
Wet Density PCF	103.3	130.4
Dry Density PCF	96.2	104.5

Init. Diameter (in)	2.402	(cm)	6.101
Init. Area (sq in)	4.531	(sq cm)	29.237
Init. Height (in)	2.994	(cm)	7.605
Vol. Bef. Consol. (cu ft)	0.00785		
Vol. After Consol. (cu ft)	0.00723		
Porosity %	41.56		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	2.962
Diameter	2.317
Pressure (psi)	0.195
Area after consol. (cm*cm)	27.205
Gradient	1.822
Permeability k (cm/s)	1.2E-04
Permeability k (m/s)	1.2E-06
Back Pressure (psi)	118.0
Cell Pressure (psi)	121.0
Ave. Effective Stress (psi)	2.903
Average temperature degree C:	23.0

Data entry by: DAW Date: 04/10/2014
 Checked by: oac Date: 4/11/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-R1_18.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO. West Borrow
DEPTH 10-20'
SAMPLE NO. WB-B2-05 85%
LOCATION Church Rock
PROJECT NO. --
SOIL DESCR. Remolded -#4

SAMPLED --
TEST STARTED 03/18/14 CAL
TEST FINISHED 04/09/14 CAL
SETUP NO. 11P
SATURATED TEST Yes
TEST TYPE TX/Pbp/Tap Water
CONF. PRES. PSF 432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)	Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open	
40.0	38.0	2.8	22.4			
50.0	48.0	23.7	26.4	38.6	46.2	7.6
60.0	58.0	26.8	28.0	47.7	55.5	7.8
70.0	68.0	28.1	29.0	58.8	66.8	8.0
80.0	78.0	29.1	29.8	68.7	77.2	8.5
90.0	88.0	30.1	30.8	78.5	87.2	8.7
100.0	98.0	31.0	31.7	88.5	97.5	9.0
110.0	108.0	32.3	33.0	98.3	107.5	9.2
120.0	118.0	33.2	33.9	108.4	117.8	9.4
130.0		35.3	35.3	118.5	128.4	9.9

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.50	0.00
0.25	0.50	1.10	-0.60
0.5	0.71	1.20	-0.70
1	1.00	1.20	-0.70
2	1.41	1.25	-0.75
4	2.00	1.25	-0.75
9	3.00	1.30	-0.80
16	4.00	1.35	-0.85
30	5.48	1.35	-0.85
60	7.75	1.35	-0.85
120	10.95	1.35	-0.85
240	15.49	1.35	-0.85
360	18.97	1.35	-0.85

