Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-10
Depth: 0-7"
Sample Number: TI-CS10-02A(0-7")
Sampled Date: 11/13/2013
Test Date: 12/5/2013

Sampled By: MWH
Technician: CAL

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 124.45
Weight of Dry Soil & Pan (g): 120.39
Weight of Water (g): 4.06
Weight of Pan (g): 3.74
Weight of Dry Soil (g): 116.65
Moisture (%): 3.5

General Sample Data

Total Wet Weight of Sample (g): 10,845.00
Total Dry Weight of Sample (g): 10,629.43
Calculated Weight Plus #200 (g): 6,495.99
Moisture of Total Sample (%): 2.0
Percent Retained #200 Sieve (%): 61.1

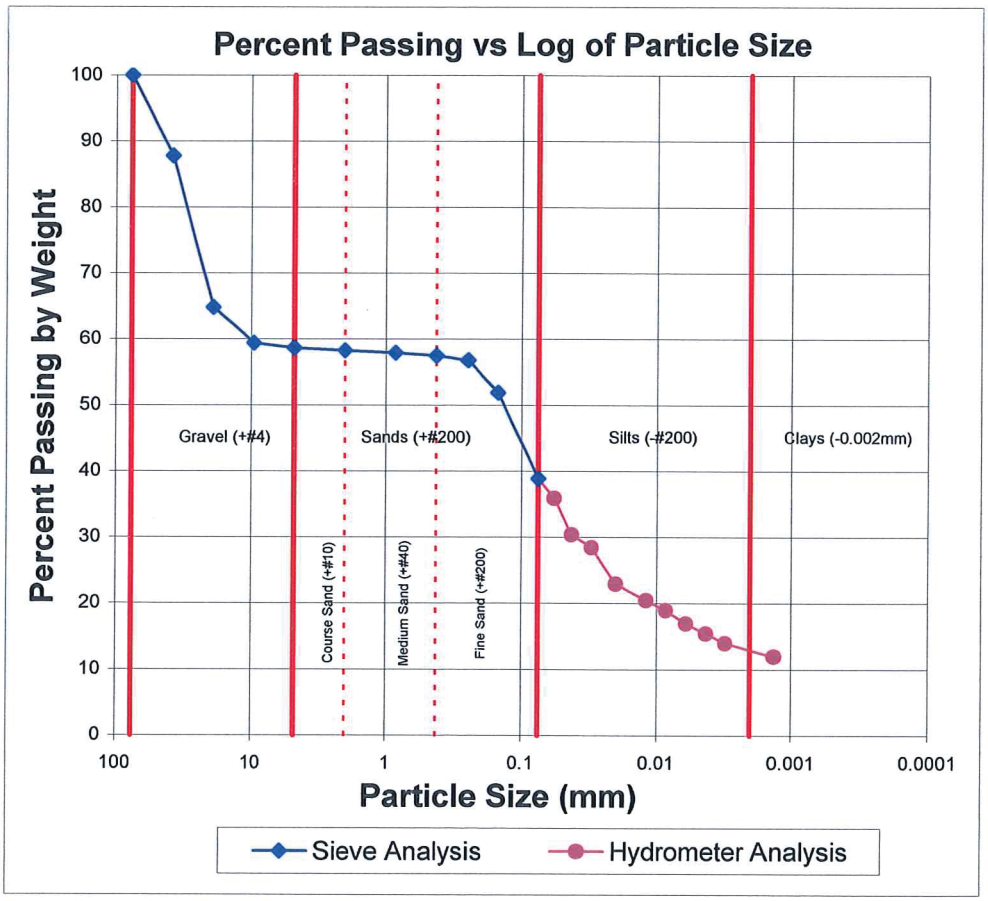
Plus Split Data

Original Weight of +#10 (g): 4,570.00
Calculated Weight of +#10 (g): 4,435.80

Minus Split Data

Original Weight of -#10 (g): 6,275.00
Calculated Dry Weight of -#10 (g): 6,193.63

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	**76.2**	0.00	0.00	0.00	0.00	100.0
1.5"	**38.10**	1300.11	0.00	1300.11	1300.11	87.8
3/4"	**19.05**	2445.00	0.00	2445.00	2445.00	64.8
3/8"	**9.525**	570.45	0.00	570.45	570.45	59.4
#4	**4.750**	82.08	0.00	82.08	82.08	58.6
#10	**2.000**	38.16	0.00	38.16	38.16	58.3
60.577g split out of -#10 material.						
#20	**0.850**	4.21	3.84	0.37	39.04	57.9
#40	**0.425**	4.13	3.72	0.41	43.80	57.5
#60	**0.250**	4.26	3.54	0.72	76.18	56.8
#100	**0.150**	8.56	3.66	4.90	518.54	51.9
#200	**0.075**	16.76	3.69	13.07	1382.63	38.9



Data Entered By: KMR
Date: 12/11/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_2.xls

Checked By: DPM
Date: 12/11/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-10
Depth: 0-7"
Sample Number: TI-CS10-02A(0-7")
Sampled Date: 11/13/2013
Test Date: 12/5/2013

Sampled By: MWH
Technician: CAL

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 7.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 10,845.00
Total Dry Weight of Sample (g): 10,629.43
Wet Weight of Sub-Sample (g): 60.577
Dry Weight of Sub-Sample (g): 58.540
Corrected Dry Weight of Sub-Sample - W(g): 100.411

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
0.5	43.0	36.0	22.4	0.0133	9.24	0.0573	35.9	3816.13	35.9
1	37.5	30.5	22.4	0.0133	10.14	0.0424	30.4	3233.11	30.4
2	35.5	28.5	22.4	0.0133	10.47	0.0305	28.4	3021.11	28.4
5	30.0	23.0	22.2	0.0133	11.37	0.0201	22.9	2438.09	22.9
15	27.5	20.5	21.5	0.0135	11.78	0.0119	20.4	2173.08	20.4
30	26.0	19.0	21.7	0.0135	12.03	0.0085	18.9	2014.07	18.9
60	24.0	17.0	22.0	0.0133	12.36	0.0060	17.0	1802.06	17.0
120	22.5	15.5	22.3	0.0133	12.60	0.0043	15.5	1643.06	15.5
250	21.0	14.0	20.4	0.0137	12.85	0.0031	14.0	1484.05	14.0
1440	19.0	12.0	18.8	0.0140	13.18	0.0013	12.0	1272.04	12.0

Data Entered By: KMR
Date: 12/11/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_2.xls

Checked By: DPM
Date: 12/11/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-11
Depth: 0-9"
Sample Number: TI-CS11-02A(0-9")
Sampled Date: 11/13/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 138.61
Weight of Dry Soil & Pan (g): 131.50
Weight of Water (g): 7.11
Weight of Pan (g): 3.79
Weight of Dry Soil (g): 127.71
Moisture (%): 5.6

General Sample Data

Total Wet Weight of Sample (g): 21,550.00
Total Dry Weight of Sample (g): 20,754.50
Calculated Weight Plus #200 (g): 12,625.34
Moisture of Total Sample (%): 3.8
Percent Retained #200 Sieve (%): 60.8

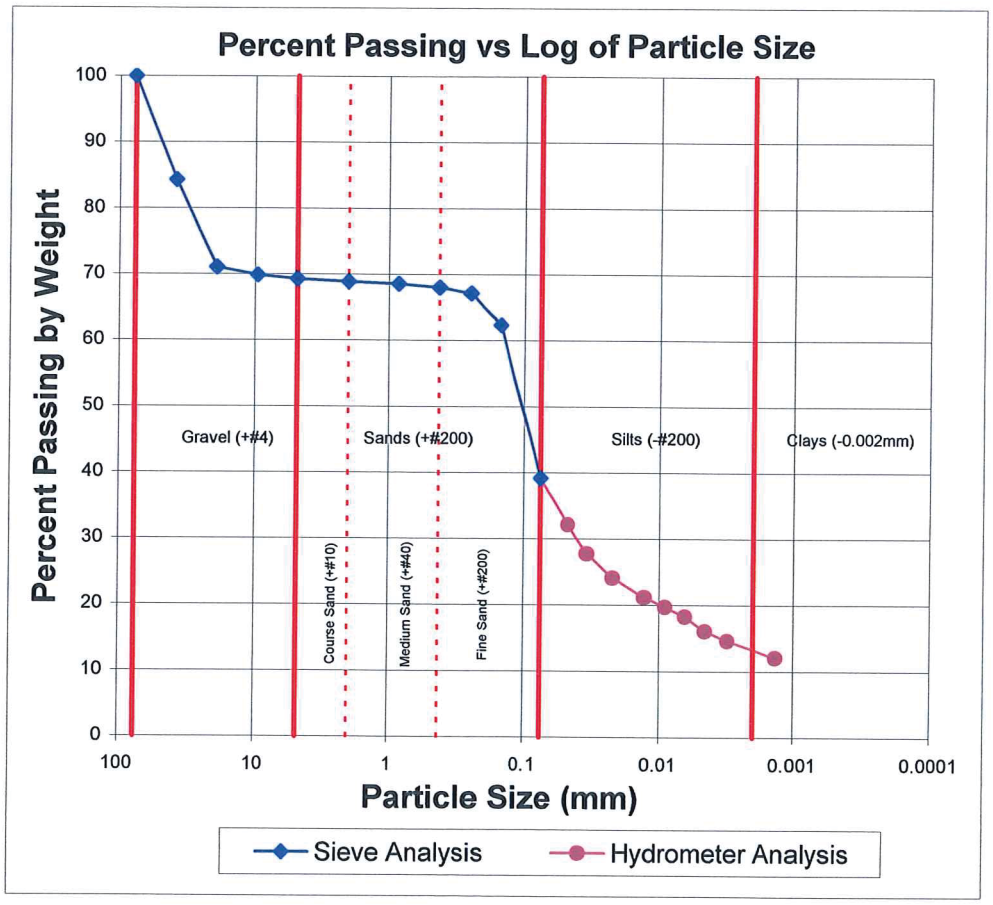
Plus Split Data

Original Weight of +#10 (g): 6,635.00
Calculated Weight of +#10 (g): 6,461.64

Minus Split Data

Original Weight of -#10 (g): 14,915.00
Calculated Dry Weight of -#10 (g): 14,292.86

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	**76.2**	0.00	0.00	0.00	0.00	100.0
1.5"	**38.10**	3265.00	0.00	3265.00	3265.00	84.3
3/4"	**19.05**	2755.00	0.00	2755.00	2755.00	71.0
3/8"	**9.525**	236.70	0.00	236.70	236.70	69.9
#4	**4.750**	121.51	0.00	121.51	121.51	69.3
#10	**2.000**	83.43	0.00	83.43	83.43	68.9
49.818g split out of -#10 material.						
#20	**0.850**	4.04	3.82	0.22	66.03	68.5
#40	**0.425**	4.11	3.74	0.37	112.97	68.0
#60	**0.250**	4.21	3.62	0.59	178.39	67.1
#100	**0.150**	6.94	3.64	3.31	1000.98	62.3
#200	**0.075**	19.52	3.66	15.87	4805.33	39.2



Data Entered By: KMR
Date: 12/13/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_9.xls

Checked By: DPM
Date: 12/13/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-11
Depth: 0-9"
Sample Number: TI-CS11-02A(0-9")
Sampled Date: 11/13/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 6.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 21,550.00
Total Dry Weight of Sample (g): 20,754.50
Wet Weight of Sub-Sample (g): 49.818
Dry Weight of Sub-Sample (g): 47.191
Corrected Dry Weight of Sub-Sample - W(g): 68.493

