

**APPENDIX B1.2**

**GEOTECHNICAL TEST RESULTS**

**ADVANCED TERRA TESTING**

## IMPOUNDMENT GEOTECHNICAL TEST RESULTS

Moisture Content Determinations  
ASTM D 2216

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

BORING NO.	CS-5	CS-6	CS-7	CS-8
DEPTH	9-24"	7-24"	0-20"	8-28"
SAMPLE NO.	TI-CS05-04A(9-24")	TI-CS06-04A(7-24")	TI-CS07-02A(0-20")	TI-CS08-04A(8-28")
DATE SAMPLED	11/12/13 MWH	11/13/13 MWH	11/13/13 MWH	11/13/13 MWH
DATE TESTED	11/22/13 CAL	11/22/13 CAL	11/22/13 CAL	11/22/13 CAL
LOCATION	Tailings Impoundment	Tailings Impoundment	Tailings Impoundment	Tailings Impoundment

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	414.50	391.13	532.93	528.02
Wt. of Dry Soil & Dish (gms)	378.91	352.93	494.69	489.34
Net Loss of Moisture (gms)	35.59	38.20	38.24	38.68
Wt. of Dish (gms)	6.62	6.56	6.55	9.27
Wt. of Dry Soil (gms)	372.29	346.37	488.14	480.07
Moisture Content (%)	9.6	11.0	7.8	8.1

BORING NO. CS-9  
DEPTH 9-26"  
SAMPLE NO. TI-CS09-04A(9-26")  
DATE SAMPLED 11/13/13 MWH  
DATE TESTED 11/22/13 CAL  
LOCATION Tailings Impoundment

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	461.42
Wt. of Dry Soil & Dish (gms)	428.77
Net Loss of Moisture (gms)	32.65
Wt. of Dish (gms)	6.57
Wt. of Dry Soil (gms)	422.20
Moisture Content (%)	7.7

Data entry by:  
Checked by:  
File name:

CAL

KP

2512-77-M&D-ASTMD-2216-2937-R0-AS3-P1.xls

Date: 12/3/2013

Date: 12/5/13



Moisture Content Determinations  
ASTM D 2216

CLIENT:  
PROJECT  
PROJECT NO.

MWH  
Church Rock  
--

JOB NO.

BORING NO.	CS-11	CS-1	CS-4
DEPTH	9-24"	11-24"	10-24"
SAMPLE NO.	TI-CS11-04A(9-24")	TI-CS01-04A(11-24")	TI-CS04-04A(10-24")
DATE SAMPLED	11/13/13 MWH	11/12/13 MWH	11/12/13 MWH
DATE TESTED	12/3/13 CAL	12/4/13 KMR	12/4/13 KMR
LOCATION	Tailings Impoundment	Tailings Impoundment	Tailings Impoundment

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	241.48	312.07	402.15
Wt. of Dry Soil & Dish (gms)	222.88	286.52	350.83
Net Loss of Moisture (gms)	18.60	25.55	51.32
Wt. of Dish (gms)	6.72	9.23	9.26
Wt. of Dry Soil (gms)	216.16	277.29	341.57
Moisture Content (%)	8.6	9.2	15.0

Data entry by:  
Checked by:  
File name:

CAL



Date:

12/5/2013

Date:



2512-77-M&D-ASTMD-2216-2937-R0-7.xls



Moisture Content Determinations  
ASTM D 2216

CLIENT:  
PROJECT  
PROJECT NO.

MWH  
Church Rock  
--

JOB NO.  
LOCATION

2512-77  
Tailings Impoundment

BORING NO.	CS-12	CS-2	CS-10
DEPTH	0-14"	10-24"	7-25"
SAMPLE NO.	TI-CS12-02A(0-14")	TI-CS2-04A(10-24")	TI-CS10-04A(7-25")
DATE SAMPLED	11/13/2013	11/12/2013	11/13/2013
DATE TESTED	12/6/2013 KMR	12/10/2013 DPM	12/10/2013 DPM
SOIL DESCRIPTION	--	--	--

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	244.75	495.60	597.59
Wt. of Dry Soil & Dish (gms)	225.12	445.63	555.15
Net Loss of Moisture (gms)	19.63	49.97	42.44
Wt. of Dish (gms)	9.24	6.58	6.66
Wt. of Dry Soil (gms)	215.88	439.05	548.49
Moisture Content (%)	9.1	11.4	7.7

Data entry by:  
Checked by:  
File name:

KMR

*DPM*

Date: 12/11/2013

Date: *12/11/13*

2512-77-M&D-ASTMD-2216-2937-R0-8.xls



Moisture Content Determinations  
ASTM D 2216

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

BORING NO.	CS-3
DEPTH	6-24"
SAMPLE NO.	TI-CS03-04A(6-24")
DATE SAMPLED	11/12/13 MWH
DATE TESTED	12/19/13 DPM
SOIL DESCRIPTION	-

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	1331.96
Wt. of Dry Soil & Dish (gms)	1257.37
Net Loss of Moisture (gms)	74.59
Wt. of Dish (gms)	15.79
Wt. of Dry Soil (gms)	1241.58
Moisture Content (%)	6.0

Data entry by:  
Checked by:  
File name:

DPM  
DPM  
2512-77- M&D-ASTMD-2216-2937-R0-10.xls

Date: 12/20/2013  
Date: 12/20/13



**Atterberg Limits Test**  
**ASTM D 4318**

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

Boring Number: CS-1  
Depth: 11-24"  
Sample Number: TI-CS01-04A(11-24")  
Test Date: 12/20/2013  
Technician: MLM  
Sampled Date: 11/12/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 0860  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	9.611	9.535	10.520
Weight of Dry Soil & Pan (g):	8.503	8.431	9.319
Weight of Water (g):	1.108	1.104	1.201
Weight of Pan (g):	1.135	1.117	1.133
Moisture Content (%):	15.0	15.1	14.7

**Average:** 14.9%

**Standard Deviation:** 0.2%

**Liquid Limits**

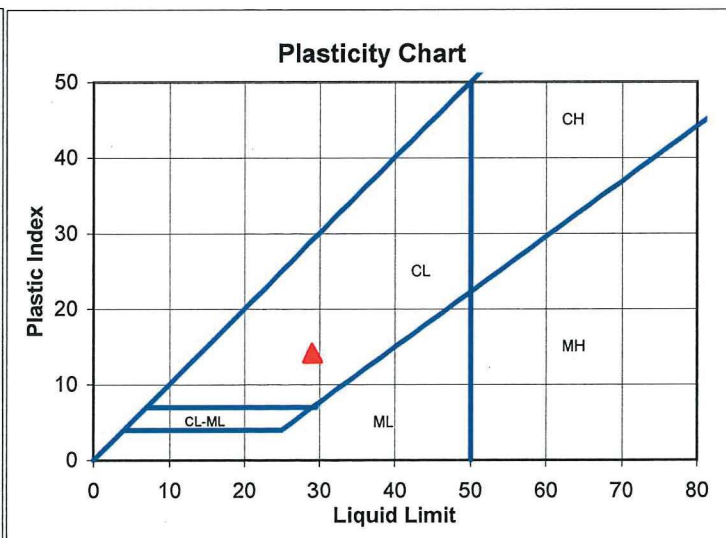
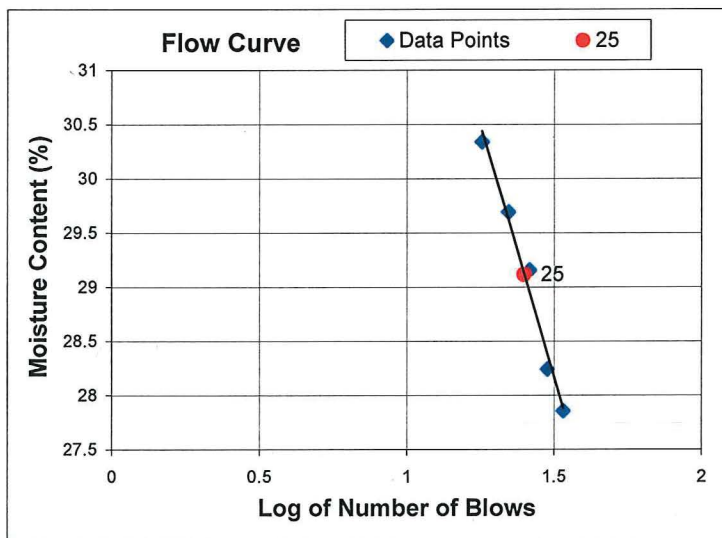
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Number of Blows:	34	30	26	22	18
Weight of Wet Soil & Pan (g):	16.758	16.257	17.649	17.054	16.046
Weight of Dry Soil & Pan (g):	13.357	12.928	13.924	13.416	12.580
Weight of Water (g):	3.401	3.329	3.725	3.638	3.466
Weight of Pan (g):	1.148	1.140	1.147	1.162	1.155
Moisture Content (%):	27.9	28.2	29.2	29.7	30.3

**Plastic Limit:** 15

**Liquid Limit:** 29

**Plastic Index:** 14

**Atterberg Classification** CL



Data Entered By: SKL

Date: 12/27/2013

Data Checked By: MLM

File Name: atterberg-ASTM\_4318-R6\_1.xls

Date: 12/30/13

**Atterberg Limits Test**  
**ASTM D 4318**

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

Boring Number: CS-4  
Depth: 10-24"  
Sample Number: TI-CS04-04A(10-24")  
Test Date: 12/20/2013  
Technician: MLM  
Sampled Date: 11/12/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 0860  
Material Size of Fines: -#40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	9.185	9.680	9.404
Weight of Dry Soil & Pan (g):	8.121	8.543	8.311
Weight of Water (g):	1.064	1.137	1.093
Weight of Pan (g):	1.108	1.136	1.133
Moisture Content (%):	15.2	15.4	15.2

**Average: 15.2%**

**Standard Deviation: 0.1%**

**Liquid Limits**

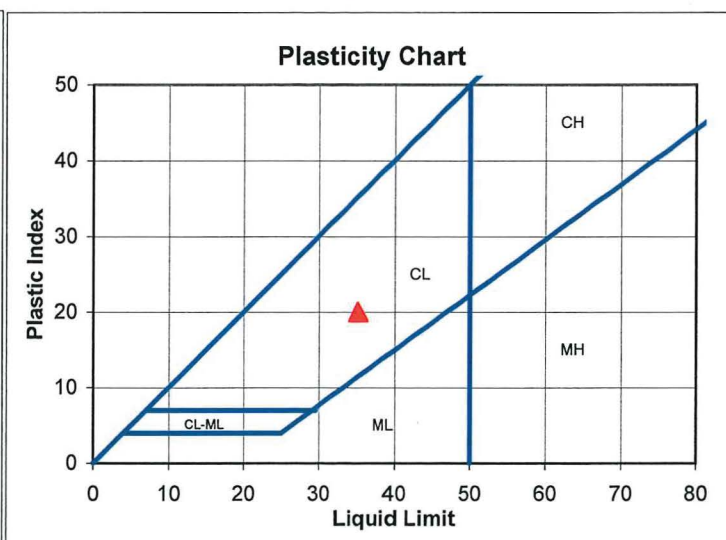
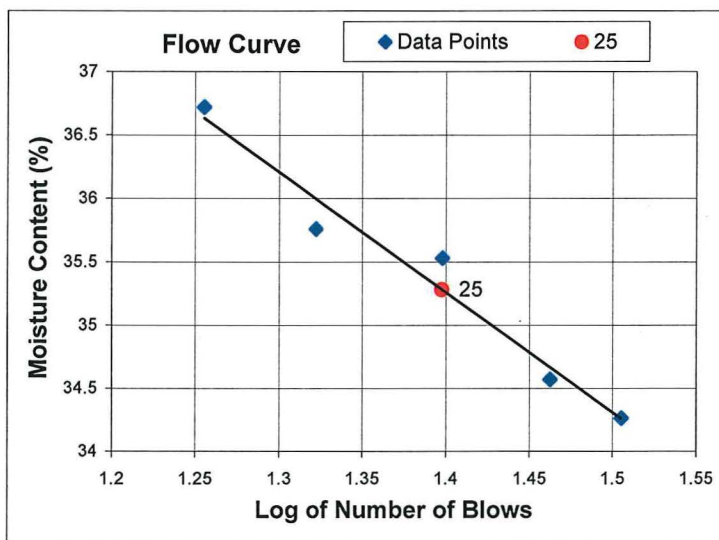
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Number of Blows:	32	29	25	21	18
Weight of Wet Soil & Pan (g):	15.825	16.545	14.944	16.252	14.906
Weight of Dry Soil & Pan (g):	12.081	12.589	11.303	12.263	11.201
Weight of Water (g):	3.744	3.956	3.641	3.989	3.705
Weight of Pan (g):	1.153	1.145	1.054	1.107	1.111
Moisture Content (%):	34.3	34.6	35.5	35.8	36.7