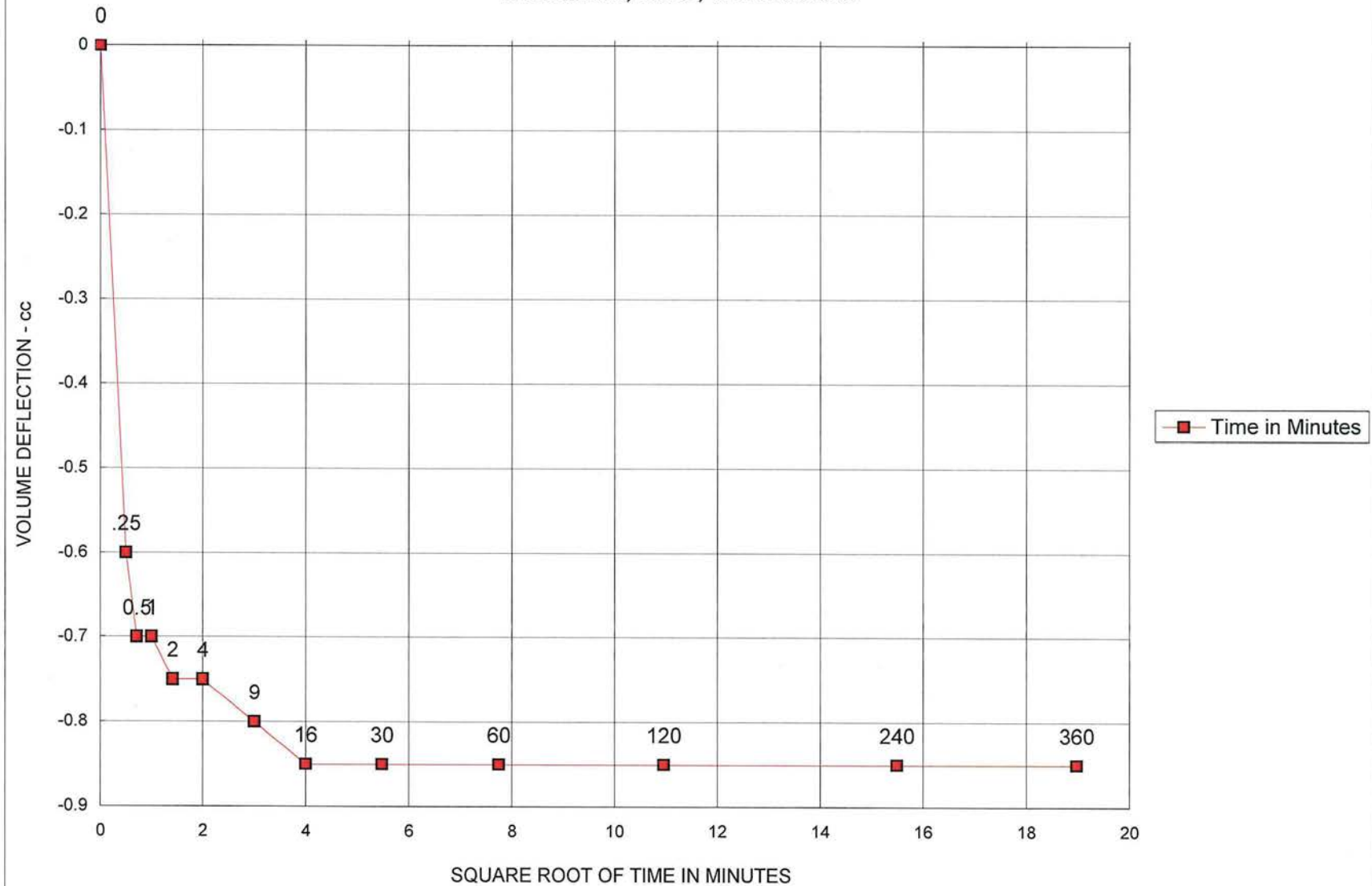
Initial Height (in)	2.994	Init. Vol. (CC)	222.365
Height Change (in)	0.032	Vol. Change (CC)	34.300
Ht. After Cons. (in)	2.962	Cell Exp. (CC)	16.651
Initial Area (sq in)	4.531	Net Change (CC)	17.650
Area After Cons. (sq in)	4.217	Cons. Vol. (CC)	204.716

Data entry by: DAW Date: 04/10/2014
Checked by: CAC Date: 4/11/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-R1_18.xls