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	28.0	22.0	19.7	0.0138	11.70	0.0473	32.2	6675.48	32.2
2	25.0	19.0	19.7	0.0138	12.19	0.0341	27.8	5765.19	27.8
5	22.5	16.5	19.7	0.0138	12.60	0.0219	24.1	5006.61	24.1
15	20.5	14.5	19.9	0.0138	12.93	0.0128	21.2	4399.75	21.2
30	19.5	13.5	20.0	0.0137	13.10	0.0090	19.7	4096.32	19.7
60	18.5	12.5	20.3	0.0137	13.26	0.0064	18.3	3792.89	18.3
120	17.0	11.0	20.8	0.0137	13.51	0.0046	16.1	3337.74	16.1
250	16.0	10.0	22.2	0.0133	13.67	0.0031	14.6	3034.31	14.6
1440	14.3	8.3	20.3	0.0137	13.96	0.0013	12.1	2503.31	12.1

Data Entered By: KMR
Date: 12/13/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_9.xls

Checked By: DPM
Date: 12/13/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-11
Depth: 9-24"
Sample Number: TI-CS11-04A(9-24')
Sampled Date: 11/13/2013
Test Date: 12/5/2013

Sampled By: MWH
Technician: CAL

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 130.26
Weight of Dry Soil & Pan (g): 126.16
Weight of Water (g): 4.10
Weight of Pan (g): 3.70
Weight of Dry Soil (g): 122.46
Moisture (%): 3.4

General Sample Data

Total Wet Weight of Sample (g): 4,640.86
Total Dry Weight of Sample (g): 4,498.12
Calculated Weight Plus #200 (g): 1,505.61
Moisture of Total Sample (%): 3.2
Percent Retained #200 Sieve (%): 33.5

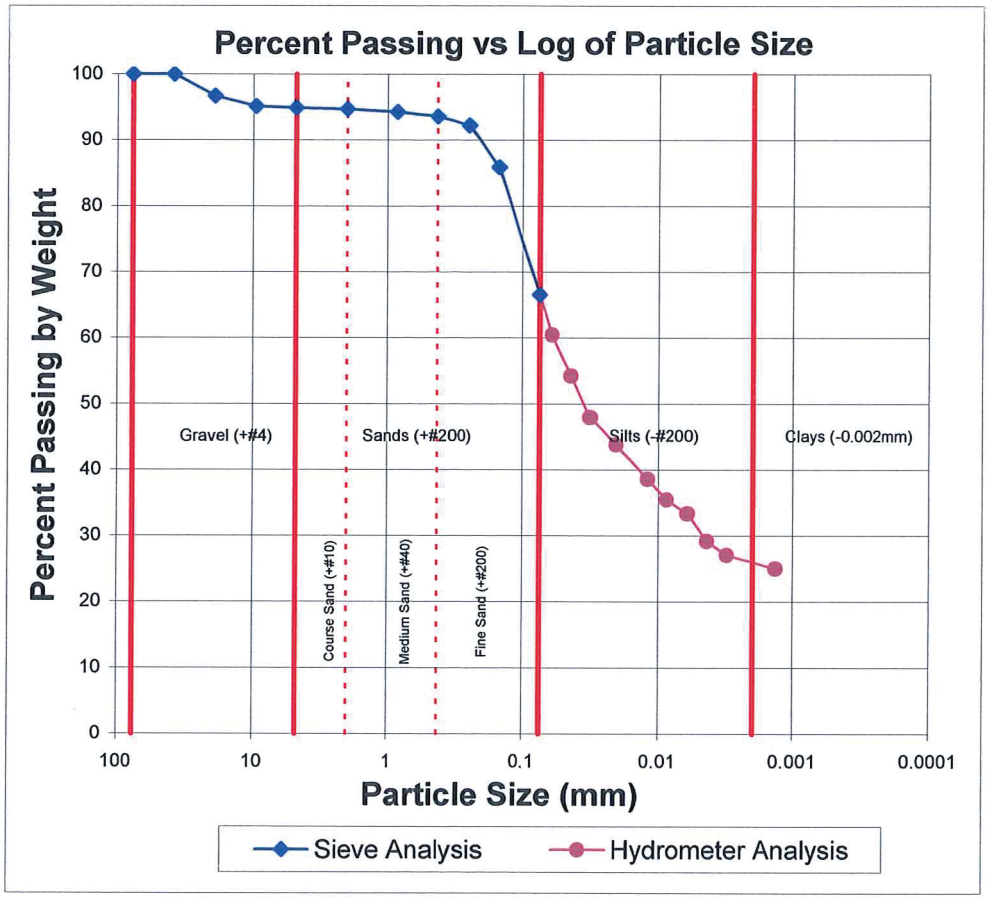
Plus Split Data

Original Weight of +#10 (g): 250.86
Calculated Weight of +#10 (g): 238.09

Minus Split Data

Original Weight of -#10 (g): 4,390.00
Calculated Dry Weight of -#10 (g): 4,260.03

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	**76.2**	0.00	0.00	0.00	0.00	100.0
1.5"	**38.10**	0.00	0.00	0.00	0.00	100.0
3/4"	**19.05**	148.98	0.00	148.98	148.98	96.7
3/8"	**9.525**	69.50	0.00	69.50	69.50	95.1
#4	**4.750**	10.77	0.00	10.77	10.77	94.9
#10	**2.000**	8.84	0.00	8.84	8.84	94.7
46.719g split out of -#10 material.						
#20	**0.850**	4.17	3.96	0.22	20.54	94.3
#40	**0.425**	4.16	3.83	0.33	31.10	93.6
#60	**0.250**	4.45	3.80	0.66	61.82	92.2
#100	**0.150**	6.74	3.73	3.01	283.85	85.9
#200	**0.075**	12.79	3.56	9.23	870.21	66.5



Data Entered By: KMR
Date: 12/11/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_3.xls

Checked By: DPM
Date: 12/11/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-11
Depth: 9-24"
Sample Number: TI-CS11-04A(9-24')
Sampled Date: 11/13/2013
Test Date: 12/5/2013

Sampled By: MWH
Technician: CAL

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.68
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 7.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 4,640.86
Total Dry Weight of Sample (g): 4,498.12
Wet Weight of Sub-Sample (g): 46.719
Dry Weight of Sub-Sample (g): 45.204
Corrected Dry Weight of Sub-Sample - W(g): 47.734

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
0.5	36.0	29.0	22.0	0.0133	10.39	0.0607	60.5	2719.33	60.5
1	33.0	26.0	22.0	0.0133	10.88	0.0439	54.2	2438.02	54.2
2	30.0	23.0	22.0	0.0133	11.37	0.0318	47.9	2156.71	47.9
5	28.0	21.0	22.3	0.0133	11.70	0.0204	43.8	1969.17	43.8
15	25.5	18.5	22.3	0.0133	12.11	0.0120	38.6	1734.74	38.6
30	24.0	17.0	21.7	0.0135	12.36	0.0087	35.4	1594.09	35.4
60	23.0	16.0	22.0	0.0133	12.52	0.0061	33.4	1500.32	33.4
120	21.0	14.0	22.2	0.0133	12.85	0.0044	29.2	1312.78	29.2
250	20.0	13.0	20.3	0.0137	13.01	0.0031	27.1	1219.01	27.1
1440	19.0	12.0	18.8	0.0140	13.18	0.0013	25.0	1125.24	25.0

Data Entered By: KMR
Date: 12/11/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_3.xls

Checked By: DPM
Date: 12/11/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-12
Depth: 0-14"
Sample Number: TI-CS12-02A(0-14")
Sampled Date: 11/13/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 87.03
Weight of Dry Soil & Pan (g): 86.61
Weight of Water (g): 0.42
Weight of Pan (g): 3.57
Weight of Dry Soil (g): 83.04
Moisture (%): 0.5

General Sample Data

Total Wet Weight of Sample (g): 1,604.40
Total Dry Weight of Sample (g): 1,596.35
Calculated Weight Plus #200 (g): 479.94
Moisture of Total Sample (%): 0.5
Percent Retained #200 Sieve (%): 30.1

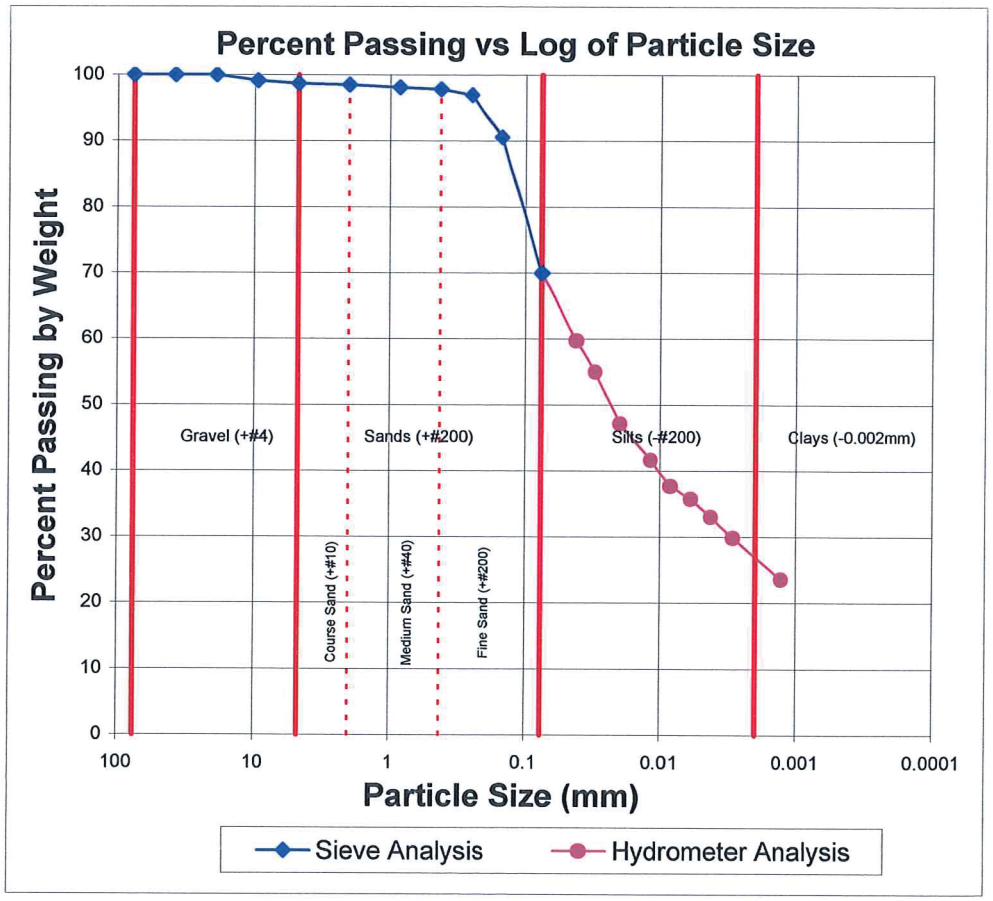
Plus Split Data

Original Weight of +#10 (g): 27.75
Calculated Weight of +#10 (g): 24.31

Minus Split Data

Original Weight of -#10 (g): 1,576.65
Calculated Dry Weight of -#10 (g): 1,572.05

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	**76.2**	0.00	0.00	0.00	0.00	100.0
1.5"	**38.10**	0.00	0.00	0.00	0.00	100.0
3/4"	**19.05**	0.00	0.00	0.00	0.00	100.0
3/8"	**9.525**	13.72	0.00	13.72	13.72	99.1
#4	**4.750**	7.58	0.00	7.58	7.58	98.7
#10	**2.000**	3.01	0.00	3.01	3.01	98.5
63.085g split out of -#10 material.						
#20	**0.850**	4.04	3.80	0.24	5.91	98.1
#40	**0.425**	4.16	3.97	0.18	4.53	97.8
#60	**0.250**	4.40	3.82	0.58	14.58	96.9
#100	**0.150**	7.62	3.56	4.06	101.72	90.5
#200	**0.075**	16.75	3.62	13.13	328.89	69.9



Data Entered By: KMR
Date: 12/13/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_7.xls

Checked By: DJM
Date: 12/13/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-12
Depth: 0-14"
Sample Number: TI-CS12-02A(0-14")
Sampled Date: 11/13/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 6.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 1,604.40
Total Dry Weight of Sample (g): 1,596.35
Wet Weight of Sub-Sample (g): 63.085
Dry Weight of Sub-Sample (g): 62.764
Corrected Dry Weight of Sub-Sample - W(g): 63.720

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	44.0	38.0	19.5	0.0138	9.08	0.0416	59.7	953.30	59.7
2	41.0	35.0	19.5	0.0138	9.57	0.0302	55.0	878.04	55.0
5	36.0	30.0	19.5	0.0138	10.39	0.0199	47.1	752.61	47.1
15	32.5	26.5	19.6	0.0138	10.96	0.0118	41.6	664.80	41.6
30	30.0	24.0	19.8	0.0138	11.37	0.0085	37.7	602.09	37.7
60	28.8	22.8	20.1	0.0137	11.58	0.0060	35.8	570.73	35.8
120	27.0	21.0	20.7	0.0137	11.87	0.0043	33.0	526.83	33.0
250	25.0	19.0	22.1	0.0133	12.19	0.0029	29.9	476.65	29.9
1440	21.0	15.0	20.3	0.0137	12.85	0.0013	23.6	376.30	23.6

Note: Removed one +3/4" rock out of the total sample weight of 6,280.0 grams.