**Plastic Limit: 15**

**Liquid Limit: 35**

**Plastic Index: 20**

**Atterberg Classification** CL



Data Entered By: SKL

Date: 12/27/2013

Data Checked By: MLM

File Name: atterberg-ASTM\_4318-R6\_0.xls

Date: 12/30/13



**Atterberg Limits Test**  
**ASTM D 4318**

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

Boring Number: CS-5  
Depth: 9-24"  
Sample Number: TI-CS05-04A(9-24")  
Test Date: 12/3/2013  
Technician: CAL  
Sampled Date: 11/12/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	8.110	8.158	7.578
Weight of Dry Soil & Pan (g):	7.299	7.357	6.825
Weight of Water (g):	0.811	0.801	0.753
Weight of Pan (g):	0.738	0.763	0.743
Moisture Content (%):	12.4	12.1	12.4

**Average:** 12.3%

**Standard Deviation:** 0.1%

**Liquid Limits**

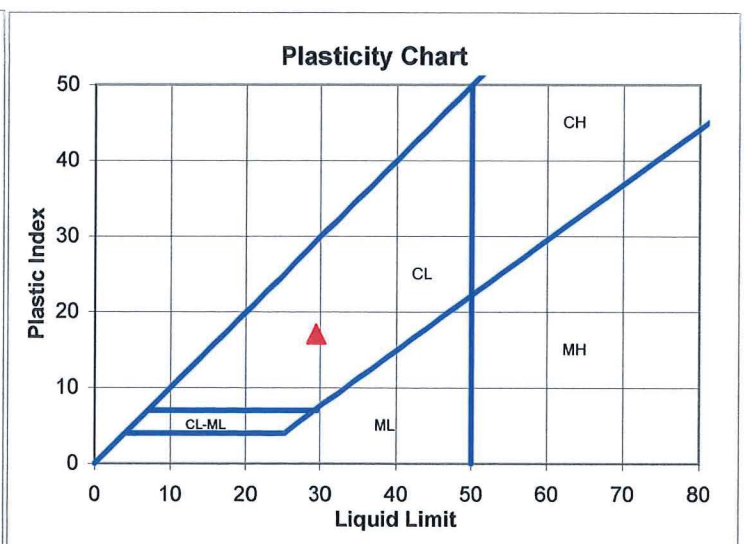
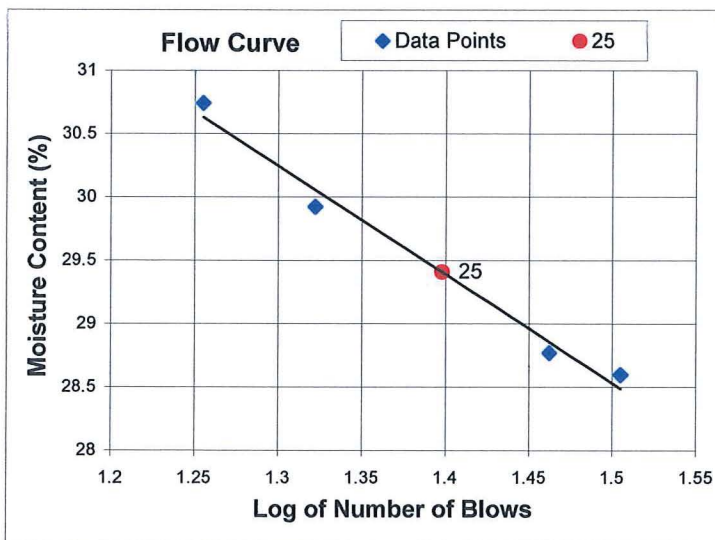
	Sample 1	Sample 2	Sample 3	Sample 4
Number of Blows:	32	29	21	18
Weight of Wet Soil & Pan (g):	11.769	11.305	11.298	9.415
Weight of Dry Soil & Pan (g):	9.315	8.948	8.871	7.382
Weight of Water (g):	2.454	2.357	2.427	2.033
Weight of Pan (g):	0.733	0.755	0.760	0.769
Moisture Content (%):	28.6	28.8	29.9	30.7

**Plastic Limit:** 12

**Liquid Limit:** 29

**Plastic Index:** 17

**Atterberg Classification** CL



Data Entered By: CAL

File Name: atterberg-ASTM\_4318-R6\_4.xls

Date: 12/4/2013

Data Checked By: KR

Date: 12/5/13

**Atterberg Limits Test  
ASTM D 4318**

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

Boring Number: CS-6  
Depth: 7-24"  
Sample Number: TI-CS06-04A(7-24")  
Test Date: 12/3/2013  
Technician: CAL  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	8.088	7.135	7.931
Weight of Dry Soil & Pan (g):	7.293	6.417	7.099
Weight of Water (g):	0.795	0.718	0.832
Weight of Pan (g):	0.766	0.746	0.734
Moisture Content (%):	12.2	12.7	13.1

**Average:** 12.6%

**Standard Deviation:** 0.4%

**Liquid Limits**

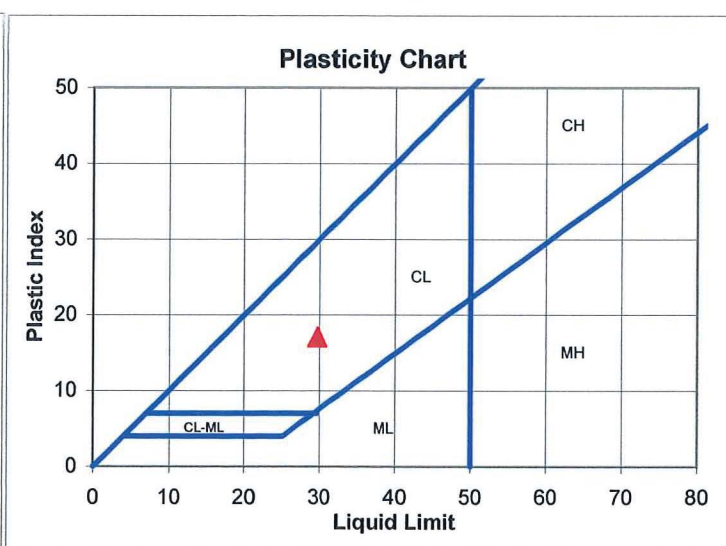
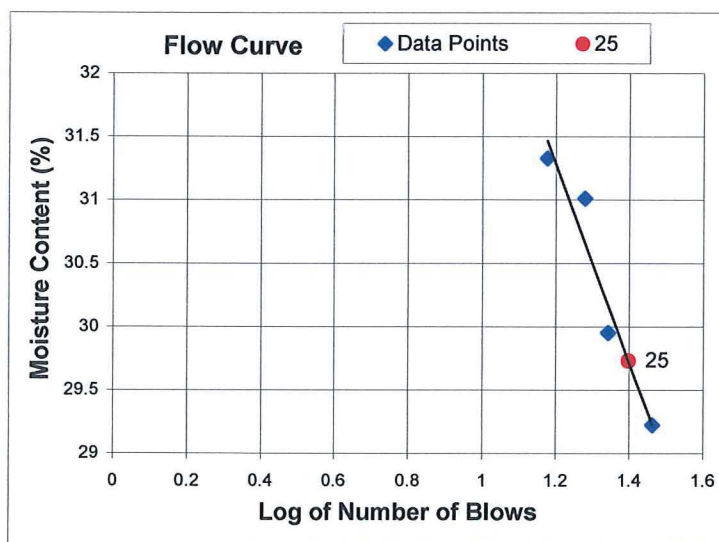
	Sample 1	Sample 2	Sample 3	Sample 4
Number of Blows:	29	22	19	15
Weight of Wet Soil & Pan (g):	11.472	12.036	11.694	10.611
Weight of Dry Soil & Pan (g):	9.043	9.438	9.108	8.261
Weight of Water (g):	2.429	2.598	2.586	2.350
Weight of Pan (g):	0.731	0.764	0.769	0.760
Moisture Content (%):	29.2	30.0	31.0	31.3

**Plastic Limit:** 13

**Liquid Limit:** 30

**Plastic Index:** 17

**Atterberg Classification** CL



Data Entered By: CAL

File Name: atterberg-ASTM\_4318-R6\_5.xls

Date: 12/4/2013

Data Checked By: KR

Date: 12/5/13

Atterberg Limits Test  
ASTM D 4318

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

Boring Number: CS-7  
Depth: 0-20"  
Sample Number: TI-CS07-02A(0-20")  
Test Date: 12/2/2013  
Technician: CAL  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

### Test Configuration

Liquid Limits Device: 1080  
Material Size of Fines: #40

### Plastic Limits

	Sample 1	Sample 2
Weight of Wet Soil & Pan (g):	6.558	7.430
Weight of Dry Soil & Pan (g):	5.888	6.648
Weight of Water (g):	0.670	0.782
Weight of Pan (g):	0.747	0.738
Moisture Content (%):	13.0	13.2

Average: 13.1%

Standard Deviation: 0.1%

### Liquid Limits

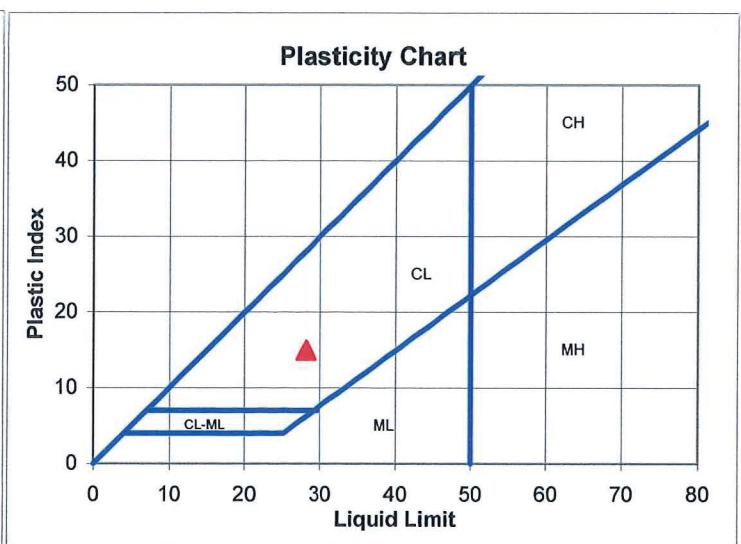
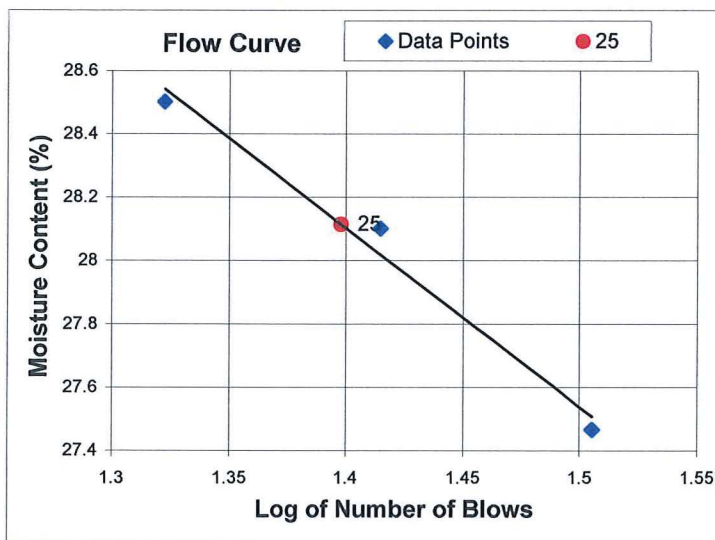
	Sample 1	Sample 2	Sample 3
Number of Blows:	32	21	26
Weight of Wet Soil & Pan (g):	11.095	10.501	13.216
Weight of Dry Soil & Pan (g):	8.870	8.342	10.484
Weight of Water (g):	2.225	2.159	2.732
Weight of Pan (g):	0.769	0.767	0.762
Moisture Content (%):	27.5	28.5	28.1

Plastic Limit: 13

Liquid Limit: 28

Plastic Index: 15

Atterberg Classification **CL**



Data Entered By: KR

File Name: atterberg-ASTM\_4318-R6\_0.xls

Date: 12/3/2013

Data Checked By: CR

Date: 12/3/13



**Atterberg Limits Test  
ASTM D 4318**

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

Boring Number: CS-8  
Depth: 8-28"  
Sample Number: TI-CS08-04A(8-28")  
Test Date: 12/2/2013  
Technician: CAL  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	7.783	6.527	5.558
Weight of Dry Soil & Pan (g):	7.010	5.904	5.035
Weight of Water (g):	0.773	0.623	0.523
Weight of Pan (g):	0.770	0.763	0.732
Moisture Content (%):	12.4	12.1	12.2