CONSOLIDATION DATA

West Borrow, 10-20', WB-B2-05 85%

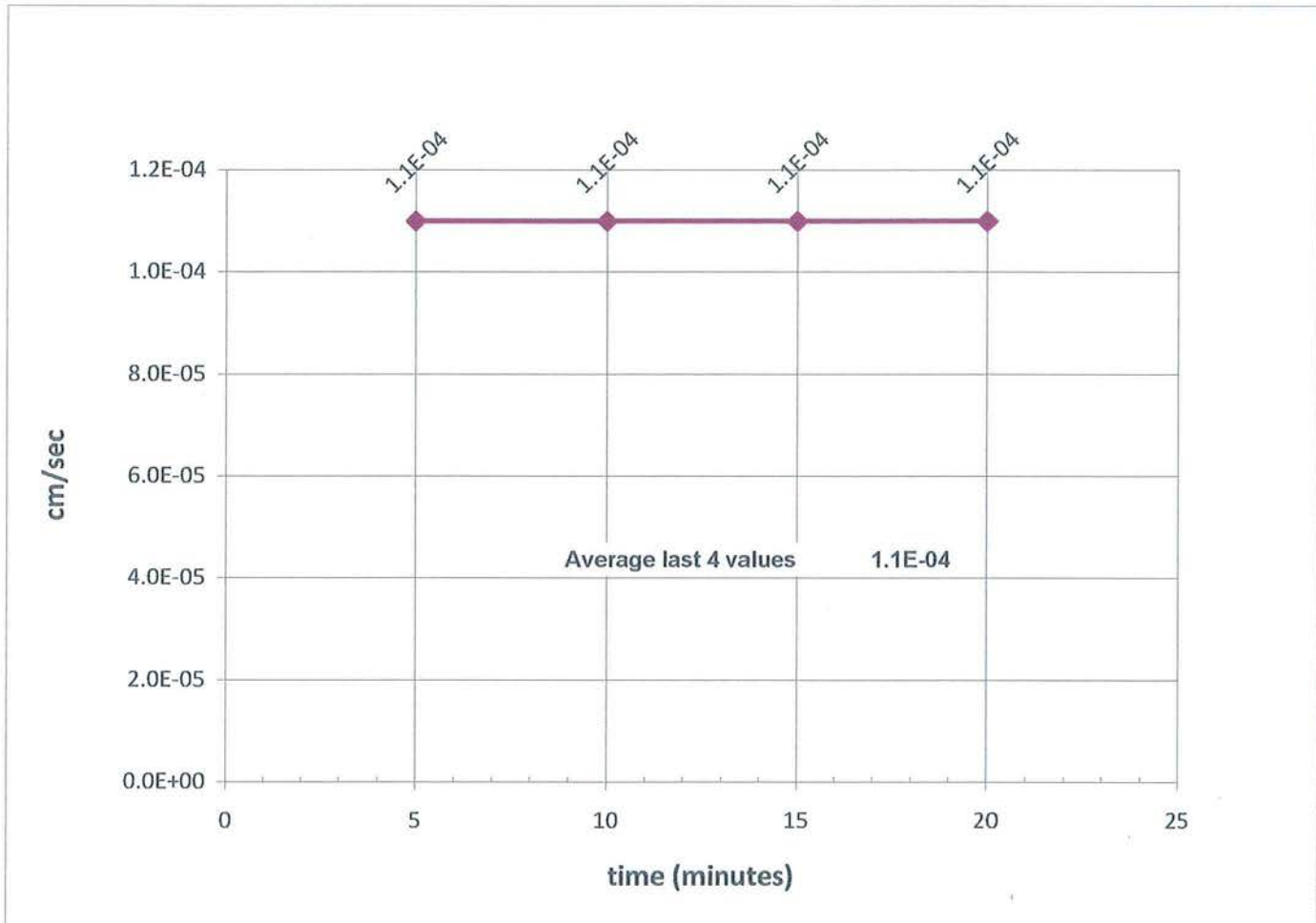


Preliminary Flow Pump Test Data ASTM D5084

Client: MWH
Job Number: 2512-77
Project: --
Location: Church Rock
Project Number: --

Boring Number: West Borrow
Depth: 10-20'
Sample Number: WB-B2-05 85%
Sampled Date: --
Test Date: 4/9/2014

Sampled By: --
Technician: CAL



Data Entered By: CAL
Date: 4/9/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_19.xls

Checked By: DAW
Date: 5/10/14

Client MWH
Job No. 2512-77
Boring No. West Borrow
Depth 10-20'
Sample No. WB-BZ-05 85%
Location Church Rock
Sampled / / by
Project No. —
Test Type Tx / Pop of 3 psi