Data Entered By: KMR
Date: 12/13/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_7.xls

Checked By: DPM
Date: 12/13/13

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-2
Depth: 10-24"
Sample Number: TI-CS02-04A(10-24")
Sampled Date: 11/12/2013
Test Date: 12/16/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 82.68
Weight of Dry Soil & Pan (g): 80.93
Weight of Water (g): 1.75
Weight of Pan (g): 3.72
Weight of Dry Soil (g): 77.21
Moisture (%): 2.3

General Sample Data

Total Wet Weight of Sample (g): 6,233.81
Total Dry Weight of Sample (g): 6,100.35
Calculated Weight Plus #200 (g): 2,948.76
Moisture of Total Sample (%): 2.2
Percent Retained #200 Sieve (%): 48.3

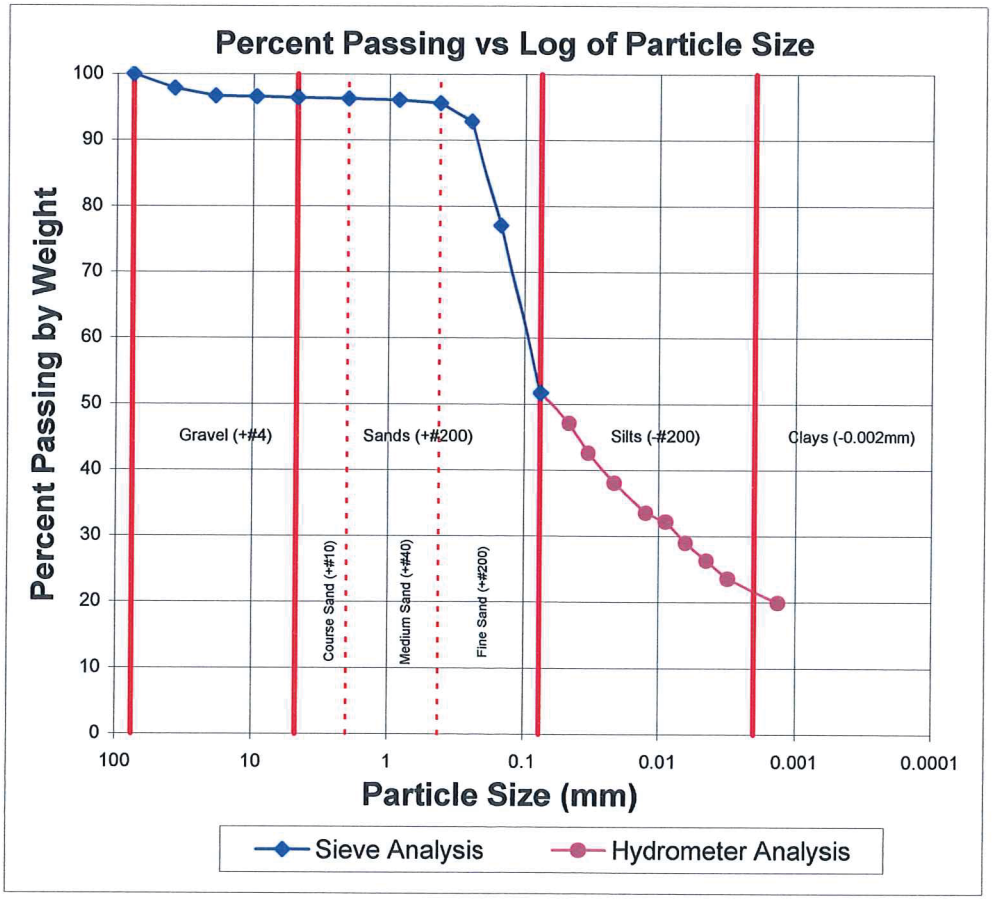
Plus Split Data

Original Weight of +#10 (g): 238.81
Calculated Weight of +#10 (g): 225.84

Minus Split Data

Original Weight of -#10 (g): 5,995.00
Calculated Dry Weight of -#10 (g): 5,874.51

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	76.2	0.00	0.00	0.00	0.00	100.0
1.5"	38.10	129.85	0.00	129.85	129.85	97.9
3/4"	19.05	71.91	0.00	71.91	71.91	96.7
3/8"	9.525	7.27	0.00	7.27	7.27	96.6
#4	4.750	8.47	0.00	8.47	8.47	96.4
#10	2.000	8.34	0.00	8.34	8.34	96.3
54.411g split out of -#10 material.						
#20	0.850	3.90	3.78	0.12	13.25	96.1
#40	0.425	4.02	3.77	0.25	27.60	95.6
#60	0.250	5.28	3.74	1.54	170.04	92.8
#100	0.150	12.50	3.77	8.73	963.95	77.0
#200	0.075	17.62	3.60	14.02	1548.06	51.7



Data Entered By: DPM
Date: 12/18/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_18.xls

Checked By: CJ
Date: 12/18/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-2
Depth: 10-24"
Sample Number: TI-CS02-04A(10-24")
Sampled Date: 11/12/2013
Test Date: 12/16/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 5.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 6,233.81
Total Dry Weight of Sample (g): 6,100.35
Wet Weight of Sub-Sample (g): 54.411
Dry Weight of Sub-Sample (g): 53.202
Corrected Dry Weight of Sub-Sample - W(g): 55.246

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	31.0	26.0	19.2	0.0138	11.21	0.0463	47.1	2874.85	47.1
2	28.5	23.5	19.2	0.0138	11.62	0.0333	42.6	2598.42	42.6
5	26.0	21.0	19.2	0.0138	12.03	0.0214	38.1	2322.00	38.1
15	23.5	18.5	19.2	0.0138	12.44	0.0126	33.5	2045.57	33.5
30	22.8	17.8	19.4	0.0138	12.56	0.0089	32.2	1962.64	32.2
60	21.0	16.0	19.8	0.0138	12.85	0.0064	29.0	1769.14	29.0
120	19.5	14.5	20.2	0.0137	13.10	0.0045	26.3	1603.28	26.3
250	18.0	13.0	20.8	0.0137	13.34	0.0032	23.6	1437.43	23.6
1440	16.0	11.0	19.8	0.0138	13.67	0.0013	19.9	1216.28	19.9

Data Entered By: DPM
Date: 12/18/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_18.xls

Checked By: [illegible]
Date: 12/18/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-10
Depth: 7-25"
Sample Number: TI-CS10-04A(7-25")
Sampled Date: 11/13/2013
Test Date: 12/16/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 47.42
Weight of Dry Soil & Pan (g): 46.12
Weight of Water (g): 1.30
Weight of Pan (g): 3.69
Weight of Dry Soil (g): 42.44
Moisture (%): 3.1

General Sample Data

Total Wet Weight of Sample (g): 7,040.25
Total Dry Weight of Sample (g): 6,837.34
Calculated Weight Plus #200 (g): 2,855.58
Moisture of Total Sample (%): 3.0
Percent Retained #200 Sieve (%): 41.8

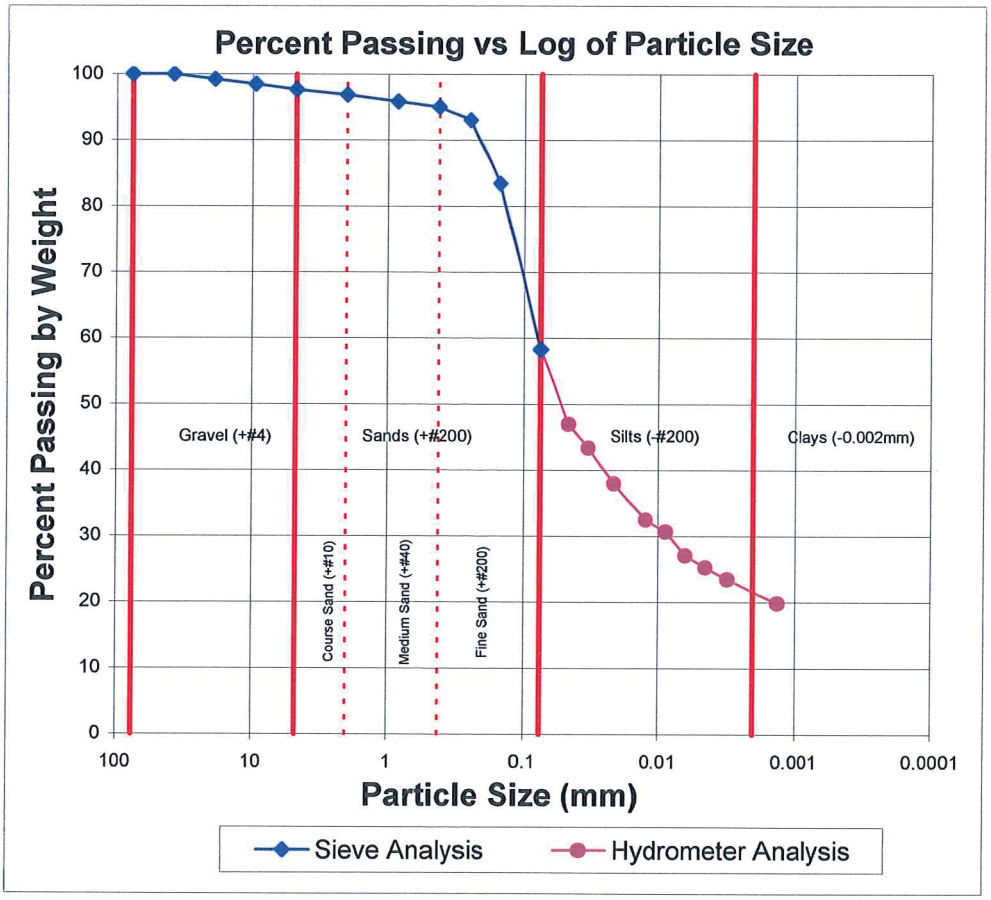
Plus Split Data

Original Weight of +#10 (g): 260.25
Calculated Weight of +#10 (g): 213.97

Minus Split Data

Original Weight of -#10 (g): 6,780.00
Calculated Dry Weight of -#10 (g): 6,623.37

