PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	35-45'	TEST STARTED	03/18/14 CAL
SAMPLE NO.	DH-B1-10 85%	TEST FINISHED	04/04/14 CAL
LOCATION	Church Rock	CELL NUMBER	8P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	401.9	435.3
Wt. Wet Soil & Pan (g)	408.9	442.3
Wt. Dry Soil & Pan (g)	363.8	363.8
Wt. Lost Moisture (g)	45.1	78.5
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	356.8	356.8
Moisture Content %	12.6	22.0
Wet Density PCF	112.0	121.2
Dry Density PCF	99.5	99.3

Init. Diameter (in)	2.404	(cm)	6.106
Init. Area (sq in)	4.539	(sq cm)	29.286
Init. Height (in)	3.011	(cm)	7.648
Vol. Bef. Consol. (cu ft)	0.00791		
Vol. After Consol. (cu ft)	0.00792		
Porosity %	34.99		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	7
Percentage of Pump setting	100
Q (cc/s)	1.14E-03
Height	2.983
Diameter	2.417
Pressure (psi)	0.165
Area after consol. (cm*cm)	29.606
Gradient	1.531
Permeability k (cm/s)	2.5E-05
Permeability k (m/s)	2.5E-07
Back Pressure (psi)	68.0
Cell Pressure (psi)	71.0
Ave. Effective Stress (psi)	2.918
Average temperature degree C:	22.7

Data entry by: DAW/SKL Date: 04/09/2014

Checked by: CAL Date: 4/09/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-R1_12.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	Dilco Hill	SAMPLED	--
DEPTH	35-45'	TEST STARTED	03/18/14 CAL
SAMPLE NO.	DH-B1-10 85%	TEST FINISHED	04/04/14 CAL
LOCATION	Church Rock	SETUP NO.	8P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.6	11.9				
50.0	48.0	12.6	13.7	38.1	45.9	7.8	0.78
60.0	58.0	13.4	14.2	48.0	57.1	9.1	0.91
70.0	68.0	14.4	15.2	59.0	68.1	9.1	0.91
80.0		15.4	15.5	68.3	78.1	9.8	0.98

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	0.80	-0.60
0.5	0.71	0.80	-0.60
1	1.00	0.80	-0.60
2	1.41	0.80	-0.60
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

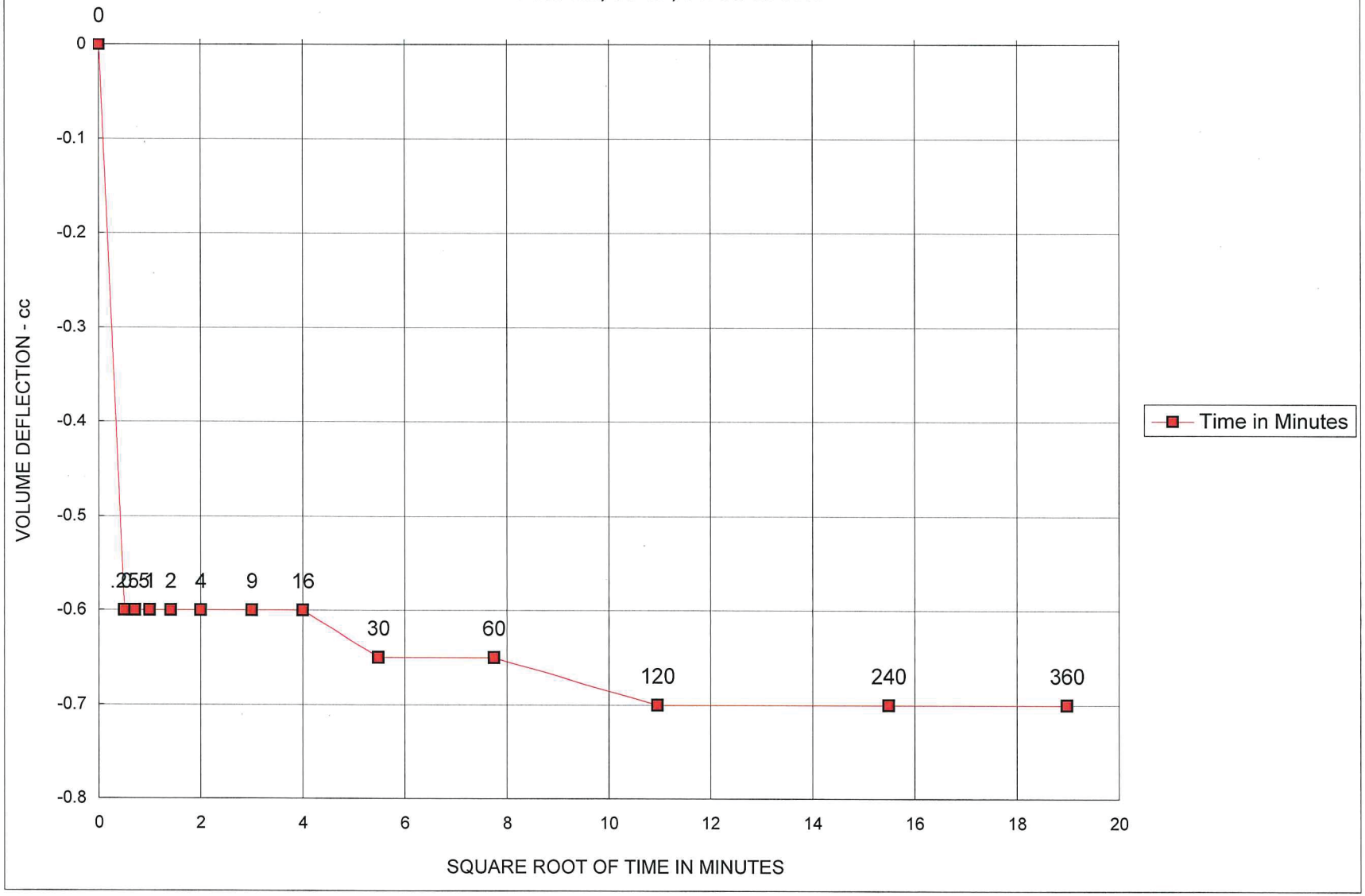
Initial Height (in)	3.011	Init. Vol. (CC)	224.000
Height Change (in)	0.028	Vol. Change (CC)	14.200
Ht. After Cons. (in)	2.983	Cell Exp. (CC)	14.560
Initial Area (sq in)	4.539	Net Change (CC)	-0.360
Area After Cons. (sq in)	4.589	Cons. Vol. (CC)	224.360

Data entry by: DAW/SKL Date: 04/09/2014
Checked by: CAL Date: 4/09/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-R1_12.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