**Average:** 12.2%

**Standard Deviation:** 0.1%

**Liquid Limits**

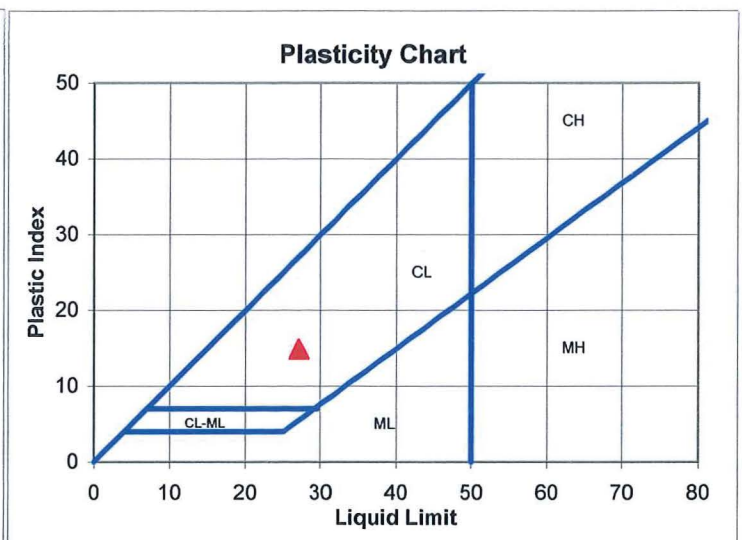
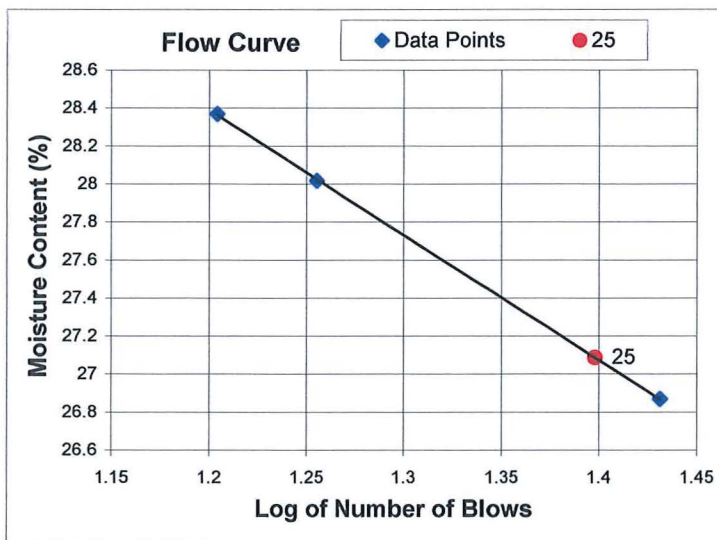
	Sample 1	Sample 2	Sample 3
Number of Blows:	16	18	27
Weight of Wet Soil & Pan (g):	11.528	9.880	9.560
Weight of Dry Soil & Pan (g):	9.147	7.883	7.691
Weight of Water (g):	2.381	1.997	1.869
Weight of Pan (g):	0.754	0.755	0.735
Moisture Content (%):	28.4	28.0	26.9

**Plastic Limit:** 12

**Liquid Limit:** 27

**Plastic Index:** 15

**Atterberg Classification** CL



Data Entered By: KR

Date: 12/3/2013

Data Checked By: CAL

File Name: atterberg-ASTM\_4318-R6\_1.xls

Date: 12/4/13



**Atterberg Limits Test**  
**ASTM D 4318**

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

Boring Number: CS-9  
Depth: 9-26"  
Sample Number: TI-CS09-04A(9-26")  
Test Date: 12/3/2013  
Technician: CAL  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	6.448	6.674	6.508
Weight of Dry Soil & Pan (g):	5.800	5.999	5.866
Weight of Water (g):	0.648	0.675	0.642
Weight of Pan (g):	0.744	0.732	0.755
Moisture Content (%):	12.8	12.8	12.6

**Average:** -880.1%

**Standard Deviation:** 27.5%

**Liquid Limits**

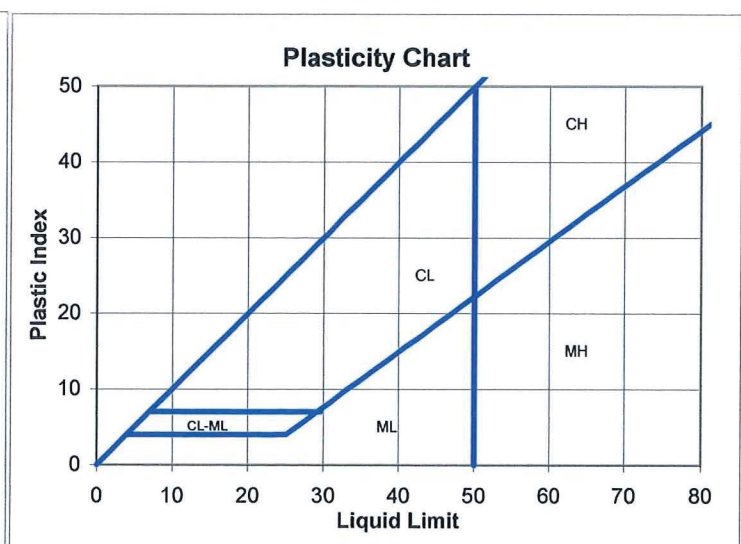
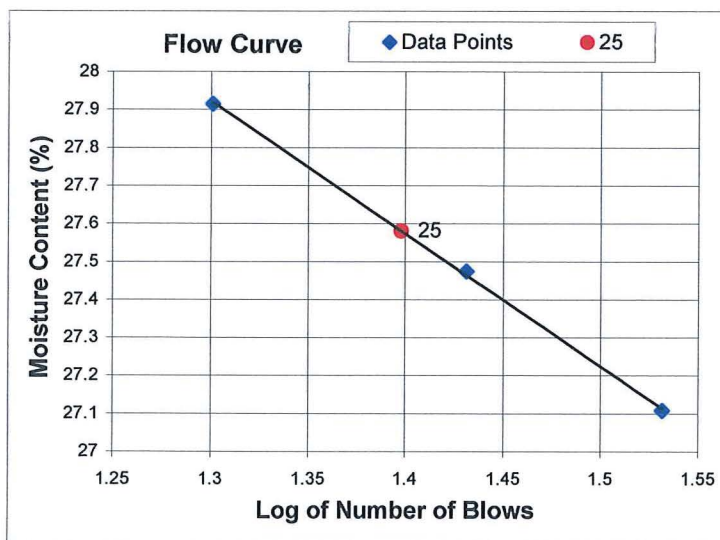
	Sample 1	Sample 2	Sample 3
Number of Blows:	20	27	34
Weight of Wet Soil & Pan (g):	9.990	9.271	11.723
Weight of Dry Soil & Pan (g):	7.974	7.436	9.386
Weight of Water (g):	2.016	1.835	2.337
Weight of Pan (g):	0.752	0.757	0.765
Moisture Content (%):	27.9	27.5	27.1

**Plastic Limit:** -880

**Liquid Limit:** 28

**Plastic Index:** 908

**Atterberg Classification** CL



Data Entered By: KR

Date: 12/4/2013

Data Checked By: CAL

File Name: atterberg-ASTM\_4318-R6\_3.xls

Date: 12/4/13

**Atterberg Limits Test**  
ASTM D 4318

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")  
Test Date: 12/11/2013  
Technician: KMR  
Sampled Date: 11/12/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: -#40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	6.623	6.911	6.271
Weight of Dry Soil & Pan (g):	5.911	6.168	5.617
Weight of Water (g):	0.712	0.743	0.654
Weight of Pan (g):	0.735	0.736	0.759
Moisture Content (%):	13.8	13.7	13.5

**Average:** 13.6%

**Standard Deviation:** 0.2%

**Liquid Limits**

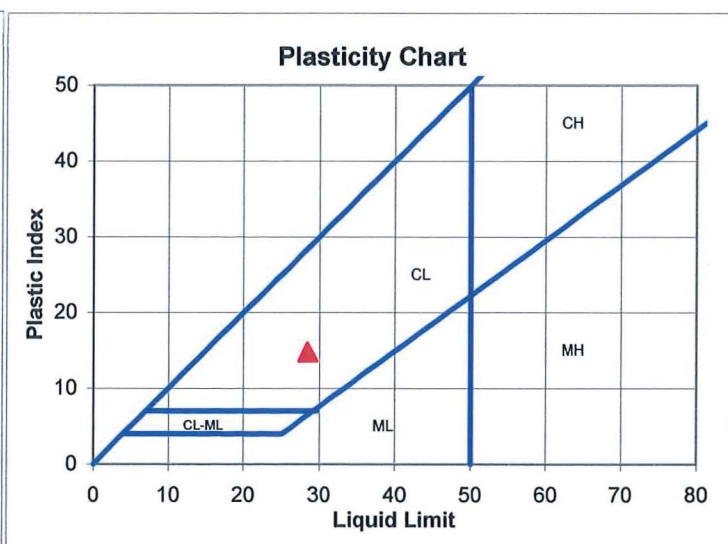
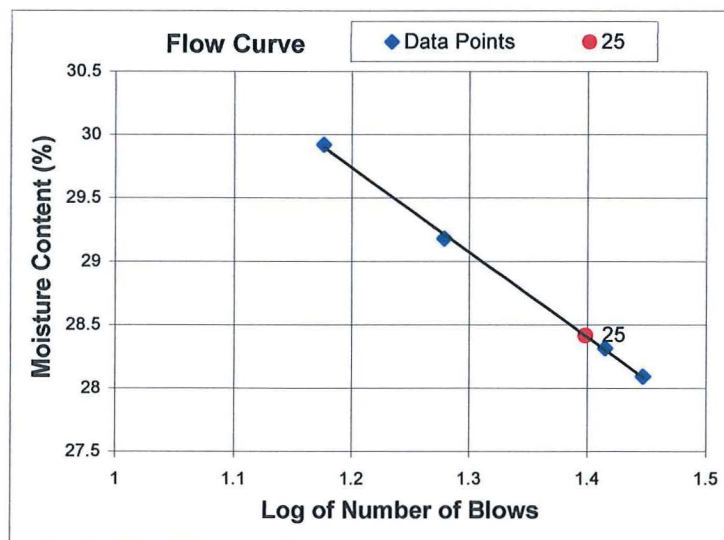
	Sample 1	Sample 2	Sample 3	Sample 4
Number of Blows:	28	26	19	15
Weight of Wet Soil & Pan (g):	11.741	12.307	14.543	12.590
Weight of Dry Soil & Pan (g):	9.334	9.756	11.432	9.870
Weight of Water (g):	2.407	2.551	3.111	2.720
Weight of Pan (g):	0.765	0.746	0.770	0.779
Moisture Content (%):	28.1	28.3	29.2	29.9

**Plastic Limit:** 14

**Liquid Limit:** 28

**Plastic Index:** 15

**Atterberg Classification** CL



Data Entered By: KMR

Date: 12/12/2013

Data Checked By: *[Signature]*

File Name: atterberg-ASTM\_4318-R6\_7.xls

Date: *12/13/13*

**Atterberg Limits Test**  
ASTM D 4318

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")  
Test Date: 12/12/2013  
Technician: KMR  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	5.870	6.032	6.324
Weight of Dry Soil & Pan (g):	5.244	5.397	5.652
Weight of Water (g):	0.626	0.635	0.672
Weight of Pan (g):	0.759	0.771	0.731
Moisture Content (%):	14.0	13.7	13.7