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	76.2	0.00	0.00	0.00	0.00	100.0
1.5"	38.10	0.00	0.00	0.00	0.00	100.0
3/4"	19.05	53.49	0.00	53.49	53.49	99.2
3/8"	9.525	48.97	0.00	48.97	48.97	98.5
#4	4.750	56.68	0.00	56.68	56.68	97.7
#10	2.000	54.82	0.00	54.82	54.82	96.9
55.378g split out of -#10 material.						
#20	0.850	3.63	3.08	0.55	67.80	95.9
#40	0.425	4.28	3.81	0.47	57.94	95.0
#60	0.250	4.85	3.73	1.12	138.06	93.0
#100	0.150	9.08	3.78	5.30	653.31	83.5
#200	0.075	17.56	3.57	13.99	1724.50	58.2



Data Entered By: DPM
Date: 12/18/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_14.xls

Checked By: GJ
Date: 12/18/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-10
Depth: 7-25"
Sample Number: TI-CS10-04A(7-25")
Sampled Date: 11/13/2013
Test Date: 12/16/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 5.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 7,040.25
Total Dry Weight of Sample (g): 6,837.34
Wet Weight of Sub-Sample (g): 55.378
Dry Weight of Sub-Sample (g): 53.732
Corrected Dry Weight of Sub-Sample - W(g): 55.451

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	31.0	26.0	19.8	0.0138	11.21	0.0463	47.0	3210.29	47.0
2	29.0	24.0	19.8	0.0138	11.54	0.0332	43.3	2963.34	43.3
5	26.0	21.0	19.8	0.0138	12.03	0.0214	37.9	2592.92	37.9
15	23.0	18.0	20.0	0.0137	12.52	0.0125	32.5	2222.51	32.5
30	22.0	17.0	20.1	0.0137	12.69	0.0089	30.7	2099.03	30.7
60	20.0	15.0	20.4	0.0137	13.01	0.0064	27.1	1852.09	27.1
120	19.0	14.0	20.5	0.0137	13.18	0.0045	25.3	1728.62	25.3
250	18.0	13.0	21.1	0.0135	13.34	0.0031	23.5	1605.14	23.5
1440	16.0	11.0	19.8	0.0138	13.67	0.0013	19.9	1358.20	19.9

Data Entered By: DPM
Date: 12/18/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_14.xls

Checked By: CJ
Date: 12/18/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-5
Depth: 0-9"
Sample Number: TI-CS05-02A(0-9")
Sampled Date: -
Test Date: 12/16/2013

Sampled By: -
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 60.73
Weight of Dry Soil & Pan (g): 57.81
Weight of Water (g): 2.92
Weight of Pan (g): 3.71
Weight of Dry Soil (g): 54.11
Moisture (%): 5.4

General Sample Data

Total Wet Weight of Sample (g): 9,638.02
Total Dry Weight of Sample (g): 9,215.19
Calculated Weight Plus #200 (g): 4,451.48
Moisture of Total Sample (%): 4.6
Percent Retained #200 Sieve (%): 48.3

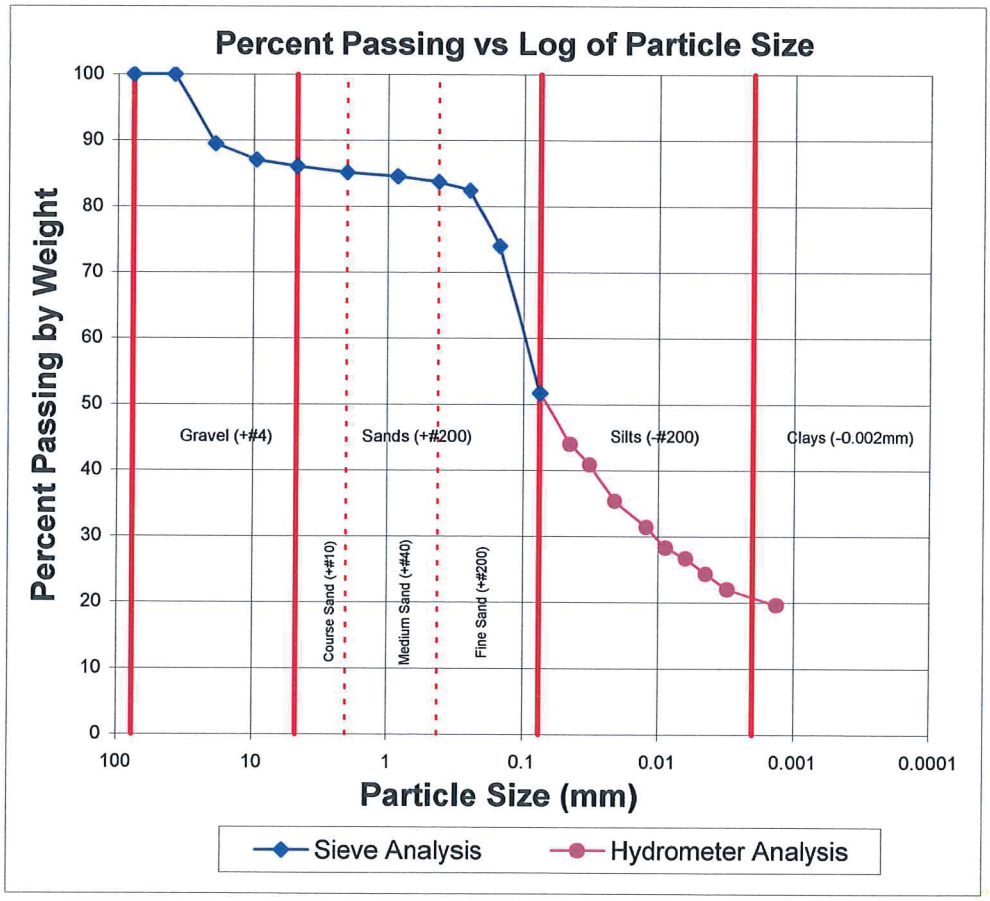
Plus Split Data

Original Weight of +#10 (g): 1,468.02
Calculated Weight of +#10 (g): 1,366.82

Minus Split Data

Original Weight of -#10 (g): 8,170.00
Calculated Dry Weight of -#10 (g): 7,848.37

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	76.2	0.00	0.00	0.00	0.00	100.0
1.5"	38.10	0.00	0.00	0.00	0.00	100.0
3/4"	19.05	967.87	0.00	967.87	967.87	89.5
3/8"	9.525	225.54	0.00	225.54	225.54	87.0
#4	4.750	90.53	0.00	90.53	90.53	86.1
#10	2.000	82.88	0.00	82.88	82.88	85.2
57.221g split out of -#10 material.						
#20	0.850	4.26	3.88	0.38	54.93	84.6
#40	0.425	4.24	3.70	0.54	78.06	83.7
#60	0.250	4.47	3.63	0.84	121.42	82.4
#100	0.150	9.12	3.76	5.36	774.78	74.0
#200	0.075	17.93	3.71	14.22	2055.48	51.7



Data Entered By: DPM
Date: 12/18/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_17.xls

Checked By: CJ
Date: 12/18/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-5
Depth: 0-9"
Sample Number: TI-CS05-02A(0-9")
Sampled Date: -
Test Date: 12/16/2013

Sampled By: -
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 5.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 9,638.02
Total Dry Weight of Sample (g): 9,215.19
Wet Weight of Sub-Sample (g): 57.221
Dry Weight of Sub-Sample (g): 54.296
Corrected Dry Weight of Sub-Sample - W(g): 63.727

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	33.0	28.0	20.5	0.0137	10.88	0.0450	44.0	4054.41	44.0
2	31.0	26.0	20.5	0.0137	11.21	0.0323	40.9	3764.81	40.9
5	27.5	22.5	20.5	0.0137	11.78	0.0210	35.4	3258.01	35.4
15	25.0	20.0	20.5	0.0137	12.19	0.0123	31.4	2896.01	31.4
30	23.0	18.0	20.6	0.0137	12.52	0.0088	28.3	2606.40	28.3
60	22.0	17.0	20.9	0.0137	12.69	0.0063	26.7	2461.60	26.7
120	20.5	15.5	20.7	0.0137	12.93	0.0045	24.4	2244.40	24.4
250	19.0	14.0	21.2	0.0135	13.18	0.0031	22.0	2027.20	22.0
1440	17.5	12.5	19.9	0.0138	13.42	0.0013	19.6	1810.00	19.6

Data Entered By: DPM
Date: 12/18/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_17.xls

Checked By: CW
Date: 12/18/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-3
Depth: 6-24"
Sample Number: TI-CS03-04A(6-24")
Sampled Date: 11/12/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 160.12
Weight of Dry Soil & Pan (g): 155.95
Weight of Water (g): 4.17
Weight of Pan (g): 3.68
Weight of Dry Soil (g): 152.28
Moisture (%): 2.7

General Sample Data

Total Wet Weight of Sample (g): 9,980.00
Total Dry Weight of Sample (g): 9,731.58
Calculated Weight Plus #200 (g): 4,378.08
Moisture of Total Sample (%): 2.6
Percent Retained #200 Sieve (%): 45.0

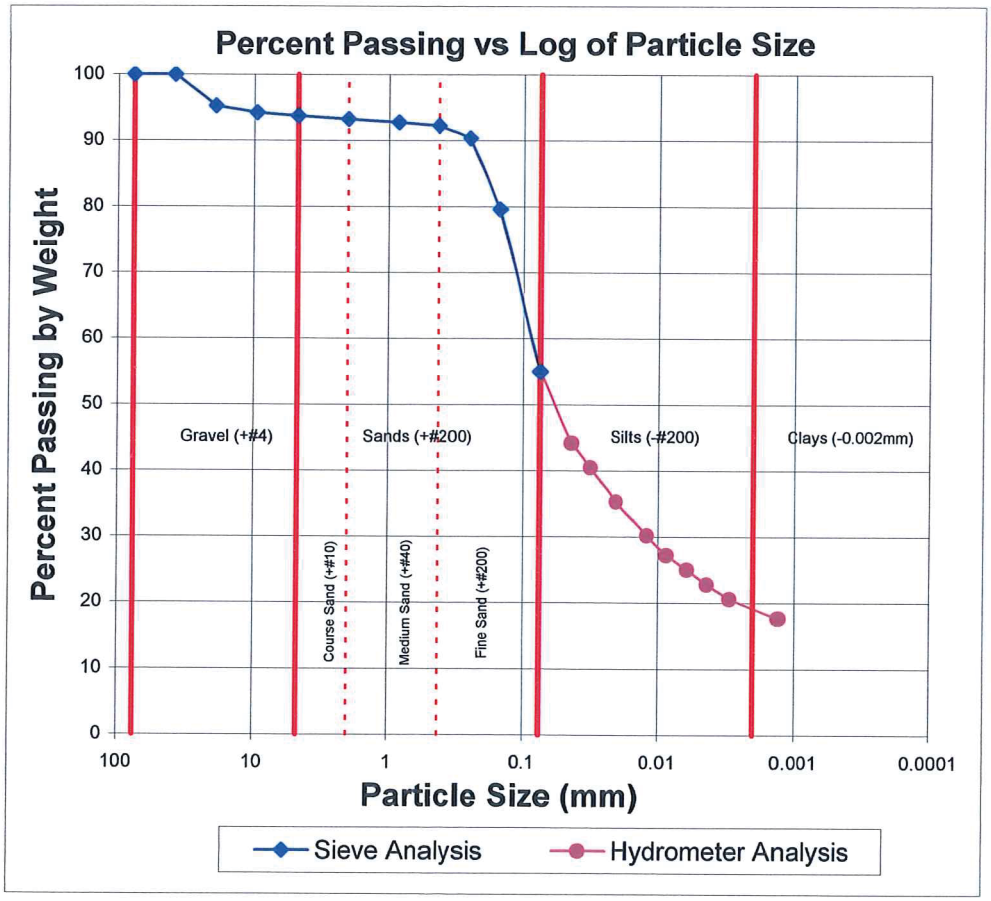
Plus Split Data

Original Weight of +#10 (g): 715.00
Calculated Weight of +#10 (g): 659.87

Minus Split Data

Original Weight of -#10 (g): 9,265.00
Calculated Dry Weight of -#10 (g): 9,071.71