Dilco Hill, 35-45', DH-B1-10 85%

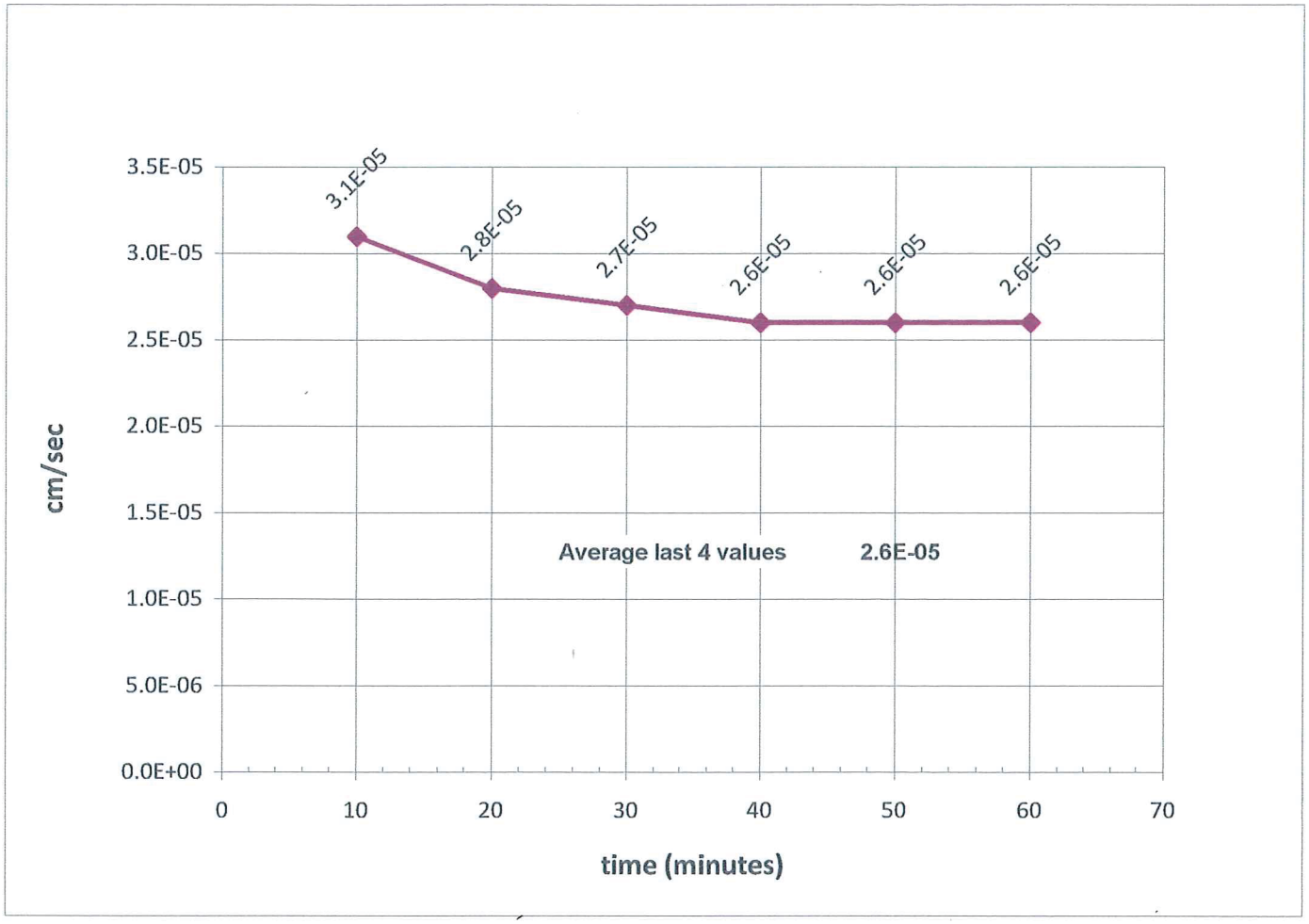


ATT
ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

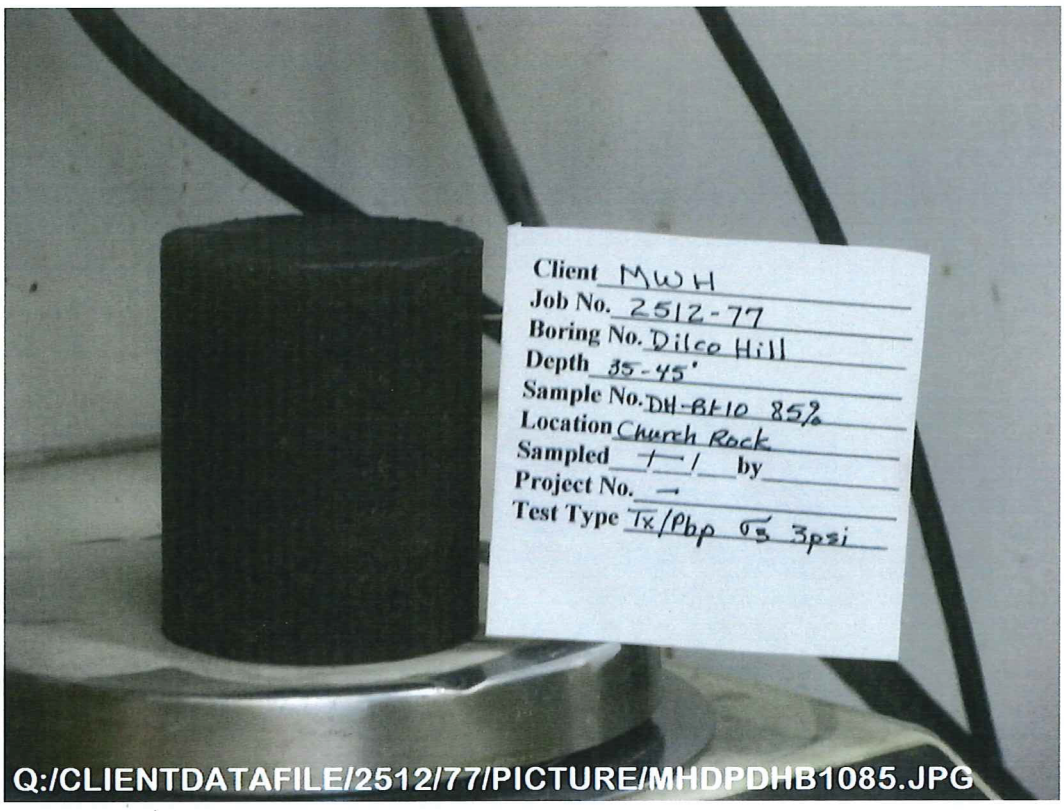
ADVANCED TERRA TESTING

Client:	MWH	Boring Number:	Dilco Hill		
Job Number:	2512-77	Depth:	35-45'		
Project:	--	Sample Number:	DH-B1-10 85%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/4/2014	Technician:	CAL



Data Entered By: CAL
Date: 4/4/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_12.xls

Checked By: DAU
Date: 04/08/14


Client MWH
Job No. 2512-77
Boring No. Dilco Hill
Depth 35-45'
Sample No. DH-BH10 85%
Location Church Rock
Sampled / / by
Project No. –
Test Type Tx/Pbp σ3 3psi
Q:/CLIENTDATAFILE/2512/77/PICTURE/MHDPDHB1085.JPG