Q:/CLIENTDATAFILE/2512/77/PICTURE/MHDPWBB20585.JPG

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	North Borrow	SAMPLED	-
DEPTH	0-10'	TEST STARTED	3/20/14 CAL
SAMPLE NO.	NB-B2-04 85%	TEST FINISHED	4/08/14 CAL
LOCATION	Church Rock	CELL NUMBER	1P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbtp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	370.1	442.0
Wt. Wet Soil & Pan (g)	377.0	448.9
Wt. Dry Soil & Pan (g)	354.0	354.0
Wt. Lost Moisture (g)	23.0	94.9
Wt. of Pan Only (g)	6.9	6.9
Wt. of Dry Soil (g)	347.1	347.1
Moisture Content %	6.6	27.3
Wet Density PCF	102.9	130.7
Dry Density PCF	96.5	102.6

Init. Diameter (in)	2.406	(cm)	6.111
Init. Area (sq in)	4.547	(sq cm)	29.334
Init. Height (in)	3.013	(cm)	7.653
Vol. Bef. Consol. (cu ft)	0.00793		
Vol. After Consol. (cu ft)	0.00746		
Porosity %	44.94		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	4
Percentage of Pump setting	100
Q (cc/s)	1.16E-02
Height	2.985
Diameter	2.344
Pressure (psi)	0.164
Area after consol. (cm*cm)	27.848
Gradient	1.521
Permeability k (cm/s)	2.7E-04
Permeability k (m/s)	2.7E-06
Back Pressure (psi)	108.0
Cell Pressure (psi)	111.0
Ave. Effective Stress (psi)	2.918
Average temperature degree C:	22.1

Data entry by: SKL Date: 04/09/2014
 Checked by: CH Date: 4/09/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_16.xls

TRIAXIAL TEST DATA
ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	North Borrow	SAMPLED	-
DEPTH	0-10'	TEST STARTED	3/20/14 CAL
SAMPLE NO.	NB-B2-04 85%	TEST FINISHED	4/08/14 CAL
LOCATION	Church Rock	SETUP NO.	1P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	Remolded #4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	4.1	13.1				
50.0	48.0	18.5	20.3	37.3	44.5	7.2	0.72
60.0	58.0	20.6	22.0	47.9	55.3	7.4	0.74
70.0	68.0	22.3	23.6	58.0	66.1	8.1	0.81
80.0	78.0	24.1	25.5	68.6	77.0	8.4	0.84
90.0	88.0	25.9	27.1	77.9	86.8	8.9	0.89
100.0	98.0	28.4	29.6	88.5	97.5	9.0	0.90
110.0	108.0	30.0	31.2	98.6	107.8	9.2	0.92
120.0		31.8	32.0	108.5	118.0	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.30	0.00
0.25	0.50	0.75	-0.45
0.5	0.71	0.75	-0.45
1	1.00	0.80	-0.50
2	1.41	0.80	-0.50
4	2.00	0.80	-0.50
9	3.00	0.85	-0.55
16	4.00	0.90	-0.60
30	5.48	0.90	-0.60
60	7.75	0.90	-0.60
120	10.95	0.95	-0.65
240	15.49	0.95	-0.65
360	18.97	1.00	-0.70

Initial Height (in)	3.013	Init. Vol. (CC)	224.522
Height Change (in)	0.028	Vol. Change (CC)	30.600
Ht. After Cons. (in)	2.985	Cell Exp. (CC)	17.256
Initial Area (sq in)	4.547	Net Change (CC)	13.345
Area After Cons. (sq in)	4.316	Cons. Vol. (CC)	211.178

Data entry by: SKL Date: 04/09/2014
 Checked by: SKL Date: 4/09/14
 FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_16.xls



CONSOLIDATION DATA

North Borrow, 0-10', NB-B2-04 85%