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	**76.2**	0.00	0.00	0.00	0.00	100.0
1.5"	**38.10**	0.00	0.00	0.00	0.00	100.0
3/4"	**19.05**	465.17	0.00	465.17	465.17	95.2
3/8"	**9.525**	100.35	0.00	100.35	100.35	94.2
#4	**4.750**	48.26	0.00	48.26	48.26	93.7
#10	**2.000**	46.09	0.00	46.09	46.09	93.2
65.132g split out of -#10 material.						
#20	**0.850**	4.18	3.86	0.32	45.22	92.8
#40	**0.425**	4.05	3.70	0.35	50.51	92.2
#60	**0.250**	4.89	3.60	1.29	184.45	90.3
#100	**0.150**	11.01	3.69	7.32	1046.89	79.6
#200	**0.075**	20.27	3.56	16.71	2391.13	55.0



Data Entered By: DPM
Date: 12/16/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_11.xls

Checked By: CJ
Date: 12/16/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-3
Depth: 6-24"
Sample Number: TI-CS03-04A(6-24")
Sampled Date: 11/12/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 6.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 9,980.00
Total Dry Weight of Sample (g): 9,731.58
Wet Weight of Sub-Sample (g): 65.132
Dry Weight of Sub-Sample (g): 63.396
Corrected Dry Weight of Sub-Sample - W(g): 68.021

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	36.0	30.0	20.6	0.0137	10.39	0.0440	44.2	4297.84	44.2
2	33.5	27.5	20.6	0.0137	10.80	0.0317	40.5	3939.69	40.5
5	30.0	24.0	20.6	0.0137	11.37	0.0206	35.3	3438.28	35.3
15	26.5	20.5	20.7	0.0137	11.95	0.0122	30.2	2936.86	30.2
30	24.5	18.5	20.9	0.0137	12.28	0.0087	27.2	2650.34	27.2
60	23.0	17.0	21.2	0.0135	12.52	0.0062	25.0	2435.45	25.0
120	21.5	15.5	21.9	0.0135	12.77	0.0044	22.8	2220.55	22.8
250	20.0	14.0	23.2	0.0132	13.01	0.0030	20.6	2005.66	20.6
1440	18.0	12.0	20.1	0.0137	13.34	0.0013	17.7	1719.14	17.7

Data Entered By: DPM
Date: 12/16/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_11.xls

Checked By: CJ
Date: 12/16/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-4
Depth: 0-10"
Sample Number: TI-CS04-02A(0-10")
Sampled Date: 11/12/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 128.86
Weight of Dry Soil & Pan (g): 123.46
Weight of Water (g): 5.40
Weight of Pan (g): 3.77
Weight of Dry Soil (g): 119.70
Moisture (%): 4.5

General Sample Data

Total Wet Weight of Sample (g): 10,960.00
Total Dry Weight of Sample (g): 10,739.81
Calculated Weight Plus #200 (g): 7,713.64
Moisture of Total Sample (%): 2.1
Percent Retained #200 Sieve (%): 71.8

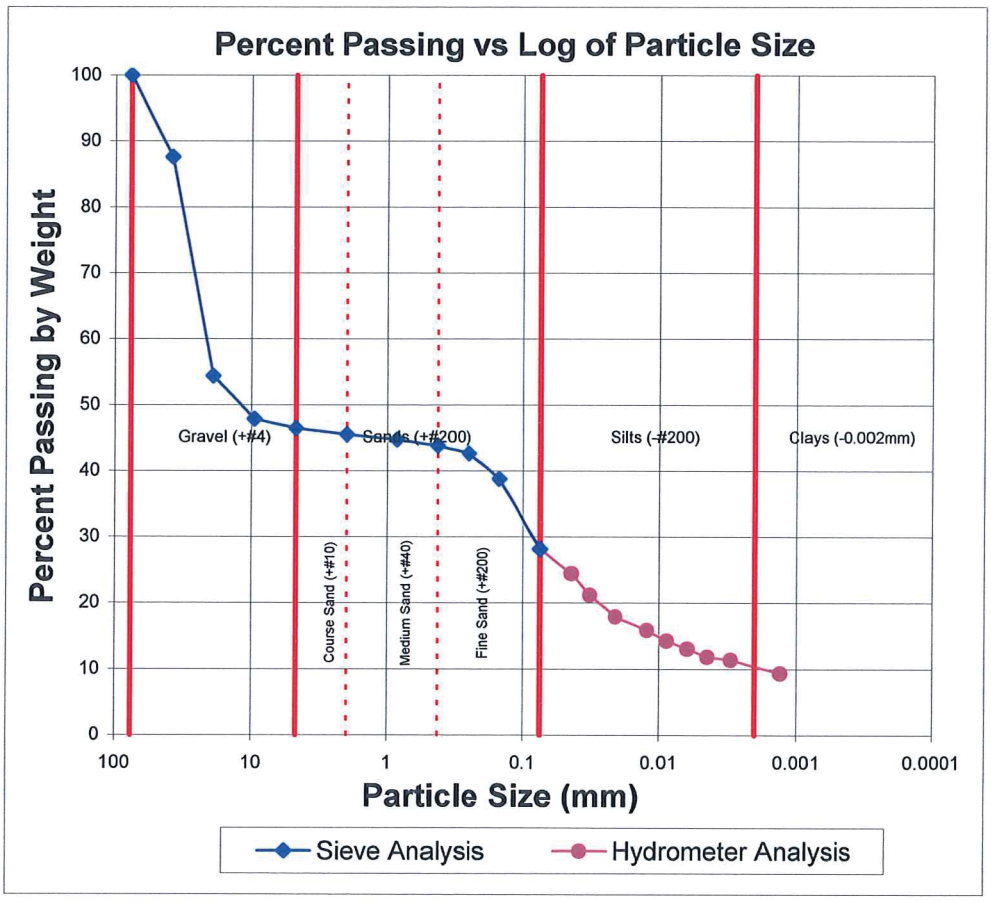
Plus Split Data

Original Weight of +#10 (g): 6,020.00
Calculated Weight of +#10 (g): 5,855.33

Minus Split Data

Original Weight of -#10 (g): 4,940.00
Calculated Dry Weight of -#10 (g): 4,884.48

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	**76.2**	0.00	0.00	0.00	0.00	100.0
1.5"	**38.10**	1335.00	0.00	1335.00	1335.00	87.6
3/4"	**19.05**	3565.00	0.00	3565.00	3565.00	54.4
3/8"	**9.525**	701.85	0.00	701.85	701.85	47.8
#4	**4.750**	153.07	0.00	153.07	153.07	46.4
#10	**2.000**	100.41	0.00	100.41	100.41	45.5
58.444g split out of -#10 material.						
#20	**0.850**	4.74	3.78	0.97	84.29	44.7
#40	**0.425**	4.89	3.77	1.12	98.09	43.8
#60	**0.250**	5.13	3.72	1.41	122.89	42.6
#100	**0.150**	8.52	3.77	4.75	414.44	38.8
#200	**0.075**	16.73	3.69	13.04	1138.60	28.2



Data Entered By: DPM
Date: 12/16/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_13.xls

Checked By: CJ
Date: 12/16/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-4
Depth: 0-10"
Sample Number: TI-CS04-02A(0-10")
Sampled Date: 11/12/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 6.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 10,960.00
Total Dry Weight of Sample (g): 10,739.81
Wet Weight of Sub-Sample (g): 58.444
Dry Weight of Sub-Sample (g): 55.923
Corrected Dry Weight of Sub-Sample - W(g): 122.908

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	36.0	30.0	20.4	0.0137	10.39	0.0440	24.4	2625.01	24.4
2	32.0	26.0	20.4	0.0137	11.05	0.0321	21.2	2275.01	21.2
5	28.0	22.0	20.4	0.0137	11.70	0.0209	17.9	1925.01	17.9
15	25.5	19.5	20.5	0.0137	12.11	0.0123	15.9	1706.25	15.9
30	23.5	17.5	20.7	0.0137	12.44	0.0088	14.3	1531.25	14.3
60	22.0	16.0	21.0	0.0135	12.69	0.0062	13.0	1400.00	13.0
120	20.5	14.5	21.7	0.0135	12.93	0.0044	11.8	1268.75	11.8
250	20.0	14.0	23.0	0.0132	13.01	0.0030	11.4	1225.00	11.4
1440	17.5	11.5	20.1	0.0137	13.42	0.0013	9.4	1006.25	9.4

Data Entered By: DPM
Date: 12/16/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_13.xls

Checked By: CJ
Date: 12/16/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-1
Depth: 0-11"
Sample Number: TI-CS01-02A(0-11")
Sampled Date: 11/12/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Grain Size Data

Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 102.21
Weight of Dry Soil & Pan (g): 95.38
Weight of Water (g): 6.83
Weight of Pan (g): 3.71
Weight of Dry Soil (g): 91.68
Moisture (%): 7.5

General Sample Data

Total Wet Weight of Sample (g): 10,625.00
Total Dry Weight of Sample (g): 10,124.70
Calculated Weight Plus #200 (g): 5,737.76
Moisture of Total Sample (%): 4.9
Percent Retained #200 Sieve (%): 56.7

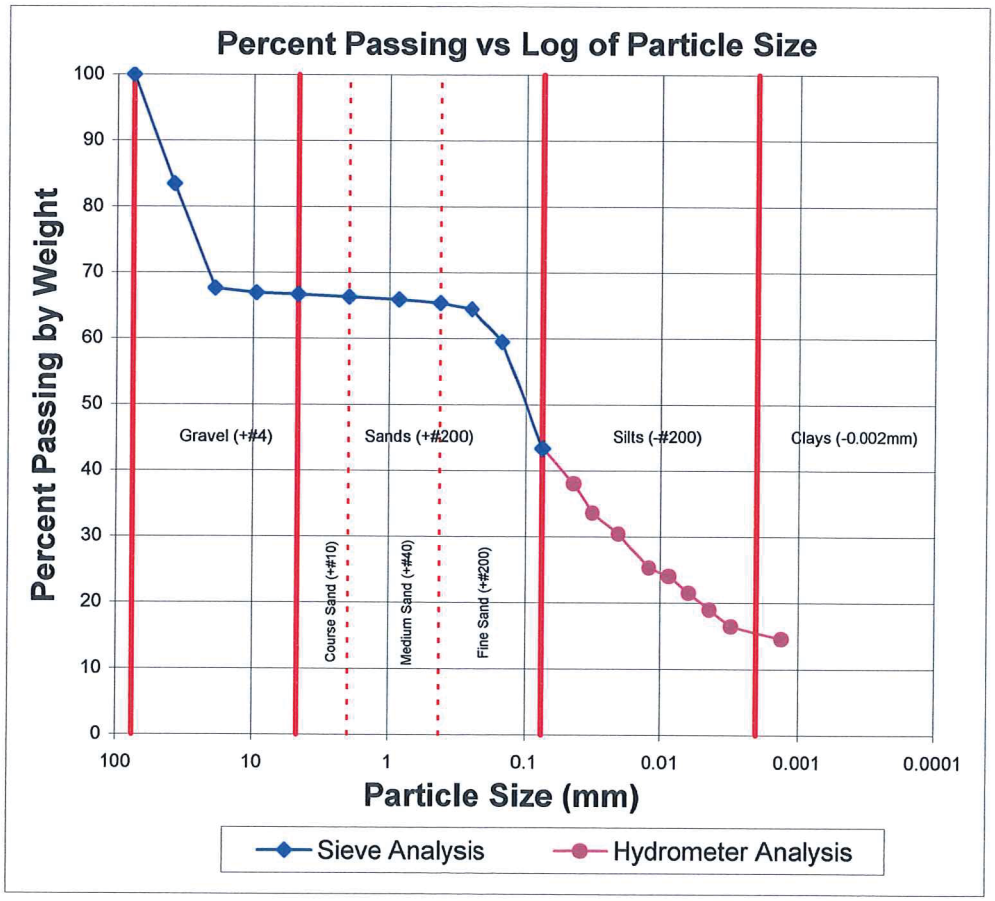
Plus Split Data

Original Weight of +#10 (g): 3,485.00
Calculated Weight of +#10 (g): 3,410.42

Minus Split Data

Original Weight of -#10 (g): 7,140.00
Calculated Dry Weight of -#10 (g): 6,714.28