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	East Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	03/20/14 CAL
SAMPLE NO.	EB-B4-06 85%	TEST FINISHED	04/04/14 CAL
LOCATION	Church Rock	CELL NUMBER	10P
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)	387.1	446.8
Wt. Wet Soil & Pan (g)	394.1	453.7
Wt. Dry Soil & Pan (g)	366.6	366.6
Wt. Lost Moisture (g)	27.5	87.2
Wt. of Pan Only (g)	6.9	6.9
Wt. of Dry Soil (g)	359.6	359.6
Moisture Content %	7.6	24.2
Wet Density PCF	108.0	137.7
Dry Density PCF	100.3	110.8

Init. Diameter (in)	2.405	(cm)	6.109
Init. Area (sq in)	4.543	(sq cm)	29.310
Init. Height (in)	3.006	(cm)	7.635
Vol. Bef. Consol. (cu ft)	0.00790		
Vol. After Consol. (cu ft)	0.00715		
Porosity %	43.02		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	3
Percentage of Pump setting	100
Q (cc/s)	2.33E-02
Height	2.980
Diameter	2.298
Pressure (psi)	0.104
Area after consol. (cm*cm)	26.766
Gradient	0.966
Permeability k (cm/s)	9.0E-04
Permeability k (m/s)	9.0E-06
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.948
Average temperature degree C:	21.8

Data entry by: DAW Date: 04/09/2014

Checked by: cdc Date: 4/09/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_11.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	East Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	03/20/14 CAL
SAMPLE NO.	EB-B4-06 85%	TEST FINISHED	04/04/14 CAL
LOCATION	Church Rock	SETUP NO.	10P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.3	15.8				
50.0	48.0	27.7	28.9	38.2	45.4	7.2	0.72
60.0	58.0	29.0	29.8	49.0	56.7	7.7	0.77
70.0	68.0	30.1	30.9	58.5	66.7	8.2	0.82
80.0	78.0	31.1	31.7	68.9	77.6	8.7	0.87
90.0	88.0	32.1	32.8	78.9	88.0	9.1	0.91
100.0	98.0	33.2	33.9	88.9	98.3	9.4	0.94
110.0		34.1	34.1	98.9	108.5	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.90	0.00
0.25	0.50	1.35	-0.45
0.5	0.71	1.40	-0.50
1	1.00	1.40	-0.50
2	1.41	1.40	-0.50
4	2.00	1.45	-0.55
9	3.00	1.45	-0.55
16	4.00	1.45	-0.55
30	5.48	1.45	-0.55
60	7.75	1.45	-0.55
120	10.95	1.50	-0.60
240	15.49	1.50	-0.60
360	18.97	1.50	-0.60

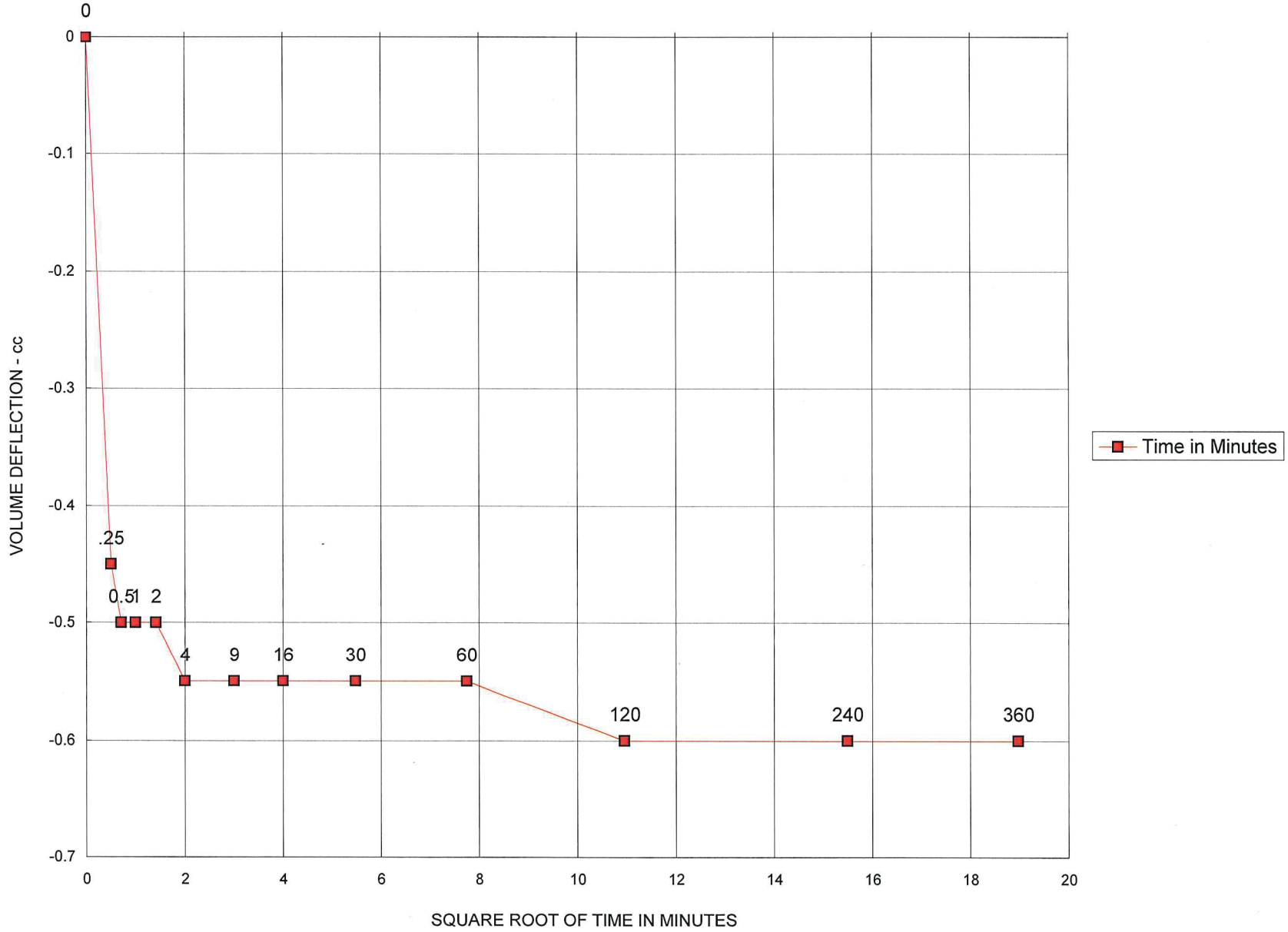
Initial Height (in)	3.006	Init. Vol. (CC)	223.814
Height Change (in)	0.026	Vol. Change (CC)	32.900
Ht. After Cons. (in)	2.980	Cell Exp. (CC)	11.717
Initial Area (sq in)	4.543	Net Change (CC)	21.183
Area After Cons. (sq in)	4.149	Cons. Vol. (CC)	202.631

Data entry by: DAW Date: 04/09/2014
Checked by: CM Date: 4/09/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_11.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