**Average: 13.8%**

**Standard Deviation: 0.2%**

**Liquid Limits**

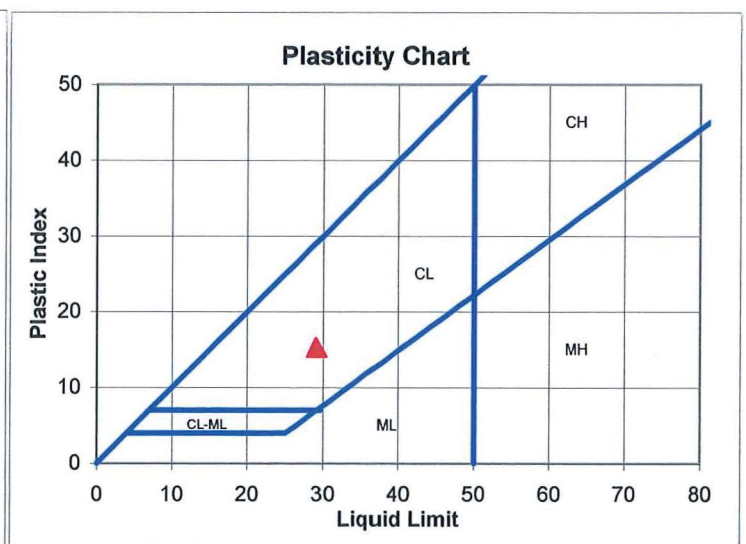
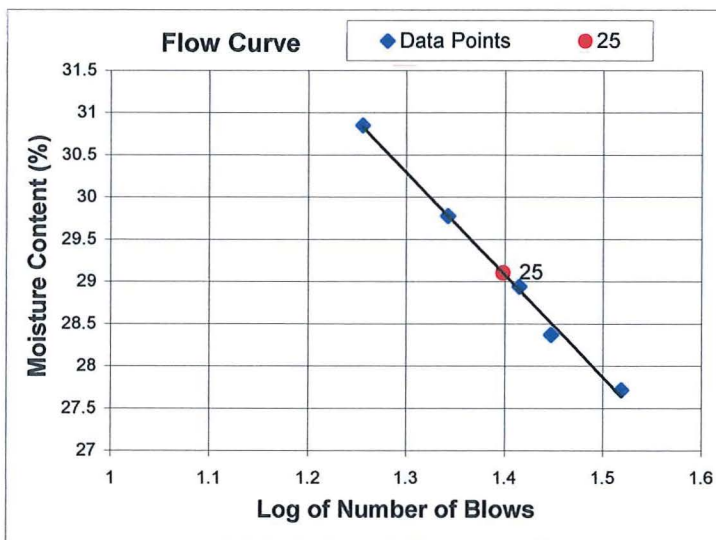
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Number of Blows:	33	28	26	22	18
Weight of Wet Soil & Pan (g):	14.400	15.122	13.908	18.819	15.267
Weight of Dry Soil & Pan (g):	11.441	11.951	10.958	14.677	11.845
Weight of Water (g):	2.959	3.171	2.950	4.142	3.422
Weight of Pan (g):	0.765	0.773	0.764	0.766	0.752
Moisture Content (%):	27.7	28.4	28.9	29.8	30.8

**Plastic Limit: 14**

**Liquid Limit: 29**

**Plastic Index: 15**

**Atterberg Classification** CL



Data Entered By: KMR

Date: 12/13/2013

Data Checked By: *Open*

File Name: atterberg-ASTM\_4318-R6\_9.xls

Date: *12/13/13*



**Atterberg Limits Test**  
**ASTM D 4318**

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")  
Test Date: 12/5/2013  
Technician: CAL  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: -#40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	6.818	7.132	7.445
Weight of Dry Soil & Pan (g):	6.139	6.413	6.699
Weight of Water (g):	0.679	0.719	0.746
Weight of Pan (g):	0.735	0.746	0.768
Moisture Content (%):	12.6	12.7	12.6

**Average:** 12.6%

**Standard Deviation:** 0.1%

**Liquid Limits**

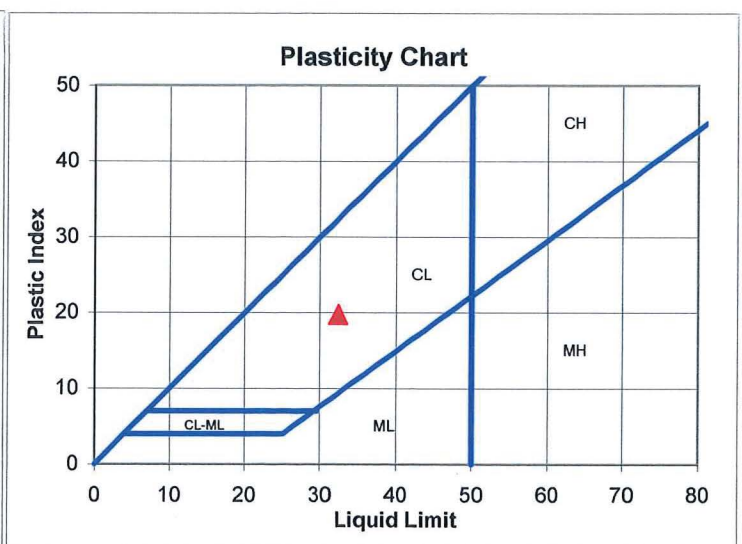
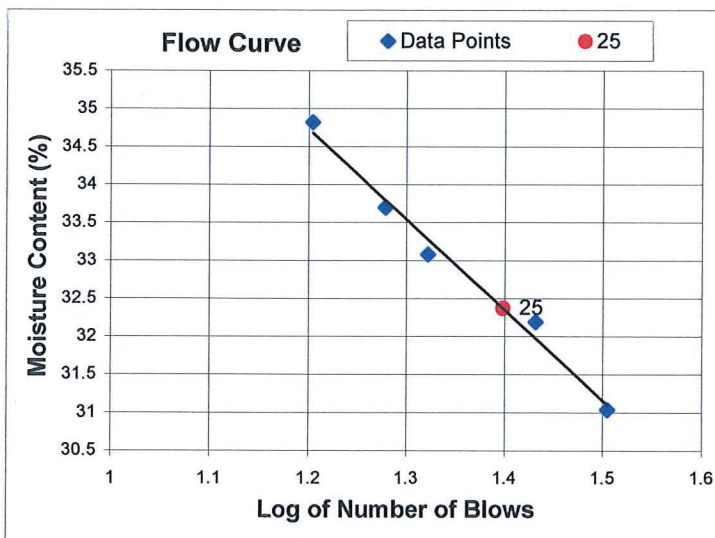
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Number of Blows:	32	27	21	19	16
Weight of Wet Soil & Pan (g):	10.899	10.245	9.851	10.238	8.958
Weight of Dry Soil & Pan (g):	8.501	7.936	7.590	7.843	6.844
Weight of Water (g):	2.398	2.309	2.261	2.395	2.114
Weight of Pan (g):	0.775	0.763	0.755	0.735	0.773
Moisture Content (%):	31.0	32.2	33.1	33.7	34.8

**Plastic Limit:** 13

**Liquid Limit:** 32

**Plastic Index:** 20

**Atterberg Classification** CL



Data Entered By: KMR

File Name: atterberg-ASTM\_4318-R6\_6.xls

Date: 12/9/2013

Data Checked By: SPM

Date: 12/09/13

Atterberg Limits Test  
ASTM D 4318

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")  
Test Date: 12/11/2013  
Technician: KMR  
Sampled Date: 11/13/2013  
Sampled By: MWH  
Method: Method A

### Test Configuration

Liquid Limits Device: 1080  
Material Size of Fines: #40

### Plastic Limits

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	5.056	5.335	5.968
Weight of Dry Soil & Pan (g):	4.558	4.790	5.354
Weight of Water (g):	0.498	0.545	0.614
Weight of Pan (g):	0.744	0.724	0.733
Moisture Content (%):	13.1	13.4	13.3

Average: 13.2%

Standard Deviation: 0.2%

### Liquid Limits

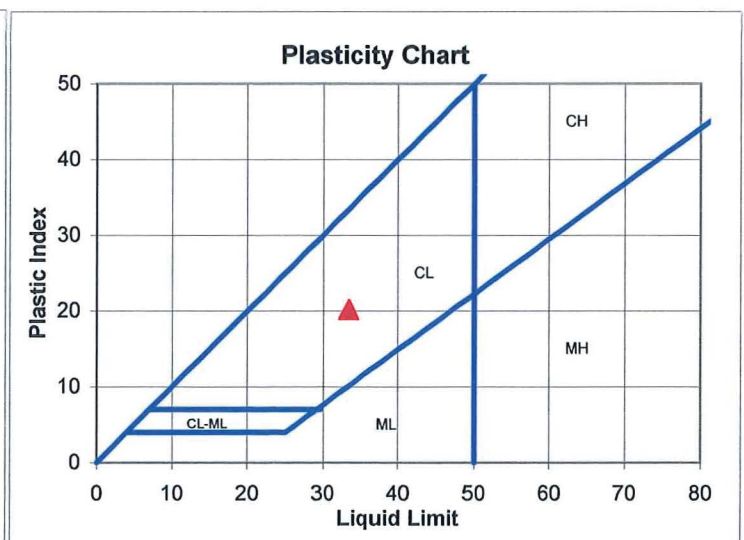
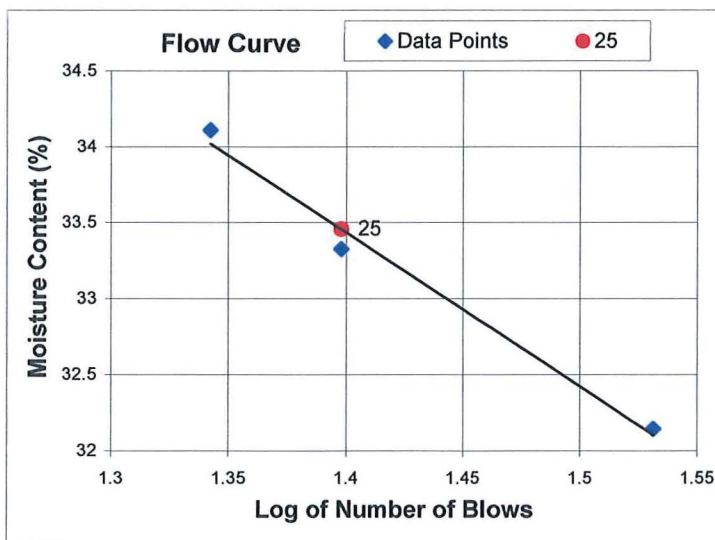
	Sample 1	Sample 2	Sample 3
Number of Blows:	34	25	22
Weight of Wet Soil & Pan (g):	14.697	12.843	15.671
Weight of Dry Soil & Pan (g):	11.301	9.819	11.877
Weight of Water (g):	3.396	3.024	3.794
Weight of Pan (g):	0.736	0.745	0.754
Moisture Content (%):	32.1	33.3	34.1

Plastic Limit: 13

Liquid Limit: 33

Plastic Index: 20

Atterberg Classification **CL**



Data Entered By: KMR

Date: 12/12/2013

Data Checked By: DPM

File Name: atterberg-ASTM\_4318-R6\_8.xls

Date: 12/13/13

**Atterberg Limits Test  
ASTM D 4318**

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")  
Test Date: 12/16/2013  
Technician: DPM  
Sampled Date: 11/12/2013  
Sampled By: MWH  
Method: Method A

**Test Configuration**

Liquid Limits Device: 1080  
Material Size of Fines: #40

**Plastic Limits**

	Sample 1	Sample 2	Sample 3
Weight of Wet Soil & Pan (g):	6.531	6.973	6.868
Weight of Dry Soil & Pan (g):	5.892	6.284	6.220
Weight of Water (g):	0.639	0.689	0.648
Weight of Pan (g):	0.766	0.768	0.774
Moisture Content (%):	12.5	12.5	11.9