Sieve Number	Sieve Size (mm)	Weight of Retained Soil & Pan (g)	Weight of Pan (g)	Weight of Retained Soil (g)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
3"	76.2	0.00	0.00	0.00	0.00	100.0
1.5"	38.10	1675.00	0.00	1675.00	1675.00	83.5
3/4"	19.05	1605.00	0.00	1605.00	1605.00	67.6
3/8"	9.525	69.87	0.00	69.87	69.87	66.9
#4	4.750	22.03	0.00	22.03	22.03	66.7
#10	2.000	38.52	0.00	38.52	38.52	66.3
56.276g split out of -#10 material.						
#20	0.850	4.16	3.83	0.32	41.41	65.9
#40	0.425	4.26	3.84	0.42	53.72	65.4
#60	0.250	4.48	3.74	0.74	95.00	64.4
#100	0.150	7.59	3.68	3.91	501.77	59.5
#200	0.075	16.29	3.54	12.76	1635.45	43.3



Data Entered By: DPM
Date: 12/16/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_12.xls

Checked By: CJ
Date: 12/16/2013

ATT
ADVANCED TERRA TESTING

Particle Size Analysis of Soils
ASTM D 422

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

Boring Number: CS-1
Depth: 0-11"
Sample Number: TI-CS01-02A(0-11")
Sampled Date: 11/12/2013
Test Date: 12/11/2013

Sampled By: MWH
Technician: DPM

Hydrometer Data

Test Configuration

Hydrometer Type: 152H
Specific Gravity: 2.65
Deflocculant: Sodium Hexametaphosphate
Deflocculant Correction: 6.0
Specific Gravity Correction Factor - α: 1.00

Total Wet Weight of Sample (g): 10,625.00
Total Dry Weight of Sample (g): 10,124.70
Wet Weight of Sub-Sample (g): 56.276
Dry Weight of Sub-Sample (g): 52.374
Corrected Dry Weight of Sub-Sample - W(g): 78.995

Elapsed Time (min)	Hydrometer Reading	Corrected Hydrometer Reading	Temperature (°C)	Temperature Coefficient (K)	Effective Depth (L)	Grain Diameter (mm)	Percent in Suspension (%)	Calculated Weight of Retained Soil (g)	Percent Passing by Weight (%)
0	-	-	-	-	-	-	-	-	-
1	36.0	30.0	20.1	0.0137	10.39	0.0440	38.0	3850.32	38.0
2	32.5	26.5	20.1	0.0137	10.96	0.0320	33.6	3401.12	33.6
5	30.0	24.0	20.1	0.0137	11.37	0.0206	30.4	3080.26	30.4
15	26.0	20.0	20.2	0.0137	12.03	0.0122	25.4	2566.88	25.4
30	25.0	19.0	20.3	0.0137	12.19	0.0087	24.1	2438.54	24.1
60	23.0	17.0	20.5	0.0137	12.52	0.0062	21.5	2181.85	21.5
120	21.0	15.0	21.3	0.0135	12.85	0.0044	19.0	1925.16	19.0
250	19.0	13.0	22.8	0.0133	13.18	0.0031	16.5	1668.47	16.5
1440	17.5	11.5	20.4	0.0137	13.42	0.0013	14.6	1475.96	14.6

Data Entered By: DPM
Date: 12/16/2013
File Name: 2512_77_hydrometer-ASTM-D422-R0.xls_12.xls

Checked By: CJ
Date: 12/16/2013

ATT
ADVANCED TERRA TESTING

Specific Gravity
ASTM D 854 - Method B

CLIENT:	MWH	JOB NO.	2512-77
PROJECT	Church Rock	LOCATION	Tailings Impoundment
PROJECT NO. -			

BORING NO.	CS-1	CS-4
DEPTH	11-24"	10-24"
SAMPLE NO.	TI-CS01-04A (11-24")	TI-CS04-041 (10-24")
DATE SAMPLED	11/12/13 MWH	11/12/13 MWH
DATE TESTED	12/20/13 MLM	12/20/13 MLM

Pycnometer #	Big 10	Big 12
Weight of oven dry soil (g) (Wo)	70.52	50.89
Weight of flask, soil, and water. (g) (Wb)	716.14	704.46
Temperature (deg. C) (Tx)	24.3	24.2
Weight of water & flask at Tx (from cal. curve)(Wa)	671.95	672.56
Specific Gravity*	2.68	2.68

*Specific Gravity = Wo/[Wo+(Wa-Wb)]

Data entry by: DAW Date: 12/27/2013
Checked by: CAL Date: 12/27/13
File name: 2512_77_SpecificGravity-ASTM-854-R1_0.xls

ATT
ADVANCED TERRA TESTING

SPECIFIC GRAVITY TESTS ASTM D 854

CLIENT: MWH JOB NO. 2512-77

PROJECT: Church Rock

BORING NO.	CS-8	CS-11
DEPTH	8-28"	9-24"
SAMPLE NO.	TI-CS08-04A(8-28")	TI-CS11-04A(9-24")
DATE SAMPLED	11/13/13 MWH	11/13/13 MWH
DATE TESTED	12/03/13 CAL	12/6/13 KMR
LOCATION	Tailings Impoundment	Tailings Impoundment
Pycnometer #	FF	AA
Weight of oven dry soil (g) (Wo)	30.797	30.853
Weight of flask, soil, and water. (g) (Wb)	184.109	184.409
Temperature (deg. C) (Tx)	20.8	19.0
Weight of water & flask at Tx (from cal. curve)(Wa)	164.828	165.088
Specific Gravity*	2.67	2.68

---

*Specific Gravity = Wo/[Wo+(Wa-Wb)]

Data entry by: CAL Date: 12/09/2013

Data checked by: DRM Date: 12/10/13

FileName: MWSGAS31

ADVANCED TERRA TESTING, INC. ATT

COMPACTION TEST
ASTM D 698 A

CLIENT:	MWH	JOB NO.	2512-77
BORING NO.	CS-11	DATE SAMPLED	11/13/13
DEPTH	9-24"	DATE TESTED	12/5/13
SAMPLE NO.	TI-CS11-04A(9-24")	LOCATION	Tailings Impoundment
SOIL DESCR.	Church Rock		

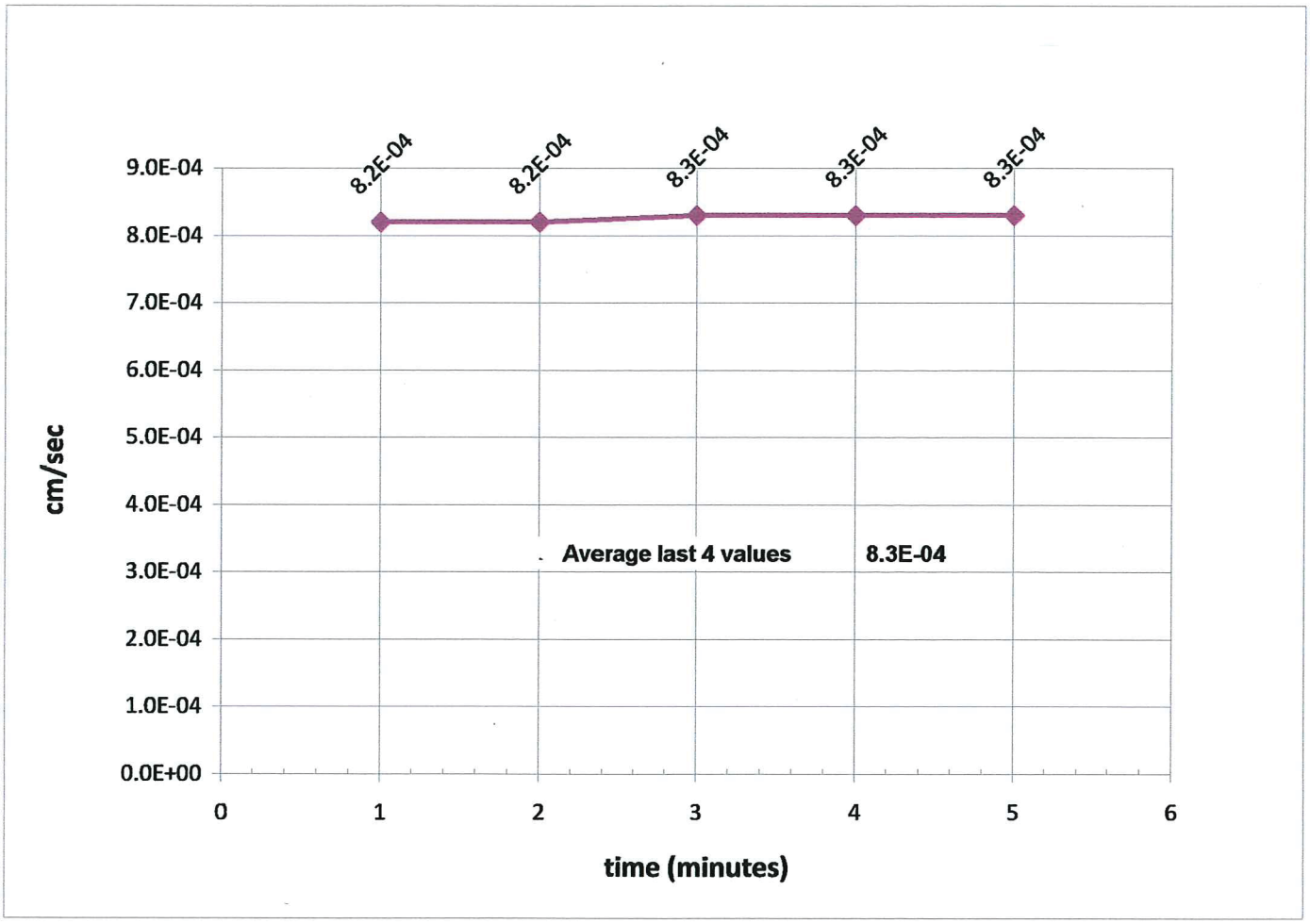
Moisture Determination	1	2	3	4	5
Wt of Moisture added (ml)	240.00	200.00	160.00	120.00	80.00
Wt. of soil & dish (g)	536.48	509.58	585.73	577.59	616.55
Dry wt. soil & dish (g)	456.88	441.11	513.44	515.08	559.20
Net loss of moisture (g)	79.60	68.47	72.29	62.51	57.35
Wt. of dish (g)	6.63	6.57	6.51	6.51	6.56
Net wt. of dry soil (g)	450.25	434.54	506.93	508.57	552.64
Moisture Content (%)	17.68	15.76	14.26	12.29	10.38
Corrected Moisture Content					
Density determination					
Wt of soil & mold (lb)	9.68	9.77	9.74	9.51	9.35
Wt. of mold (lb)	5.36	5.36	5.36	5.36	5.36
Net wt. of wet soil (lb)	4.32	4.41	4.38	4.15	3.99
Net wt of dry soil (lb)	3.67	3.81	3.83	3.70	3.61
Dry Density, (pcf)	110.13	114.29	115.00	110.87	108.45
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