East Borrow, 10-20', EB-B4-06 85%

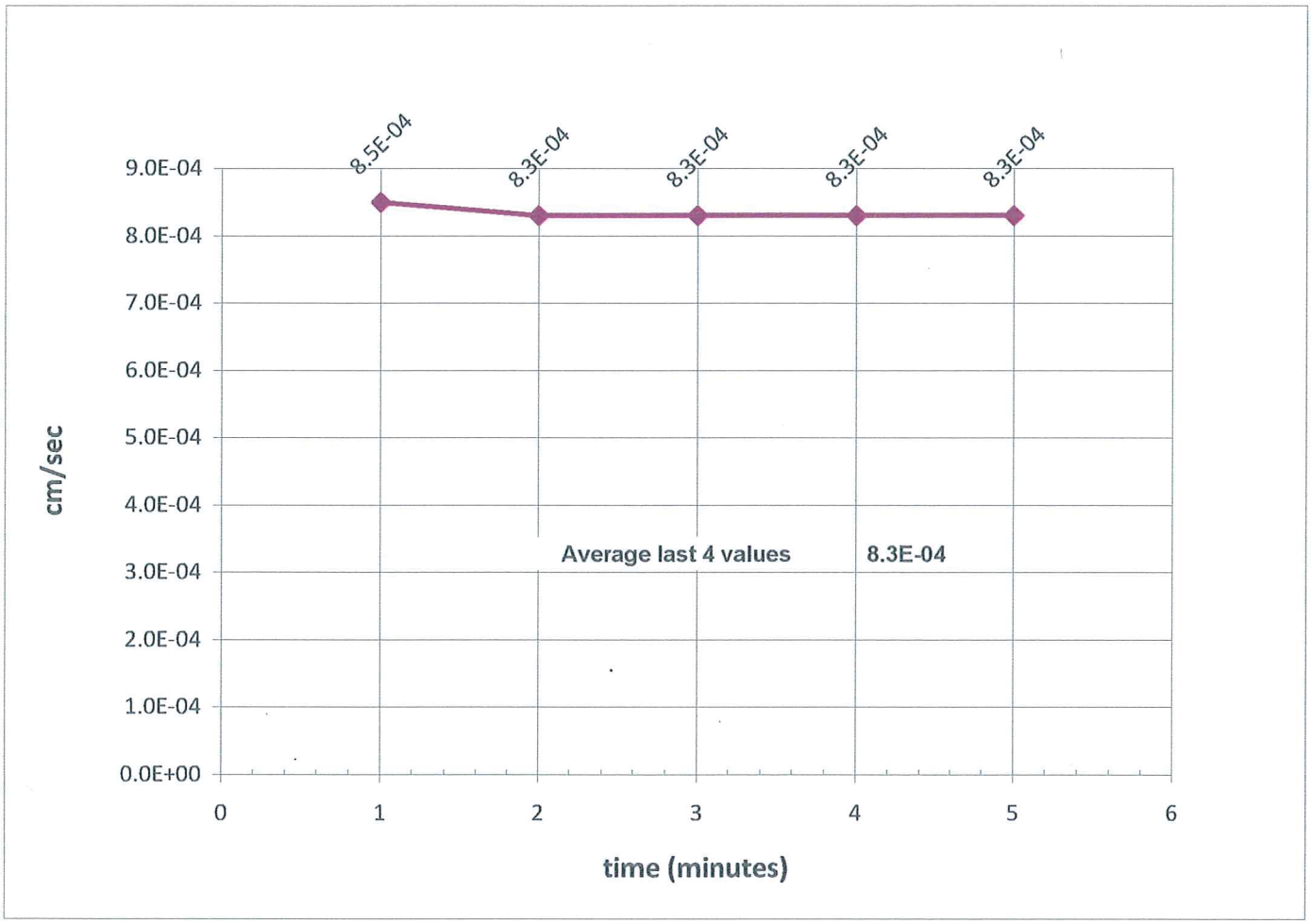


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	East Borrow		
Job Number:	2512-77	Depth:	10-20'		
Project:	--	Sample Number:	EB-B4-06 85%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/4/2014	Technician:	CAL



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Date:	4/4/2014	Checked By:	DTW
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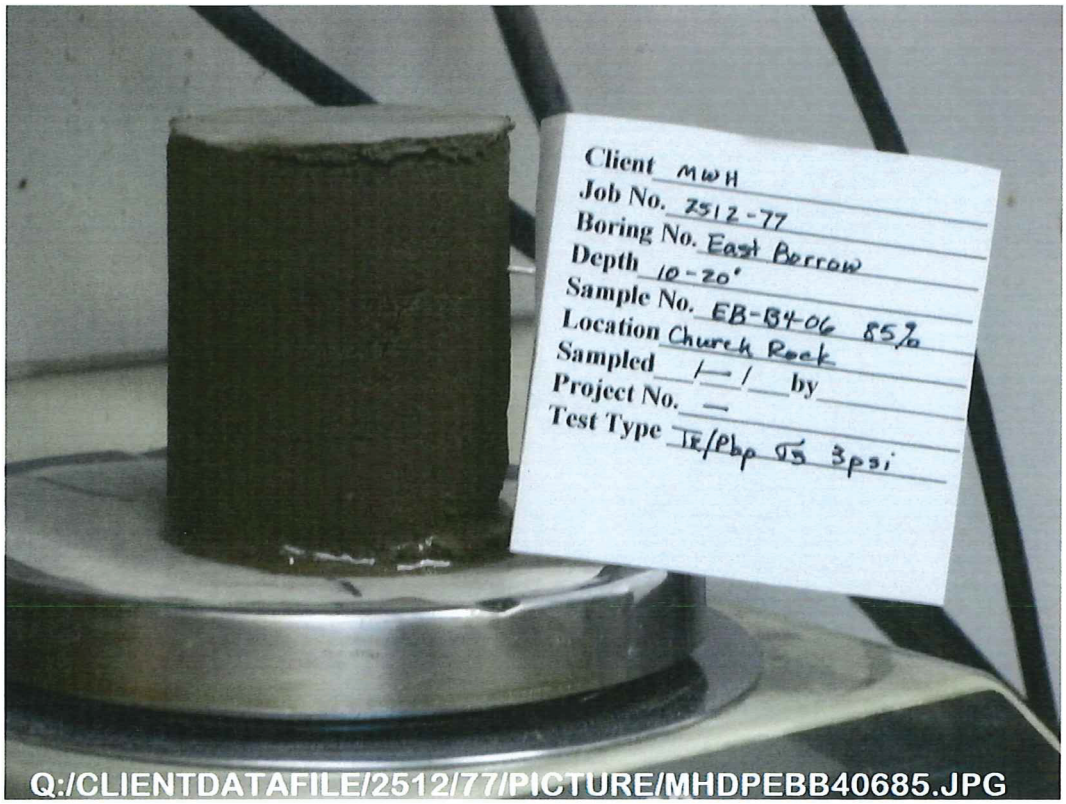