**Average:** 12.3%

**Standard Deviation:** 0.3%

**Liquid Limits**

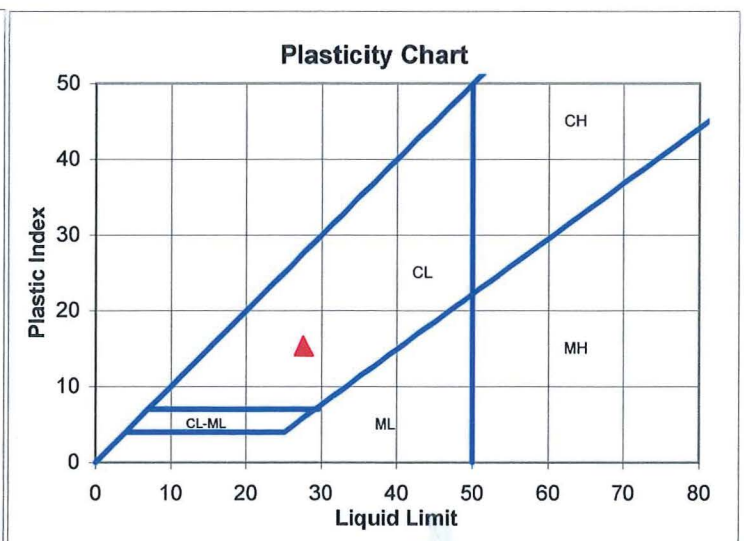
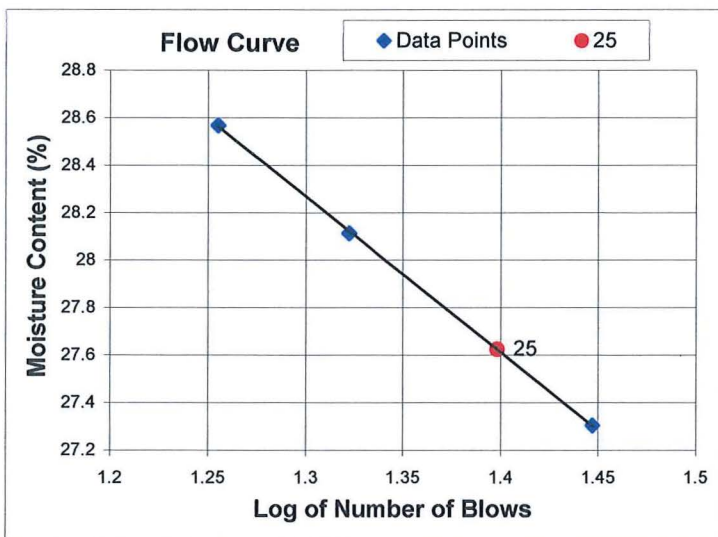
	Sample 1	Sample 2	Sample 3
Number of Blows:	28	18	21
Weight of Wet Soil & Pan (g):	14.596	14.925	14.115
Weight of Dry Soil & Pan (g):	11.625	11.772	11.180
Weight of Water (g):	2.971	3.153	2.935
Weight of Pan (g):	0.744	0.735	0.740
Moisture Content (%):	27.3	28.6	28.1

**Plastic Limit:** 12

**Liquid Limit:** 28

**Plastic Index:** 15

**Atterberg Classification** CL



Data Entered By: DPM

File Name: atterberg-ASTM\_4318-R6\_10.xls

Date: 12/17/2013

Data Checked By: DJ

Date: 12/17/2013



# 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: 11-24"  
Sample Number: TI-CS01-04A(11-24")  
Sampled Date: 11/12/2013  
Test Date: 12/20/2013  
Sampled By: MWH  
Technician: DAW

## Grain Size Data

### Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 75.37  
Weight of Dry Soil & Pan (g): 73.80  
Weight of Water (g): 1.57  
Weight of Pan (g): 3.20  
Weight of Dry Soil (g): 70.60  
Moisture (%): 2.2

### General Sample Data

Total Wet Weight of Sample (g): 2,163.10  
Total Dry Weight of Sample (g): 2,117.52  
Calculated Weight Plus #200 (g): 884.35  
Moisture of Total Sample (%): 2.2  
Percent Retained #200 Sieve (%): 41.8

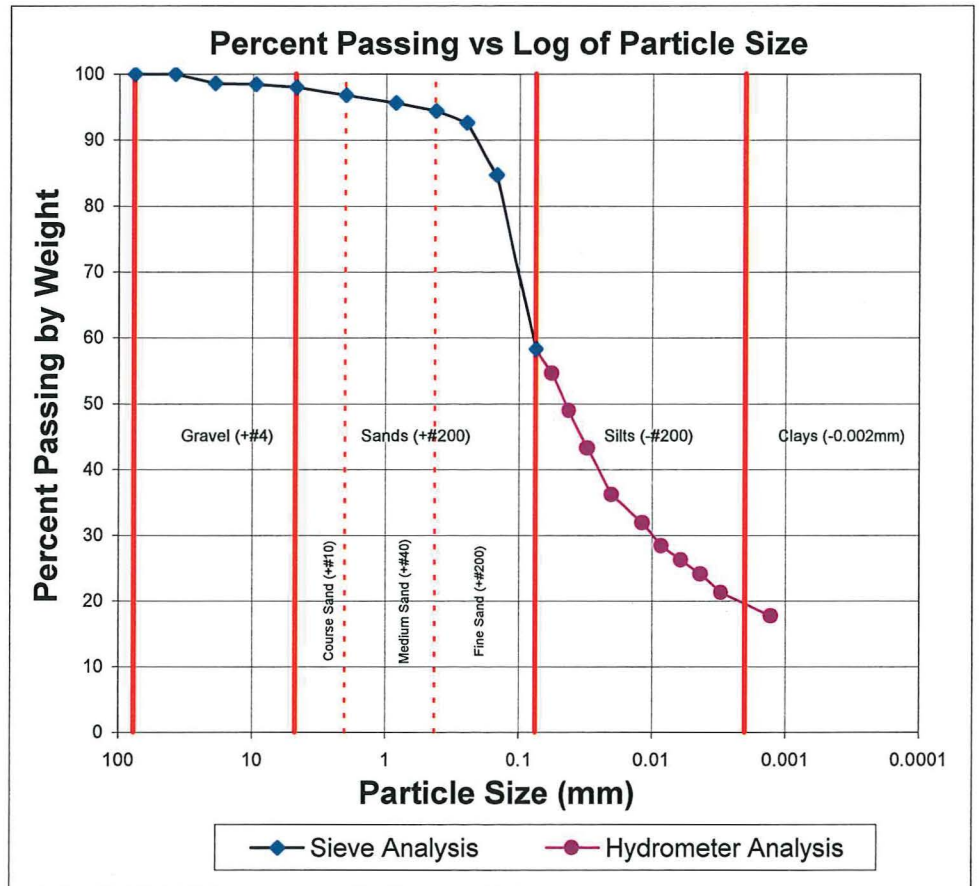
### Plus Split Data

Original Weight of + #10 (g): 83.30  
Calculated Weight of + #10 (g): 68.05

### Minus Split Data

Original Weight of - #10 (g): 2,079.80  
Calculated Dry Weight of - #10 (g): 2,049.47

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	30.00	0.00	30.00	30.00	98.6
3/8"	9.525	3.47	0.00	3.47	3.47	98.4
#4	4.750	8.44	0.00	8.44	8.44	98.0
#10	2.000	26.14	0.00	26.14	26.14	96.8
69.406g split out of -#10 material.						
#20	0.850	4.01	3.19	0.82	24.84	95.6
#40	0.425	3.87	3.03	0.84	25.30	94.4
#60	0.250	4.38	3.09	1.29	38.88	92.6
#100	0.150	8.64	3.09	5.55	167.47	84.7
#200	0.075	21.52	2.97	18.55	559.82	58.2



Data Entered By: SKL

Date: 12/27/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0\_0.xls

Checked By: MLM

Date: 12/30/13

# 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: 11-24"  
Sample Number: TI-CS01-04A(11-24")  
Sampled Date: 11/12/2013  
Test Date: 12/19/2013  
Sampled By: MWH  
Technician: MLM

## Hydrometer Data

### Test Configuration

Hydrometer Type: 152H  
Specific Gravity: 2.68  
Deflocculant: Sodium Hexametaphosphate  
Deflocculant Correction: 5.5

Total Wet Weight of Sample (g): 2,163.10  
Total Dry Weight of Sample (g): 2,117.52  
Wet Weight of Sub-Sample (g): 69.406  
Dry Weight of Sub-Sample (g): 67.896

Specific Gravity Correction Factor -  $\alpha$ : 1.00

Corrected Dry Weight of Sub-Sample - W(g): 70.141

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	44.0	38.5	22.1	0.0133	9.08	0.0568	54.6	1156.60	54.6
1	40.0	34.5	22.1	0.0133	9.73	0.0416	48.9	1036.43	48.9
2	36.0	30.5	22.1	0.0133	10.39	0.0304	43.3	916.27	43.3
5	31.0	25.5	22.1	0.0133	11.21	0.0199	36.2	766.06	36.2
15	28.0	22.5	22.2	0.0133	11.70	0.0118	31.9	675.93	31.9
30	25.5	20.0	22.2	0.0133	12.11	0.0085	28.4	600.83	28.4
60	24.0	18.5	22.3	0.0133	12.36	0.0060	26.2	555.77	26.2
120	22.5	17.0	22.4	0.0133	12.60	0.0043	24.1	510.71	24.1
250	20.5	15.0	22.7	0.0133	12.93	0.0030	21.3	450.62	21.3
1440	18.0	12.5	22.6	0.0133	13.34	0.0013	17.7	375.52	17.7

Data Entered By: SKL

Date: 12/27/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0\_0.xls

Checked By: MLM  
Date: 12/30/13



# 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: 10-24"  
Sample Number: TI-CS04-04A(10-24")  
Sampled Date: 11/12/2013  
Test Date: 12/20/2013  
Sampled By: MWH  
Technician: DAW

## Grain Size Data

### Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 55.14  
Weight of Dry Soil & Pan (g): 54.07  
Weight of Water (g): 1.07  
Weight of Pan (g): 3.13  
Weight of Dry Soil (g): 50.94  
Moisture (%): 2.1

### General Sample Data

Total Wet Weight of Sample (g): 1,557.65  
Total Dry Weight of Sample (g): 1,526.04  
Calculated Weight Plus #200 (g): 485.81  
Moisture of Total Sample (%): 2.1  
Percent Retained #200 Sieve (%): 31.8

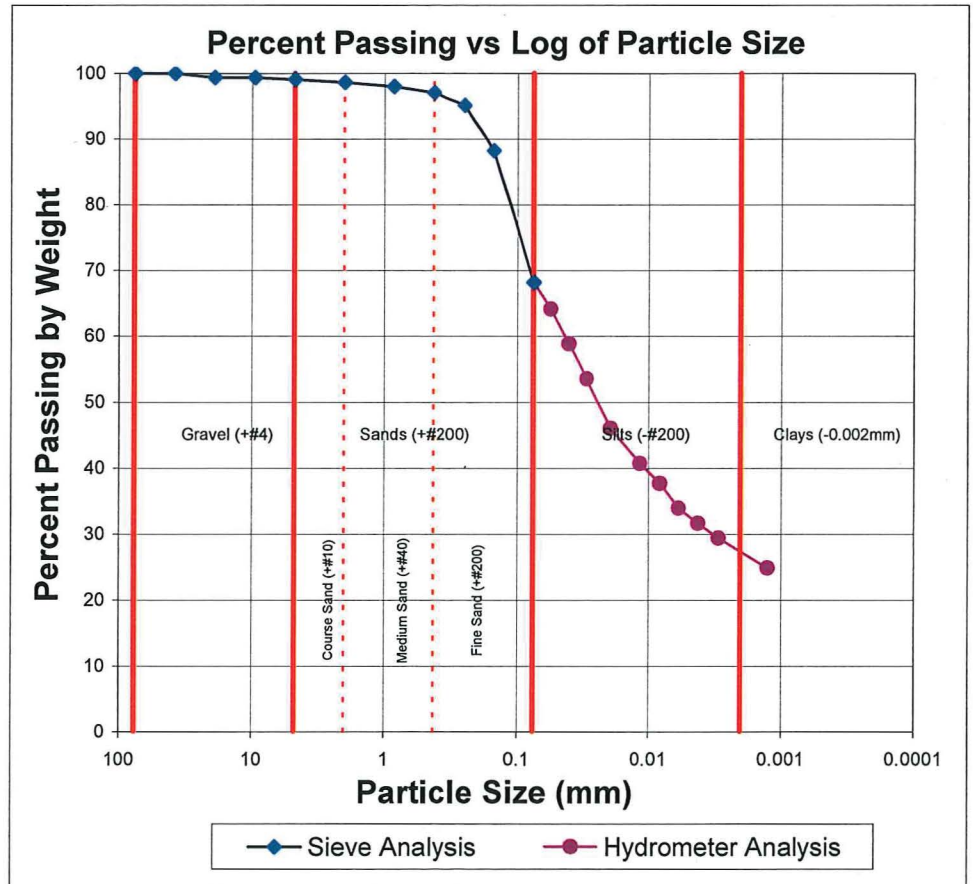
### Plus Split Data

Original Weight of + #10 (g): 38.49  
Calculated Weight of + #10 (g): 21.12

### Minus Split Data

Original Weight of - #10 (g): 1,519.16  
Calculated Dry Weight of - #10 (g): 1,504.92

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	9.95	0.00	9.95	9.95	99.3
3/8"	9.525	0.00	0.00	0.00	0.00	99.3
#4	4.750	3.94	0.00	3.94	3.94	99.1
#10	2.000	7.23	0.00	7.23	7.23	98.6
66.413g split out of #10 material.						
#20	0.850	3.42	3.03	0.40	9.16	98.0
#40	0.425	3.64	3.03	0.60	13.97	97.1
#60	0.250	4.28	2.99	1.29	29.89	95.1
#100	0.150	7.58	3.03	4.56	105.41	88.2
#200	0.075	16.48	3.24	13.24	306.25	68.2