Data entered by: KMR Date: 12/09/2013
Data checked by: DPM Date: 12/09/13
FileName: MW68913

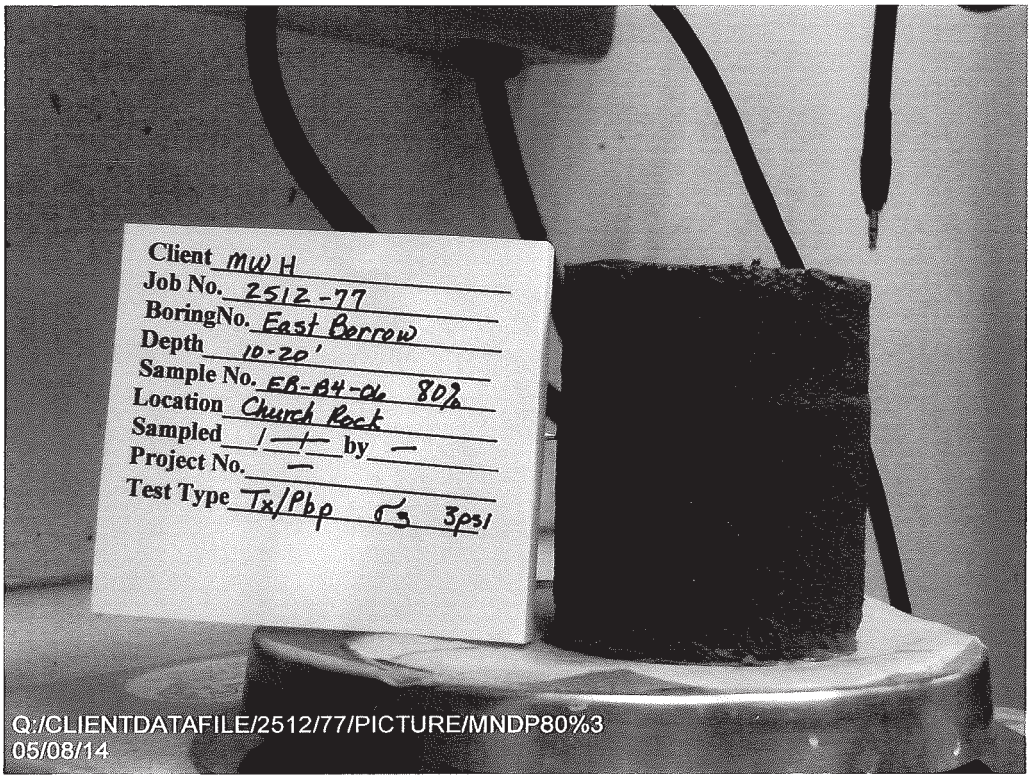
ADVANCED TERRA TESTING, INC. ATT

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	East Borrow		
Job Number:	2512-77	Depth:	10-20'		
Project:	--	Sample Number:	EB-B4-06 80%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	5/6/2014	Technician:	CAL



Data Entered By:	CAL		
Date:	5/6/2014	Checked By:	DJW
File Name:	2512_77_PrelimPerm_ASTMD-5084-methodD_31.xls	Date:	05/08/14


Client MWH
Job No. 2512-77
BoringNo. East Borrow
Depth 10-20'
Sample No. EB-B4-06 80%
Location Church Rock
Sampled / / by –
Project No. –
Test Type Tx/Pbp σ3 3psi
Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP80%3
05/08/14

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: DAM Date: 4/18/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_13.xls

ATT ADVANCED TERRA TESTING

TRIAXAL 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

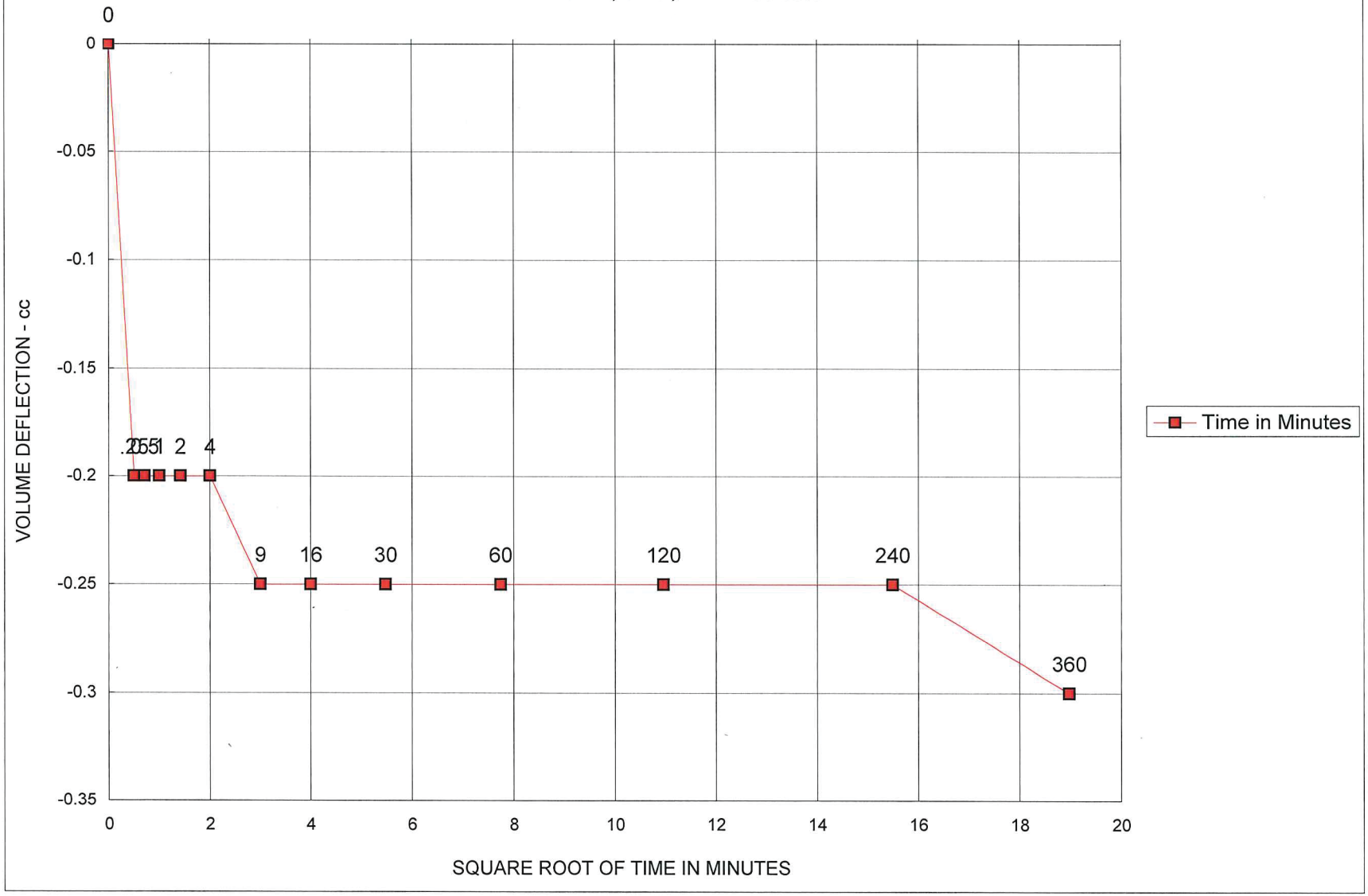
Initial Height (in)	3.013	Init. Vol. (CC)	224.709
Height Change (in)	0.018	Vol. Change (CC)	29.300
Ht. After Cons. (in)	2.995	Cell Exp. (CC)	19.929
Initial Area (sq in)	4.550	Net Change (CC)	9.372
Area After Cons. (sq in)	4.387	Cons. Vol. (CC)	215.337

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

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

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

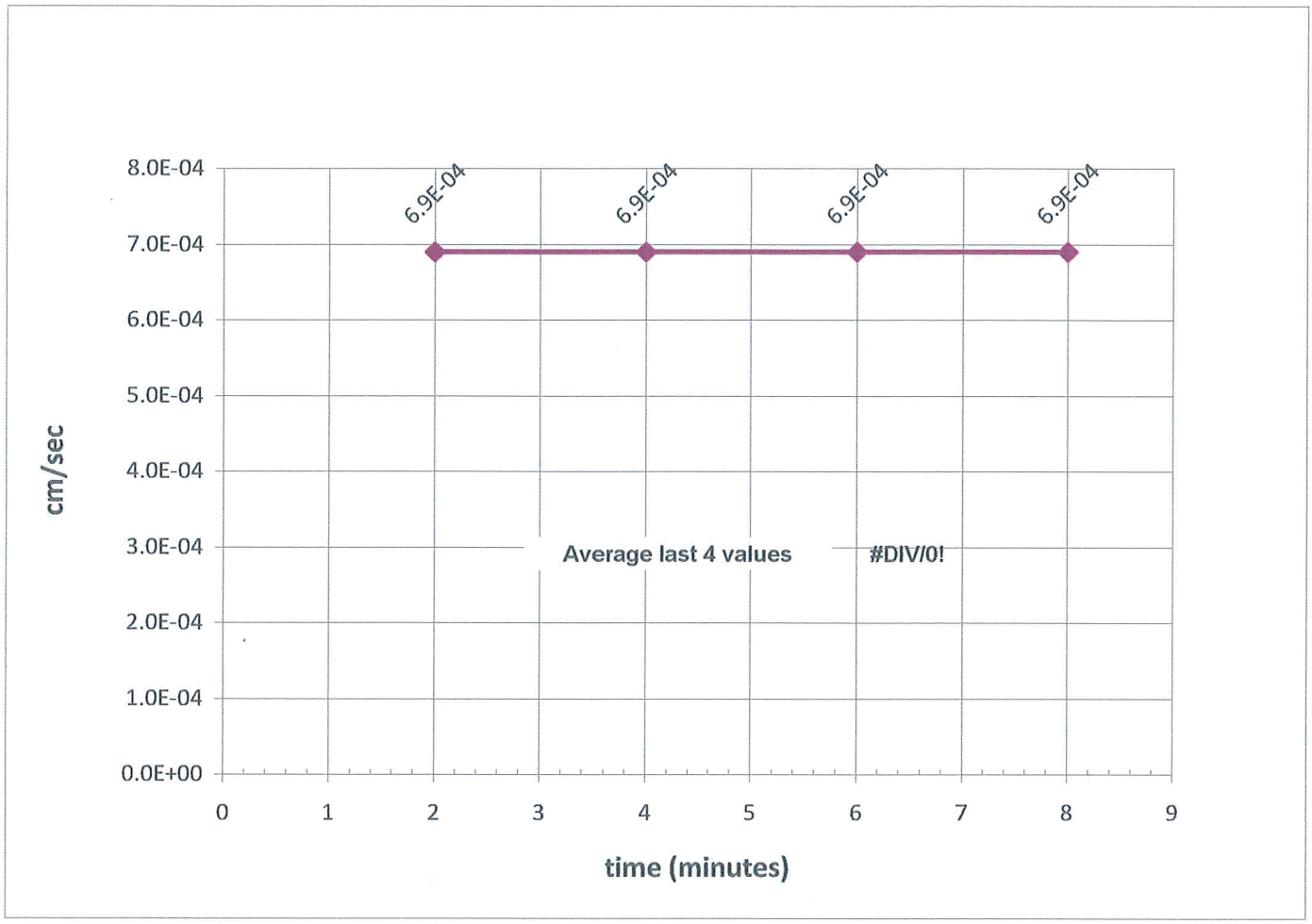


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	Dilco Hill		
Job Number:	2512-77	Depth:	0-10'		
Project:	--	Sample Number:	DH-B1-03 85%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/7/2014	Technician:	DPM