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PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	East Borrow	SAMPLED	-
DEPTH	10-20'	TEST STARTED	4/05/14 CAL
SAMPLE NO.	EB-B4-06 90%	TEST FINISHED	4/18/14 CAL
LOCATION	Church Rock	CELL NUMBER	8P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	409.8	462.9
Wt. Wet Soil & Pan (g)	416.8	469.9
Wt. Dry Soil & Pan (g)	385.5	385.5
Wt. Lost Moisture (g)	31.3	84.4
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	378.5	378.5
Moisture Content %	8.3	22.3
Wet Density PCF	114.4	129.4
Dry Density PCF	105.7	105.8

Init. Diameter (in)	2.407	(cm)	6.114
Init. Area (sq in)	4.550	(sq cm)	29.359
Init. Height (in)	2.999	(cm)	7.617
Vol. Bef. Consol. (cu ft)	0.00790		
Vol. After Consol. (cu ft)	0.00789		
Porosity %	37.78		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	4
Percentage of Pump setting	100
Q (cc/s)	1.16E-02
Height	2.990
Diameter	2.409
Pressure (psi)	0.098
Area after consol. (cm*cm)	29.403
Gradient	0.907
Permeability k (cm/s)	4.4E-04
Permeability k (m/s)	4.4E-06
Back Pressure (psi)	108.0
Cell Pressure (psi)	111.0
Ave. Effective Stress (psi)	2.951
Average temperature degree C:	22.0

Data entry by: SKL Date: 04/21/2014

Checked by: CAL Date: 4/22/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_20.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	East Borrow	SAMPLED	-
DEPTH	10-20'	TEST STARTED	4/05/14 CAL
SAMPLE NO.	EB-B4-06 90%	TEST FINISHED	4/18/14 CAL
LOCATION	Church Rock	SETUP NO.	8P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.2	11.0				
50.0	48.0	13.0	14.1	38.5	45.0	6.5	0.65
60.0	58.0	14.1	15.0	49.0	56.1	7.1	0.71
70.0	68.0	15.2	16.0	58.4	66.4	8.0	0.80
80.0	78.0	16.3	17.1	68.3	77.0	8.7	0.87
90.0	88.0	17.6	18.4	78.4	87.6	9.2	0.92
100.0	98.0	18.5	19.2	88.4	97.8	9.4	0.94
110.0	108.0	19.3	20.0	98.5	107.9	9.4	0.94
120.0		20.4	20.8	108.9	118.5	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.30	0.00
0.25	0.50	0.60	-0.30
0.5	0.71	0.65	-0.35
1	1.00	0.65	-0.35
2	1.41	0.65	-0.35
4	2.00	0.65	-0.35
9	3.00	0.70	-0.40
16	4.00	0.70	-0.40
30	5.48	0.70	-0.40
60	7.75	0.70	-0.40
120	10.95	0.80	-0.50
240	15.49	0.80	-0.50
360	18.97	0.80	-0.50

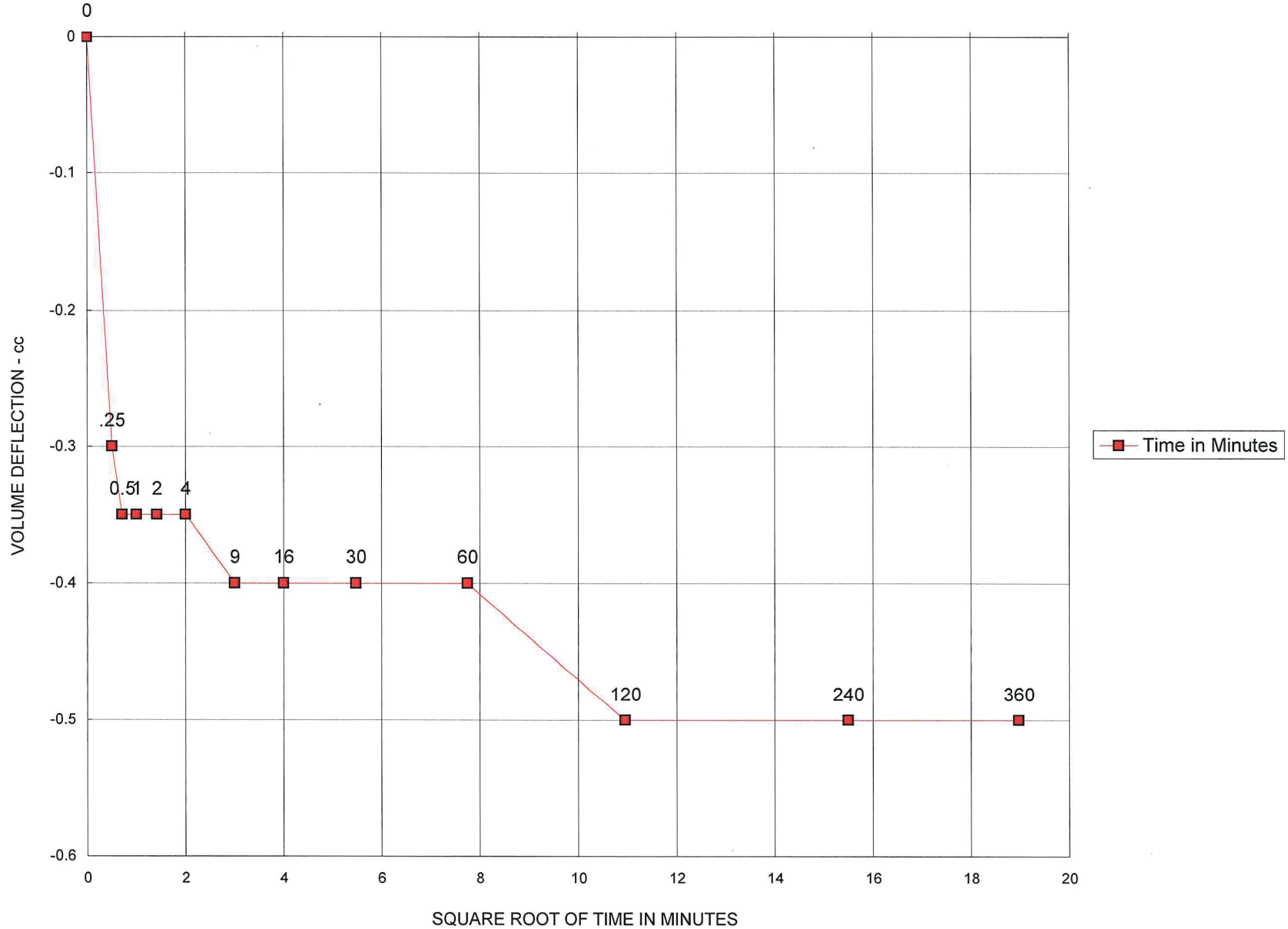
Initial Height (in)	2.999	Init. Vol. (CC)	223.665
Height Change (in)	0.009	Vol. Change (CC)	19.000
Ht. After Cons. (in)	2.990	Cell Exp. (CC)	18.680
Initial Area (sq in)	4.550	Net Change (CC)	0.320
Area After Cons. (sq in)	4.557	Cons. Vol. (CC)	223.344