Data Entered By: SKL

Date: 12/27/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0\_1.xls

Checked By: CHL

Date: 12/27/13

# 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: 10-24"  
Sample Number: TI-CS04-04A(10-24")  
Sampled Date: 11/12/2013  
Test Date: 12/19/2013  
Sampled By: MWH  
Technician: MLM

## Hydrometer Data

### Test Configuration

Hydrometer Type: 152H  
Specific Gravity: 2.68  
Deflocculant: Sodium Hexametaphosphate  
Deflocculant Correction: 5.5

Total Wet Weight of Sample (g): 1,557.65  
Total Dry Weight of Sample (g): 1,526.04  
Wet Weight of Sub-Sample (g): 66.413  
Dry Weight of Sub-Sample (g): 65.047

Specific Gravity Correction Factor -  $\alpha$ : 1.00

Corrected Dry Weight of Sub-Sample - W(g): 65.970

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	48.0	42.5	21.9	0.0135	8.42	0.0553	64.1	978.29	64.1
1	44.5	39.0	21.9	0.0135	9.00	0.0404	58.8	897.73	58.8
2	41.0	35.5	21.9	0.0135	9.57	0.0295	53.5	817.16	53.5
5	36.0	30.5	21.9	0.0135	10.39	0.0194	46.0	702.07	46.0
15	32.5	27.0	21.9	0.0135	10.96	0.0115	40.7	621.50	40.7
30	30.5	25.0	22.0	0.0133	11.29	0.0082	37.7	575.47	37.7
60	28.0	22.5	22.1	0.0133	11.70	0.0059	33.9	517.92	33.9
120	26.5	21.0	22.2	0.0133	11.95	0.0042	31.7	483.39	31.7
250	25.0	19.5	22.4	0.0133	12.19	0.0029	29.4	448.86	29.4
1440	22.0	16.5	22.3	0.0133	12.69	0.0013	24.9	379.81	24.9

Data Entered By: SKL

Date: 12/27/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0\_1.xls

Checked By: \_\_\_\_\_

Date: \_\_\_\_\_

# 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: 9-24"  
Sample Number: TI-CS05-04A(9-24")  
Sampled Date: 11/12/2013  
Test Date: 12/3/2013

Sampled By: MWH  
Technician: CAL

## Grain Size Data

### Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 108.63  
Weight of Dry Soil & Pan (g): 105.86  
Weight of Water (g): 2.77  
Weight of Pan (g): 3.60  
Weight of Dry Soil (g): 102.26  
Moisture (%): 2.7

### General Sample Data

Total Wet Weight of Sample (g): 1,644.61  
Total Dry Weight of Sample (g): 1,601.96  
Calculated Weight Plus #200 (g): 617.80  
Moisture of Total Sample (%): 2.7  
Percent Retained #200 Sieve (%): 38.6

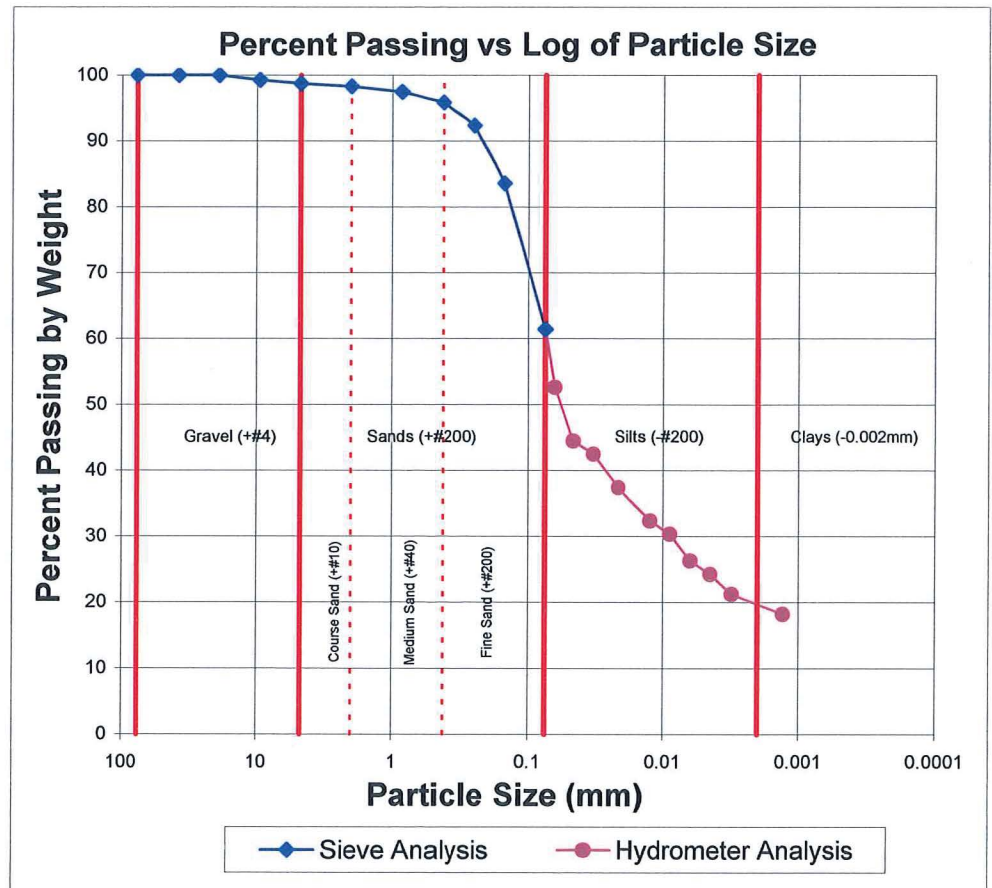
### Plus Split Data

Original Weight of + #10 (g): 32.87  
Calculated Weight of + #10 (g): 27.24

### Minus Split Data

Original Weight of - #10 (g): 1,611.74  
Calculated Dry Weight of - #10 (g): 1,574.72

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	11.73	0.00	11.73	11.73	99.3
#4	4.750	8.37	0.00	8.37	8.37	98.7
#10	2.000	7.14	0.00	7.14	7.14	98.3
49.99g split out of -#10 material.						
#20	0.850	4.27	3.84	0.42	13.69	97.4
#40	0.425	4.55	3.76	0.79	25.62	95.8
#60	0.250	5.41	3.69	1.72	55.58	92.4
#100	0.150	8.01	3.66	4.35	140.67	83.6
#200	0.075	14.51	3.53	10.97	354.99	61.4



Data Entered By: CAL

Date: 12/5/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R1\_2.xls

Checked By: *VR*

Date: *12/5/13*



# 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: 9-24"  
Sample Number: TI-CS05-04A(9-24")  
Sampled Date: 11/12/2013  
Test Date: 12/3/2013

Sampled By: MWH  
Technician: CAL

## Hydrometer Data

### Test Configuration

Hydrometer Type: 152H  
Specific Gravity: 2.65  
Deflocculant: Sodium Hexametaphosphate

Deflocculant Correction: 8.0

Specific Gravity Correction Factor -  $\alpha$ : 1.00

Total Wet Weight of Sample (g): 1,644.61

Total Dry Weight of Sample (g): 1,601.96

Wet Weight of Sub-Sample (g): 49.990

Dry Weight of Sub-Sample (g): 48.672

Corrected Dry Weight of Sub-Sample - W(g): 49.513

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	34.0	26.0	19.8	0.0138	10.72	0.0640	52.6	842.35	52.6
1	30.0	22.0	19.8	0.0138	11.37	0.0466	44.5	712.76	44.5
2	29.0	21.0	19.8	0.0138	11.54	0.0332	42.5	680.36	42.5
5	26.5	18.5	19.8	0.0138	11.95	0.0214	37.4	599.37	37.4
15	24.0	16.0	19.8	0.0138	12.36	0.0125	32.4	518.37	32.4
30	23.0	15.0	19.9	0.0138	12.52	0.0089	30.3	485.97	30.3
60	21.0	13.0	20.1	0.0137	12.85	0.0063	26.3	421.18	26.3
120	20.0	12.0	20.5	0.0137	13.01	0.0045	24.3	388.78	24.3
250	18.5	10.5	21.4	0.0135	13.26	0.0031	21.2	340.18	21.2
1440	17.0	9.0	21.2	0.0135	13.51	0.0013	18.2	291.58	18.2

Data Entered By: CAL

Date: 12/5/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R1\_2.xls

Checked By: KP

Date: 12/5/13

# 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-7  
Depth: 0-20"  
Sample Number: TI-CS07-02A(0-20")  
Sampled Date: 11/13/2013  
Test Date: 12/2/2013

Sampled By: MWH  
Technician: CAL

## Grain Size Data

### Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 109.74  
Weight of Dry Soil & Pan (g): 107.07  
Weight of Water (g): 2.66  
Weight of Pan (g): 3.56  
Weight of Dry Soil (g): 103.52  
Moisture (%): 2.6

### General Sample Data

Total Wet Weight of Sample (g): 1,976.72  
Total Dry Weight of Sample (g): 1,927.70  
Calculated Weight Plus #200 (g): 754.57  
Moisture of Total Sample (%): 2.5  
Percent Retained #200 Sieve (%): 39.1

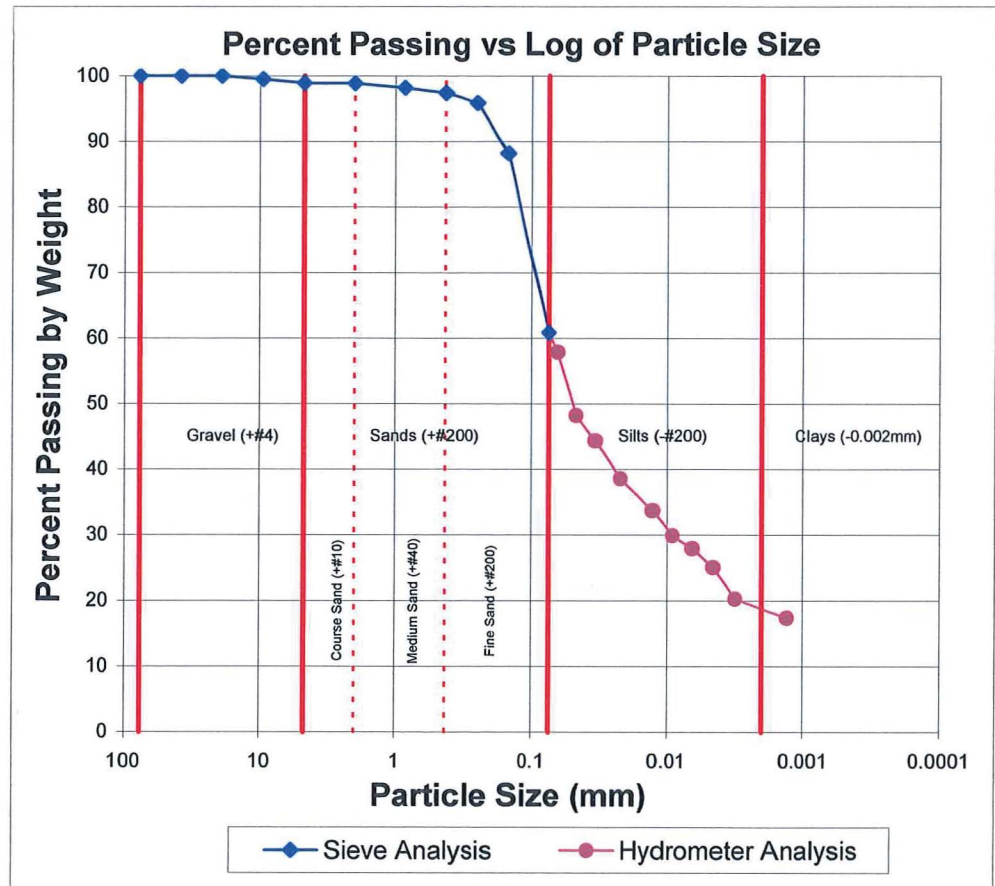
### Plus Split Data

Original Weight of + #10 (g): 25.71  
Calculated Weight of + #10 (g): 22.06

### Minus Split Data

Original Weight of - #10 (g): 1,951.01  
Calculated Dry Weight of - #10 (g): 1,905.64