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Date:	4/7/2014	Checked By:	DJW
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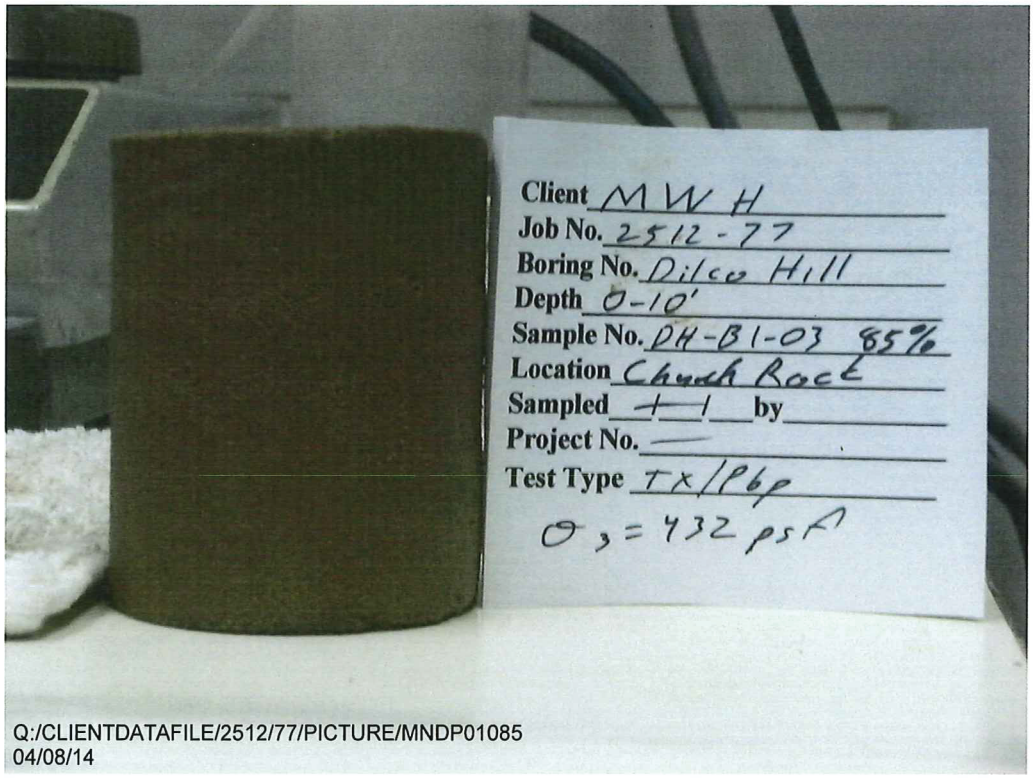

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04/08/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	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: DPM Date: 4/8/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_14.xls

ATT ADVANCED TERRA TESTING

TRIAXAL 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

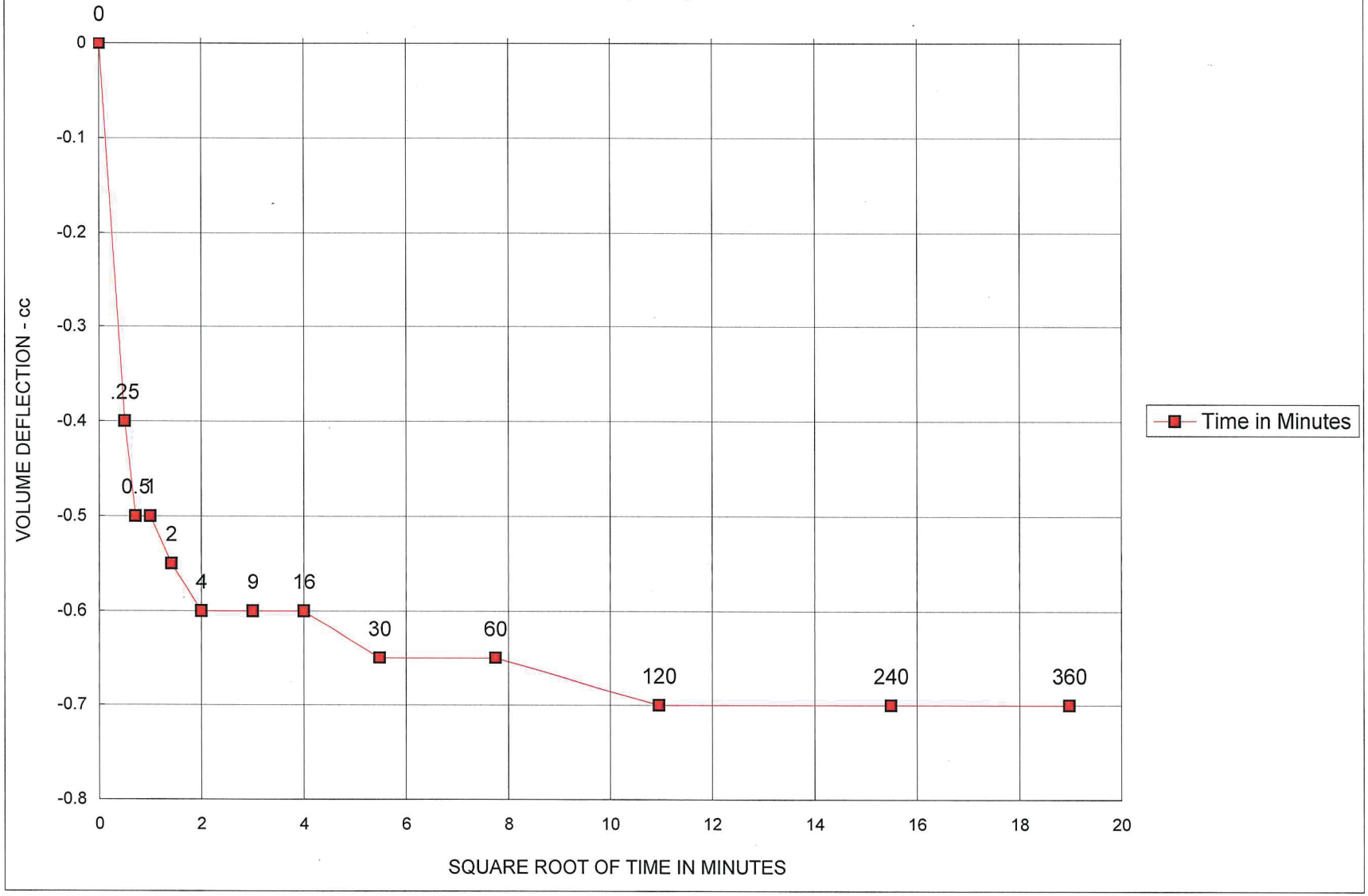
Initial Height (in)	3.005	Init. Vol. (CC)	223.740
Height Change (in)	0.013	Vol. Change (CC)	33.900
Ht. After Cons. (in)	2.992	Cell Exp. (CC)	15.877
Initial Area (sq in)	4.543	Net Change (CC)	18.023
Area After Cons. (sq in)	4.195	Cons. Vol. (CC)	205.717

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

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

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

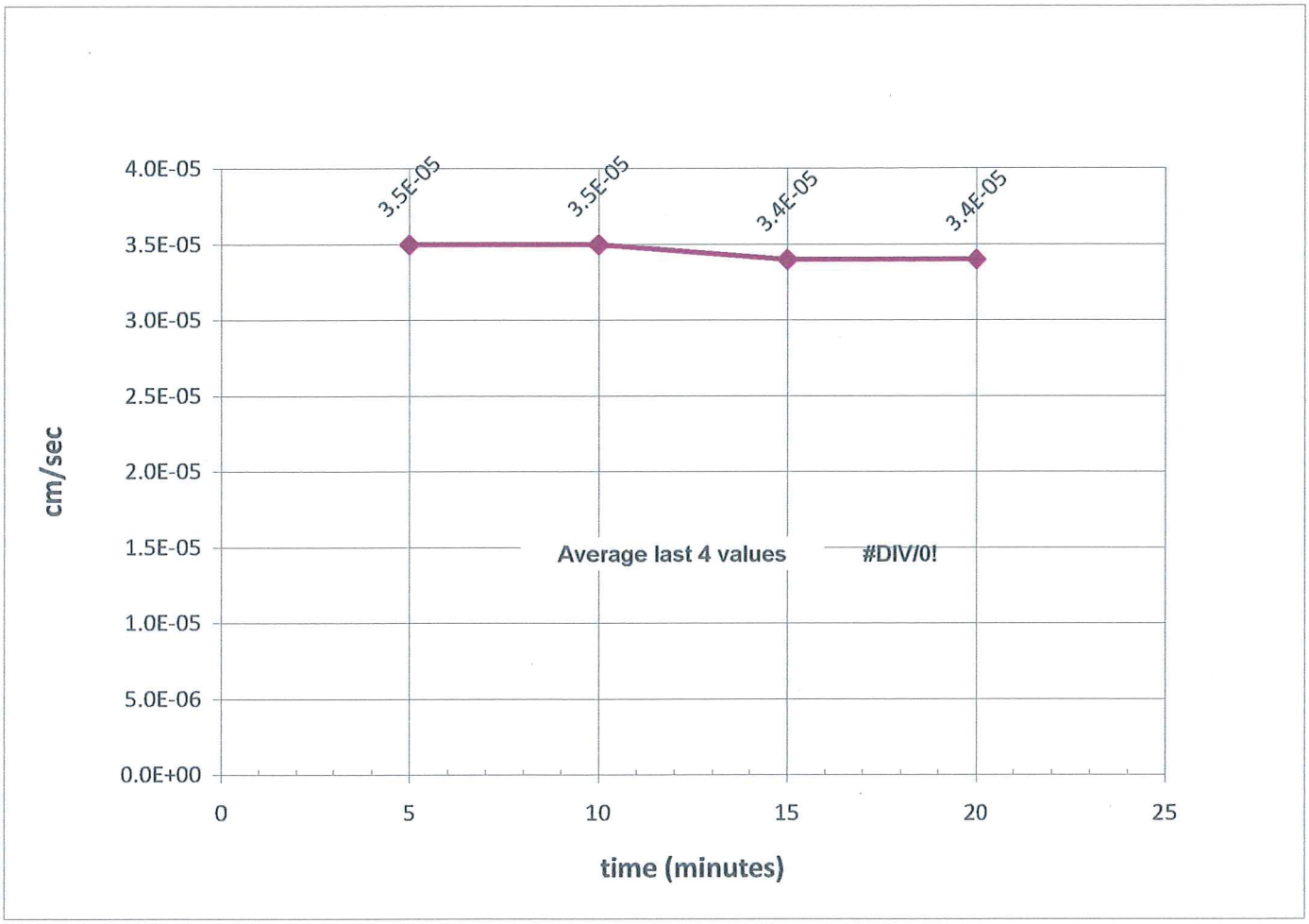


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	East Borrow		
Job Number:	2512-77	Depth:	0-10'		
Project:	--	Sample Number:	EB-B6-03 85%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/7/2014	Technician:	DPM



Data Entered By:	DPM		
Date:	4/7/2014	Checked By:	DAW
File Name:	2512_77_PrelimPerm_ASTMD-5084-methodD_15.xls	Date:	04/08/14