Data entry by: SKL Date: 04/21/2014
Checked by: CAL Date: 4/22/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_20.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

East Borrow, 10-20', EB-B4-06 90%

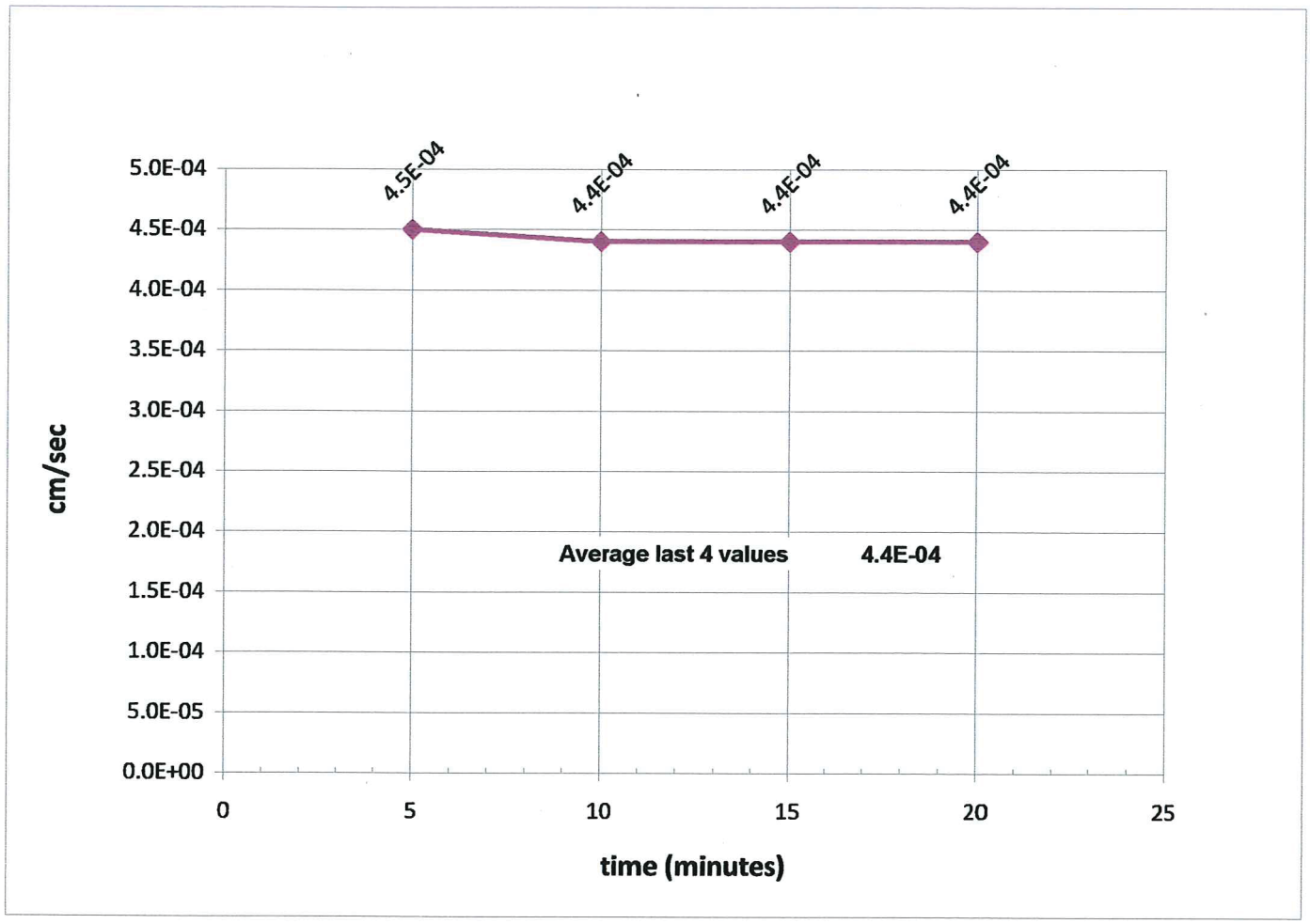


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	East Borrow		
Job Number:	2512-77	Depth:	10-20'		
Project:	--	Sample Number:	EB-B4-06 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/18/2014	Technician:	CAL



Data Entered By:	CAL		
Date:	4/29/2014	Checked By:	CJL
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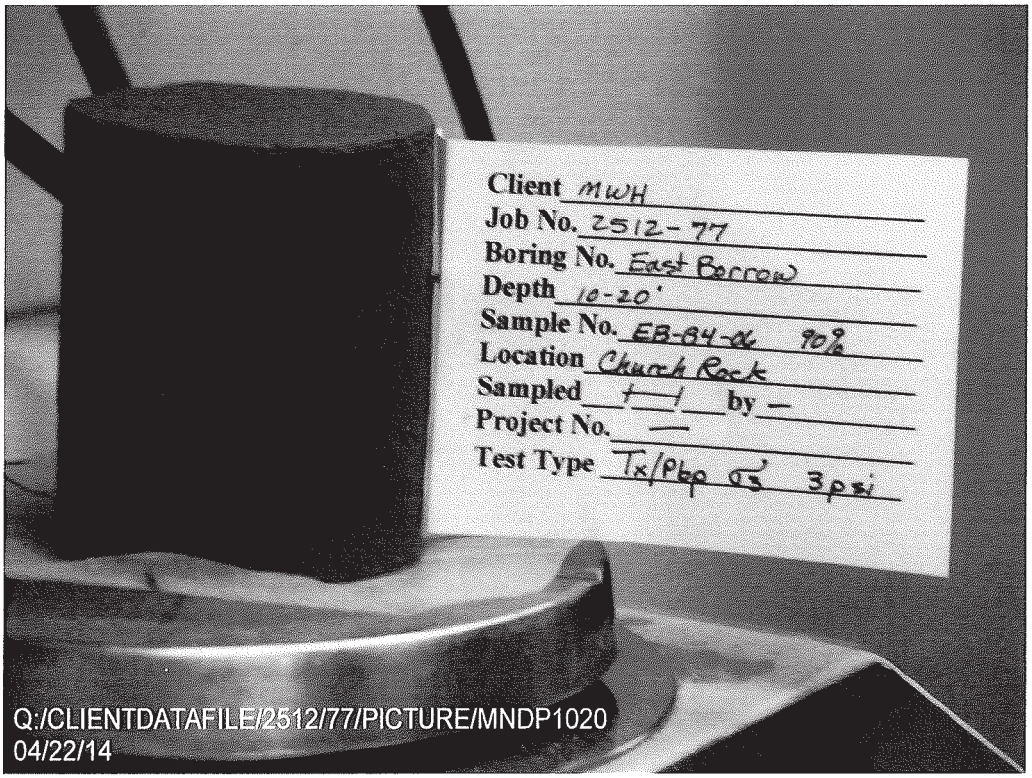