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	9.33	0.00	9.33	9.33	99.5
#4	4.750	11.27	0.00	11.27	11.27	98.9
#10	2.000	1.46	0.00	1.46	1.46	98.9
52.654g split out of - #10 material.						
#20	0.850	4.05	3.71	0.34	12.58	98.2
#40	0.425	4.11	3.70	0.42	15.55	97.4
#60	0.250	4.63	3.84	0.79	29.29	95.9
#100	0.150	7.83	3.84	3.99	147.97	88.2
#200	0.075	17.98	3.78	14.20	527.11	60.9



Data Entered By: CAL

Date: 12/5/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R1\_1.xls

Checked By: *KC*

Date: 12/5/13

# 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-7  
Depth: 0-20"  
Sample Number: TI-CS07-02A(0-20")  
Sampled Date: 11/13/2013  
Test Date: 12/2/2013

Sampled By: MWH  
Technician: CAL

## Hydrometer Data

### Test Configuration

Hydrometer Type: 152H  
Specific Gravity: 2.65  
Deflocculant: Sodium Hexametaphosphate  
Deflocculant Correction: 8.0

Specific Gravity Correction Factor -  $\alpha$ : 1.00

Total Wet Weight of Sample (g): 1,976.72  
Total Dry Weight of Sample (g): 1,927.70  
Wet Weight of Sub-Sample (g): 52.654  
Dry Weight of Sub-Sample (g): 51.333  
Corrected Dry Weight of Sub-Sample - W(g): 51.904

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	38.0	30.0	16.9	0.0144	10.06	0.0644	57.9	1115.70	57.9
1	33.0	25.0	16.9	0.0144	10.88	0.0473	48.2	929.75	48.2
2	31.0	23.0	16.9	0.0144	11.21	0.0340	44.4	855.37	44.4
5	28.0	20.0	16.8	0.0144	11.70	0.0220	38.6	743.80	38.6
15	25.5	17.5	17.1	0.0142	12.11	0.0127	33.8	650.83	33.8
30	23.5	15.5	17.4	0.0142	12.44	0.0091	29.9	576.45	29.9
60	22.5	14.5	17.7	0.0142	12.60	0.0065	28.0	539.26	28.0
120	21.0	13.0	18.3	0.0140	12.85	0.0046	25.1	483.47	25.1
250	18.5	10.5	20.1	0.0137	13.26	0.0031	20.3	390.50	20.3
1440	17.0	9.0	20.2	0.0137	13.51	0.0013	17.4	334.71	17.4

Data Entered By: CAL

Date: 12/5/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R1\_1.xls

Checked By: KR  
Date: 12/5/13



# 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-9  
Depth: 9-26"  
Sample Number: TI-CS09-04A(9-26")  
Sampled Date: 11/13/2013  
Test Date: 12/2/2013

Sampled By: MWH  
Technician: CAL

## Grain Size Data

### Hygroscopic Moisture of Fines

Weight of Wet Soil & Pan (g): 101.03  
Weight of Dry Soil & Pan (g): 98.89  
Weight of Water (g): 2.14  
Weight of Pan (g): 3.77  
Weight of Dry Soil (g): 95.12  
Moisture (%): 2.3

### General Sample Data

Total Wet Weight of Sample (g): 1,718.28  
Total Dry Weight of Sample (g): 1,681.98  
Calculated Weight Plus #200 (g): 707.36  
Moisture of Total Sample (%): 2.2  
Percent Retained #200 Sieve (%): 42.1

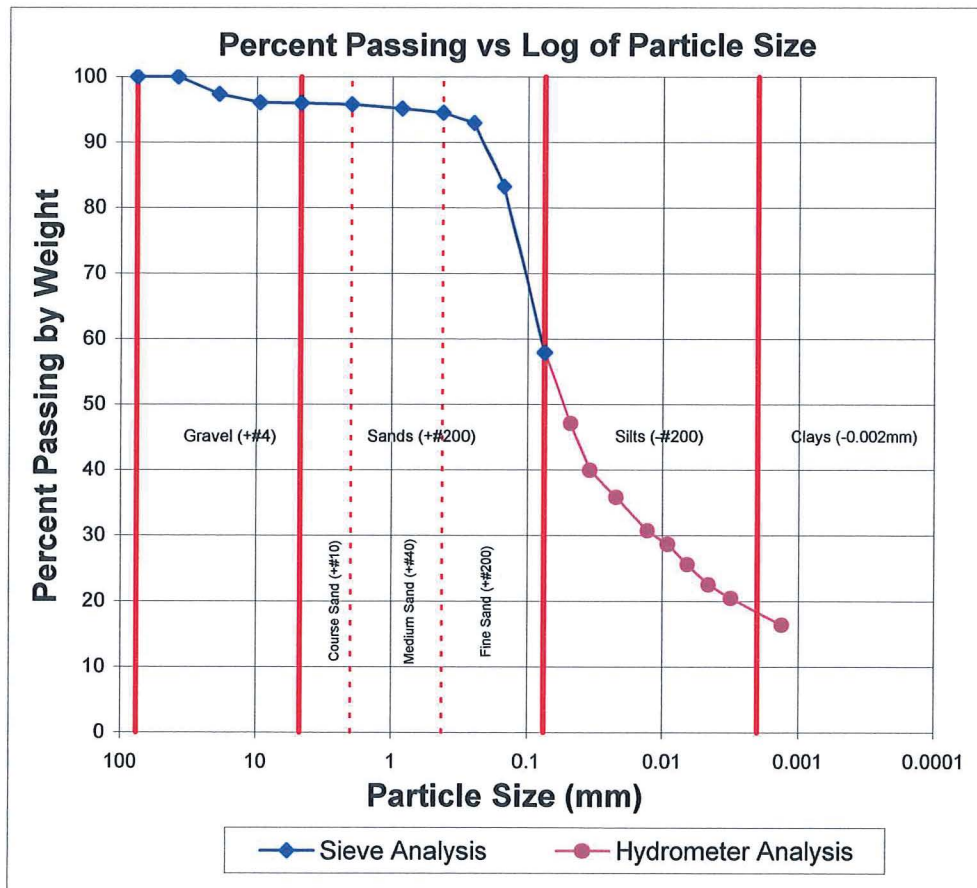
### Plus Split Data

Original Weight of + #10 (g): 86.45  
Calculated Weight of + #10 (g): 70.98

### Minus Split Data

Original Weight of - #10 (g): 1,631.83  
Calculated Dry Weight of - #10 (g): 1,611.00

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	44.53	0.00	44.53	44.53	97.4
3/8"	9.525	21.02	0.00	21.02	21.02	96.1
#4	4.750	1.85	0.00	1.85	1.85	96.0
#10	2.000	3.58	0.00	3.58	3.58	95.8
47.875g split out of -#10 material.						
#20	0.850	4.13	3.83	0.30	10.22	95.2
#40	0.425	4.28	3.96	0.32	10.94	94.5
#60	0.250	4.58	3.80	0.77	26.67	92.9
#100	0.150	8.56	3.82	4.74	162.92	83.3
#200	0.075	15.92	3.55	12.37	425.63	57.9



Data Entered By: CAL

Date: 12/5/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R1\_0.xls

Checked By: KL

Date: 12/5/13

# 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-9  
Depth: 9-26"  
Sample Number: TI-CS09-04A(9-26")  
Sampled Date: 11/13/2013  
Test Date: 12/2/2013

Sampled By: MWH  
Technician: CAL

### Hydrometer Data

#### Test Configuration

Hydrometer Type: 152H  
Specific Gravity: 2.65  
Deflocculant: Sodium Hexametaphosphate  
Deflocculant Correction: 8.0

Specific Gravity Correction Factor -  $\alpha$ : 1.00

Total Wet Weight of Sample (g): 1,718.28  
Total Dry Weight of Sample (g): 1,681.98  
Wet Weight of Sub-Sample (g): 47.875  
Dry Weight of Sub-Sample (g): 46.820  
Corrected Dry Weight of Sub-Sample - W(g): 48.873

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	23.0	16.7	0.0144	11.21	0.0480	47.1	792.64	47.1
2	27.5	19.5	16.7	0.0144	11.78	0.0348	40.0	672.02	40.0
5	25.5	17.5	16.7	0.0144	12.11	0.0223	35.9	603.09	35.9
15	23.0	15.0	17.0	0.0142	12.52	0.0129	30.7	516.94	30.7
30	22.0	14.0	17.2	0.0142	12.69	0.0092	28.7	482.47	28.7
60	20.5	12.5	17.7	0.0142	12.93	0.0066	25.6	430.78	25.6
120	19.0	11.0	18.1	0.0140	13.18	0.0046	22.5	379.09	22.5
250	18.0	10.0	20.1	0.0137	13.34	0.0032	20.5	344.62	20.5
1440	16.0	8.0	20.1	0.0137	13.67	0.0013	16.4	275.70	16.4

Data Entered By: CAL

Date: 12/5/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R1\_0.xls

Checked By: KR

Date: 12/5/13



# 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: 0-10"  
Sample Number: TI-CS02-02A(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): 117.84  
Weight of Dry Soil & Pan (g): 112.26  
Weight of Water (g): 5.58  
Weight of Pan (g): 3.60  
Weight of Dry Soil (g): 108.66  
Moisture (%): 5.1

### General Sample Data

Total Wet Weight of Sample (g): 10,935.00  
Total Dry Weight of Sample (g): 10,592.42  
Calculated Weight Plus #200 (g): 5,714.14  
Moisture of Total Sample (%): 3.2  
Percent Retained #200 Sieve (%): 53.9

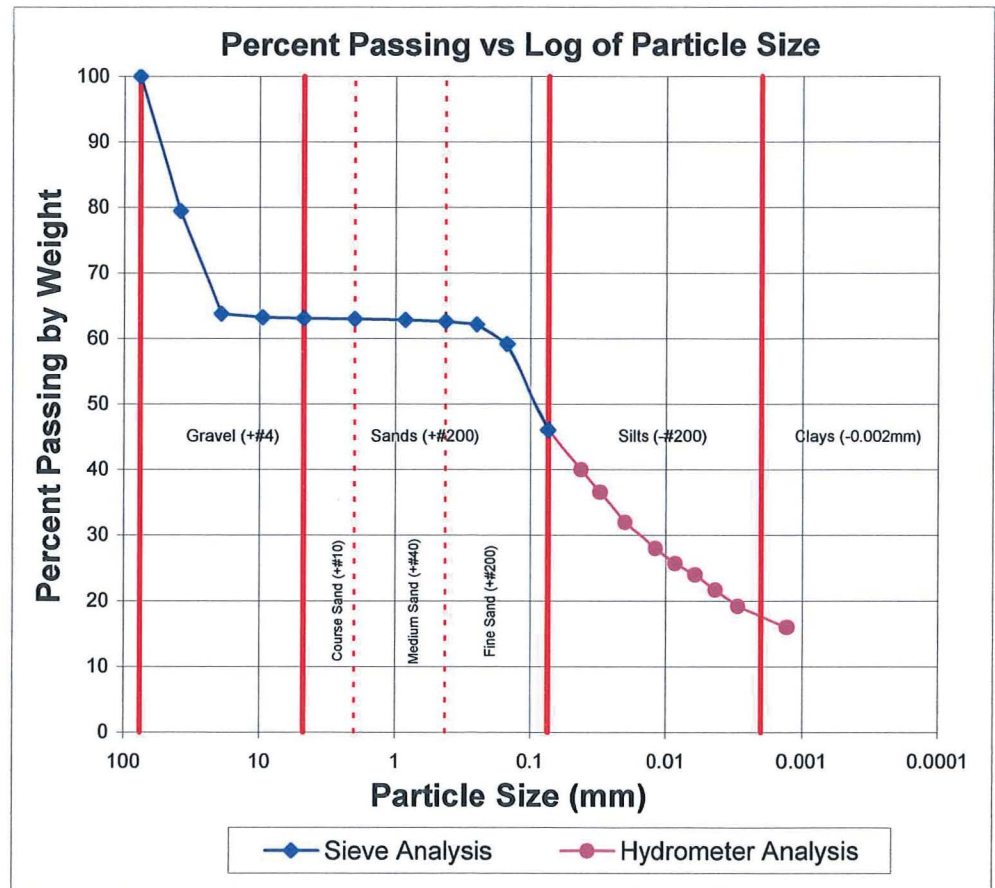
### Plus Split Data

Original Weight of + #10 (g): 3,980.00  
Calculated Weight of + #10 (g): 3,921.13

### Minus Split Data

Original Weight of - #10 (g): 6,955.00  
Calculated Dry Weight of - #10 (g): 6,671.29