Client MWH
Job No. 2512-77
Boring No. East Borrow
Depth 10-20'
Sample No. EB-84-dc 90%
Location Church Rock
Sampled / / by —
Project No. —
Test Type Tx/Pkp σ3 3psi
Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP1020
04/22/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	West Borrow	SAMPLED	--
DEPTH	5-10'	TEST STARTED	04/08/14 CAL
SAMPLE NO.	WB-B1-06 90%	TEST FINISHED	04/21/14 CAL
LOCATION	Church Rock	CELL NUMBER	12P
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)	392.3	452.2
Wt. Wet Soil & Pan (g)	399.3	459.2
Wt. Dry Soil & Pan (g)	371.6	371.6
Wt. Lost Moisture (g)	27.8	87.6
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	364.6	364.6
Moisture Content %	7.6	24.0
Wet Density PCF	109.9	128.4
Dry Density PCF	102.1	103.5

Init. Diameter (in)	2.405	(cm)	6.109
Init. Area (sq in)	4.543	(sq cm)	29.310
Init. Height (in)	2.995	(cm)	7.607
Vol. Bef. Consol. (cu ft)	0.00787		
Vol. After Consol. (cu ft)	0.00777		
Porosity %	39.84		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	4
Percentage of Pump setting	100
Q (cc/s)	1.16E-02
Height	2.987
Diameter	2.392
Pressure (psi)	0.205
Area after consol. (cm*cm)	28.987
Gradient	1.900
Permeability k (cm/s)	2.1E-04
Permeability k (m/s)	2.1E-06
Back Pressure (psi)	98.0
Cell Pressure (psi)	101.0
Ave. Effective Stress (psi)	2.898
Average temperature degree C:	22.6

Data entry by: DAW Date: 04/23/2014

Checked by: CAL Date: 4/23/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_22.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	West Borrow	SAMPLED	--
DEPTH	5-10'	TEST STARTED	04/08/14 CAL
SAMPLE NO.	WB-B1-06 90%	TEST FINISHED	04/21/14 CAL
LOCATION	Church Rock	SETUP NO.	12P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.1	9.2				
50.0	48.0	9.2	10.5	38.3	44.2	5.9	0.59
60.0	58.0	10.9	12.1	47.6	55.0	7.4	0.74
70.0	68.0	12.4	13.0	57.8	66.1	8.3	0.83
80.0	78.0	13.3	14.0	68.4	77.2	8.8	0.88
90.0	88.0	14.0	14.7	78.3	87.4	9.1	0.91
100.0	98.0	15.0	15.8	88.3	97.7	9.4	0.94
110.0		15.8	16.0	98.2	107.8	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	15.90	0.00
0.25	0.50	16.20	-0.30
0.5	0.71	16.20	-0.30
1	1.00	16.20	-0.30
2	1.41	16.20	-0.30
4	2.00	16.20	-0.30
9	3.00	16.20	-0.30
16	4.00	16.20	-0.30
30	5.48	16.25	-0.35
60	7.75	16.25	-0.35
120	10.95	16.25	-0.35
240	15.49	16.25	-0.35
360	18.97	16.25	-0.35

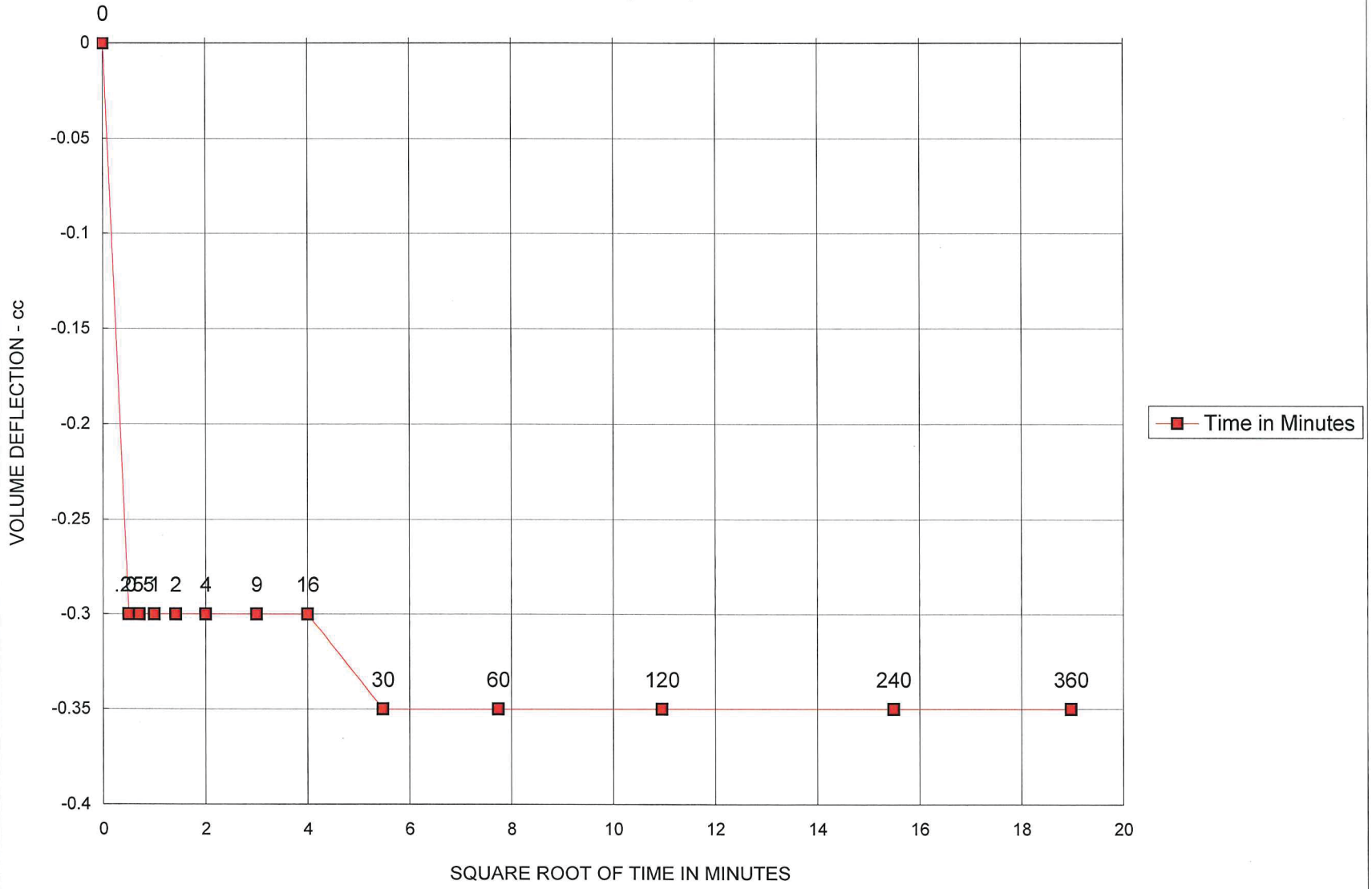
Initial Height (in)	2.995	Init. Vol. (CC)	222.995
Height Change (in)	0.008	Vol. Change (CC)	14.700
Ht. After Cons. (in)	2.987	Cell Exp. (CC)	11.668
Initial Area (sq in)	4.543	Net Change (CC)	3.033
Area After Cons. (sq in)	4.493	Cons. Vol. (CC)	219.963