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	2180.00	0.00	2180.00	2180.00	79.4
3/4"	19.05	1660.45	0.00	1660.45	1660.45	63.7
3/8"	9.525	54.02	0.00	54.02	54.02	63.2
#4	4.750	16.04	0.00	16.04	16.04	63.1
#10	2.000	10.62	0.00	10.62	10.62	63.0
58.043g split out of -#10 material.						
#20	0.850	3.95	3.80	0.15	18.01	62.8
#40	0.425	3.94	3.74	0.20	24.41	62.6
#60	0.250	4.15	3.77	0.38	46.16	62.1
#100	0.150	6.16	3.56	2.60	314.06	59.2
#200	0.075	14.57	3.07	11.51	1390.38	46.1



Data Entered By: KMR

Date: 12/13/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0.xls\_8.xls

Checked By: *DPM*

Date: *12/13/13*

# 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: 0-10"  
Sample Number: TI-CS02-02A(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 -  $\alpha$ : 1.00

Total Wet Weight of Sample (g): 10,935.00

Total Dry Weight of Sample (g): 10,592.42

Wet Weight of Sub-Sample (g): 58.043

Dry Weight of Sub-Sample (g): 55.208

Corrected Dry Weight of Sub-Sample - W(g): 87.632

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	41.0	35.0	19.3	0.0138	9.57	0.0428	40.0	4236.37	40.0
2	38.0	32.0	19.3	0.0138	10.06	0.0310	36.6	3873.25	36.6
5	34.0	28.0	19.3	0.0138	10.72	0.0202	32.0	3389.09	32.0
15	30.5	24.5	19.4	0.0138	11.29	0.0120	28.0	2965.46	28.0
30	28.5	22.5	19.6	0.0138	11.62	0.0086	25.7	2723.38	25.7
60	27.0	21.0	19.9	0.0138	11.87	0.0061	24.0	2541.82	24.0
120	25.0	19.0	20.4	0.0137	12.19	0.0044	21.7	2299.74	21.7
250	22.8	16.8	22.0	0.0133	12.56	0.0030	19.2	2033.46	19.2
1440	20.0	14.0	20.1	0.0137	13.01	0.0013	16.0	1694.55	16.0

Data Entered By: KMR

Date: 12/13/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0.xls\_8.xls

Checked By: *DPM*

Date: *12/13/13*

# 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: 0-6"  
Sample Number: TI-CS03-02A(0-6")  
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): 114.81  
Weight of Dry Soil & Pan (g): 107.72  
Weight of Water (g): 7.10  
Weight of Pan (g): 3.67  
Weight of Dry Soil (g): 104.05  
Moisture (%): 6.8

### General Sample Data

Total Wet Weight of Sample (g): 12,025.00  
Total Dry Weight of Sample (g): 11,659.26  
Calculated Weight Plus #200 (g): 8,432.80  
Moisture of Total Sample (%): 3.1  
Percent Retained #200 Sieve (%): 72.3

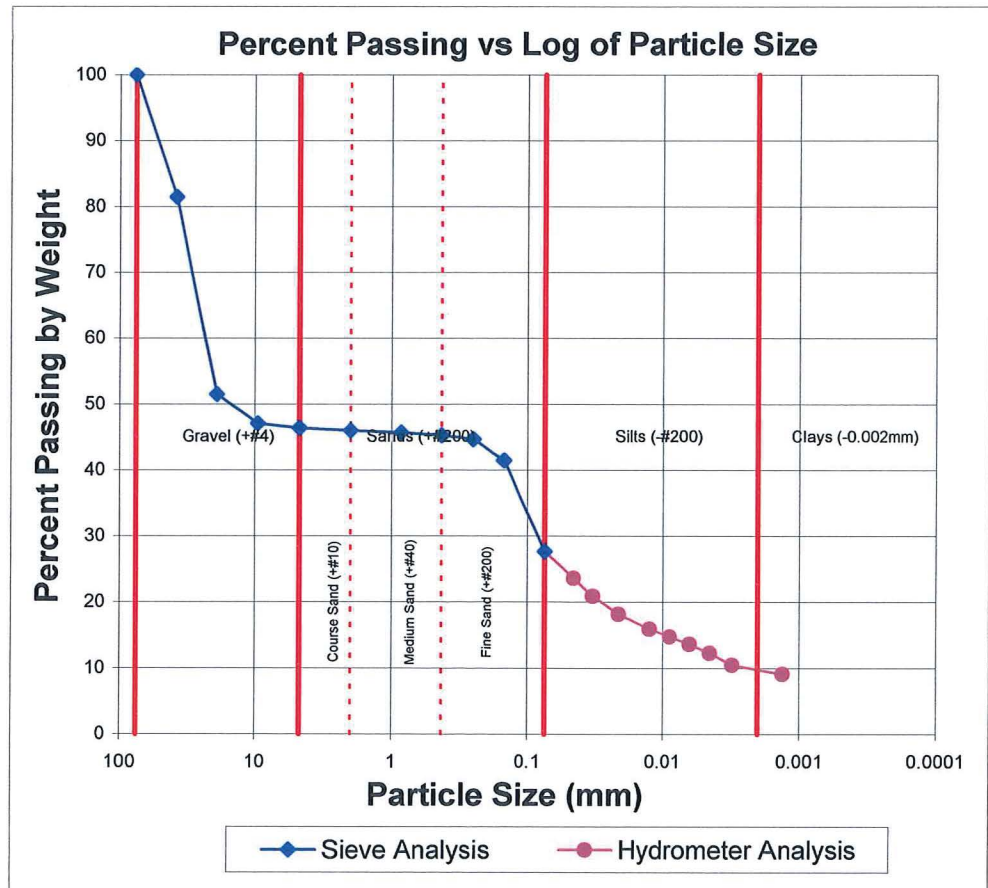
### Plus Split Data

Original Weight of + #10 (g): 6,450.00  
Calculated Weight of + #10 (g): 6,296.34

### Minus Split Data

Original Weight of - #10 (g): 5,575.00  
Calculated Dry Weight of - #10 (g): 5,362.92

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	2165.00	0.00	2165.00	2165.00	81.4
3/4"	19.05	3490.00	0.00	3490.00	3490.00	51.5
3/8"	9.525	516.72	0.00	516.72	516.72	47.1
#4	4.750	79.91	0.00	79.91	79.91	46.4
#10	2.000	44.71	0.00	44.71	44.71	46.0
54.113g split out of -#10 material.						
#20	0.850	4.25	3.89	0.36	38.43	45.7
#40	0.425	4.18	3.73	0.45	47.75	45.3
#60	0.250	4.22	3.55	0.67	71.25	44.6
#100	0.150	7.24	3.72	3.52	372.43	41.5
#200	0.075	18.73	3.56	15.18	1606.60	27.7



Data Entered By: KMR

Date: 12/13/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0.xls\_10.xls

Checked By: *DPM*  
Date: *12/13/13*



# 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: 0-6"  
Sample Number: TI-CS03-02A(0-6")  
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 -  $\alpha$ : 1.00

Total Wet Weight of Sample (g): 12,025.00

Total Dry Weight of Sample (g): 11,659.26

Wet Weight of Sub-Sample (g): 54.113

Dry Weight of Sub-Sample (g): 50.658

Corrected Dry Weight of Sub-Sample - W(g): 110.127

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	32.0	26.0	19.7	0.0138	11.05	0.0459	23.6	2756.41	23.6
2	29.0	23.0	19.7	0.0138	11.54	0.0332	20.9	2438.36	20.9
5	26.0	20.0	19.7	0.0138	12.03	0.0214	18.2	2120.32	18.2
15	23.5	17.5	19.8	0.0138	12.44	0.0126	15.9	1855.28	15.9
30	22.3	16.3	20.0	0.0137	12.65	0.0089	14.8	1722.76	14.8
60	21.0	15.0	20.4	0.0137	12.85	0.0063	13.6	1590.24	13.6
120	19.5	13.5	20.9	0.0137	13.10	0.0045	12.3	1431.21	12.3
250	17.5	11.5	22.4	0.0133	13.42	0.0031	10.5	1219.18	10.5
1440	16.0	10.0	20.4	0.0137	13.67	0.0013	9.1	1060.16	9.1

Data Entered By: KMR

Date: 12/13/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0.xls\_10.xls

Checked By: DPM  
Date: 12/13/13

# 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-6  
Depth: 0-7"  
Sample Number: TI-CS06-02A(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): 118.66  
Weight of Dry Soil & Pan (g): 112.58  
Weight of Water (g): 6.08  
Weight of Pan (g): 3.69  
Weight of Dry Soil (g): 108.89  
Moisture (%): 5.6

### General Sample Data

Total Wet Weight of Sample (g): 8,880.00  
Total Dry Weight of Sample (g): 8,635.72  
Calculated Weight Plus #200 (g): 5,779.94  
Moisture of Total Sample (%): 2.8  
Percent Retained #200 Sieve (%): 66.9

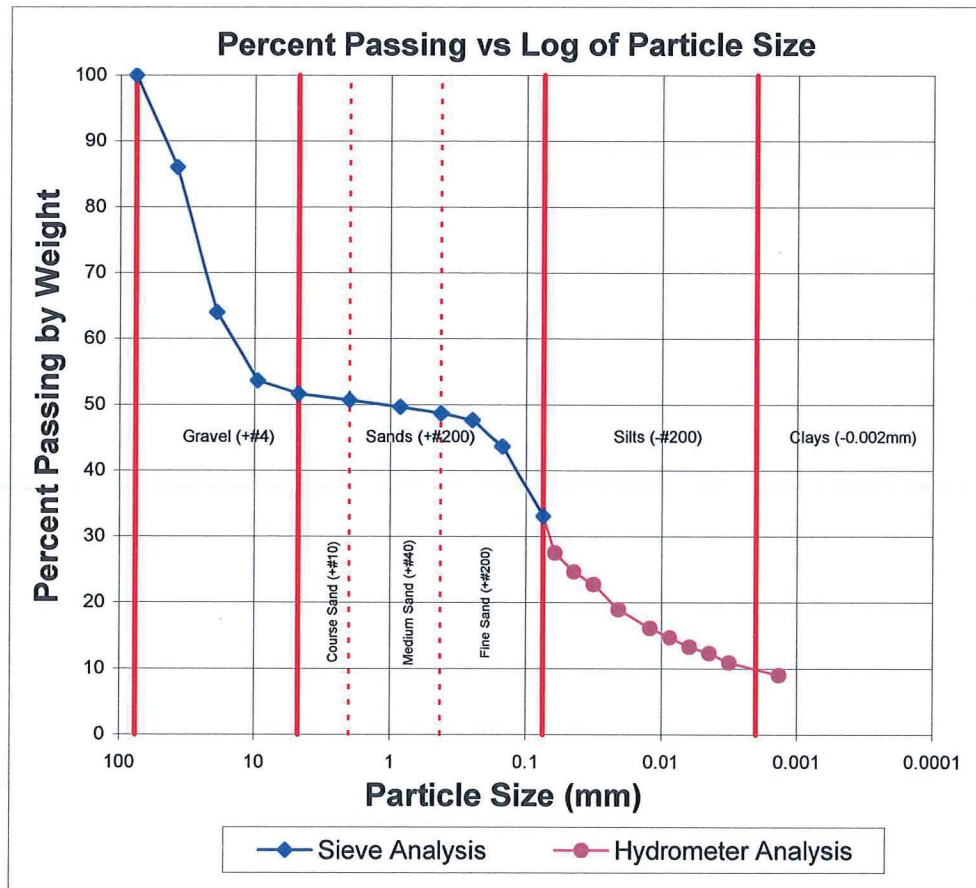
### Plus Split Data

Original Weight of + #10 (g): 4,420.00  
Calculated Weight of + #10 (g): 4,260.84

### Minus Split Data

Original Weight of - #10 (g): 4,460.00  
Calculated Dry Weight of - #10 (g): 4,374.88

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	1206.82	0.00	1206.82	1206.82	86.0
3/4"	19.05	1901.60	0.00	1901.60	1901.60	64.0
3/8"	9.525	896.62	0.00	896.62	896.62	53.6
#4	4.750	172.60	0.00	172.60	172.60	51.6
#10	2.000	83.20	0.00	83.20	83.20	50.7
56.524g split out of - #10 material.						
#20	0.850	4.77	3.70	1.07	87.60	49.6
#40	0.425	4.97	3.90	1.07	87.03	48.6
#60	0.250	4.82	3.77	1.05	86.05	47.6
#100	0.150	7.90	3.69	4.21	343.80	43.7
#200	0.075	14.82	3.63	11.19	914.61	33.1



Data Entered By: KMR

Date: 12/11/2013

File Name: 2512\_77\_hydrometer-ASTM-D422-R0.xls\_6.xls

Checked By: DDM

Date: 12/11/13