Data entry by: DAW Date: 04/22/2014
Checked by: CH Date: 4/23/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_22.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

West Borrow, 5-10', WB-B1-06 90%

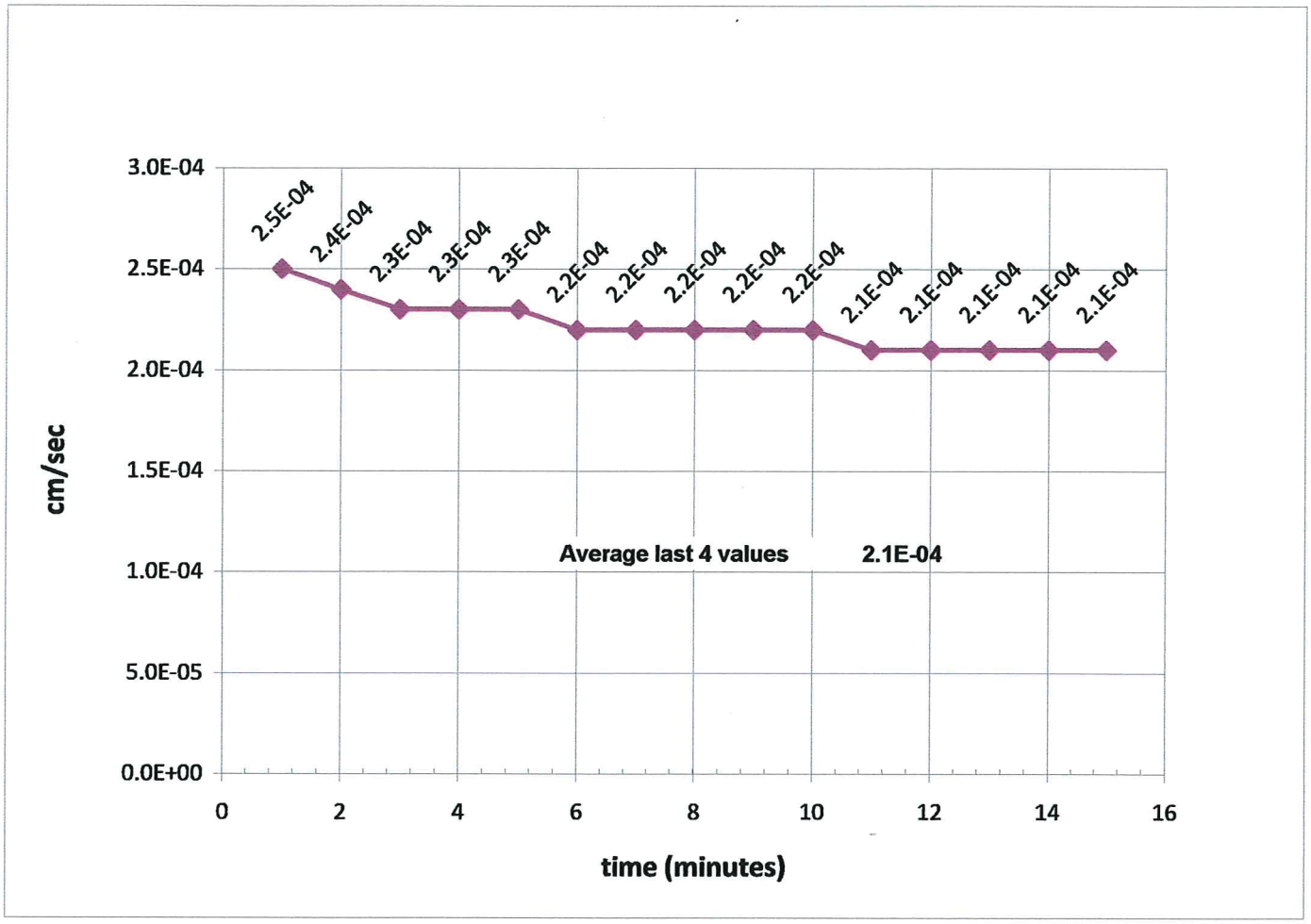


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	West Borrow		
Job Number:	2512-77	Depth:	5-10'		
Project:	--	Sample Number:	WB-B1-06 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/21/2014	Technician:	CAL



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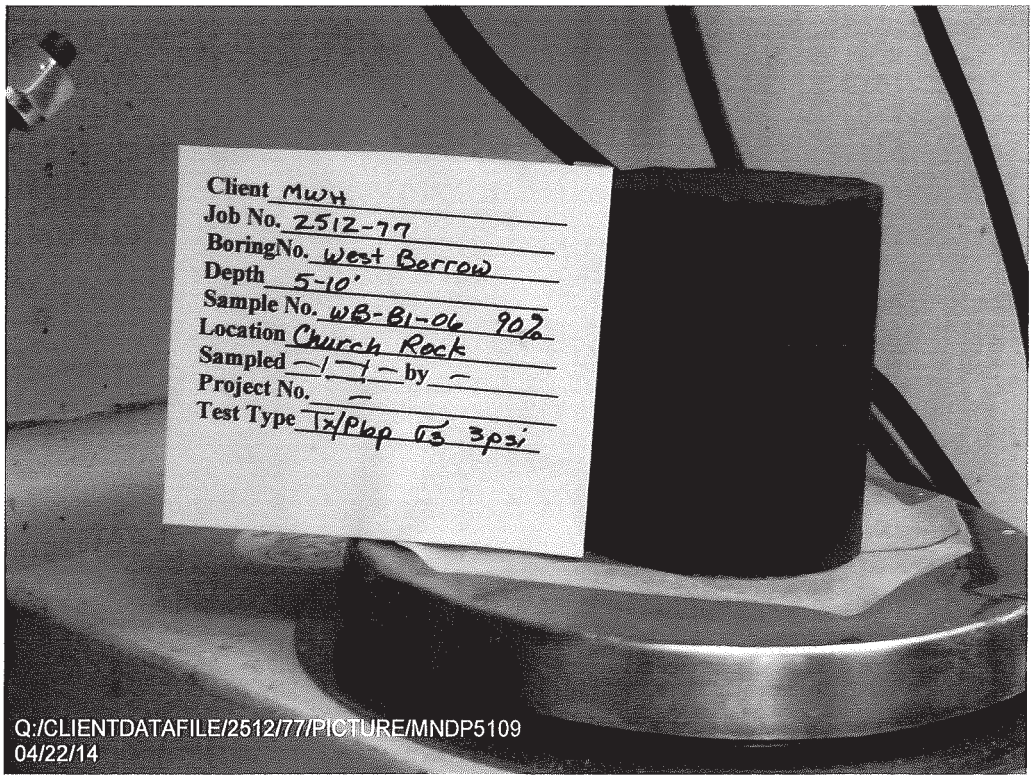
Date: 4/21/2014
File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_23.xls

Checked By: DAW
Date: 04/22/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP5109
04/22/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	Dilco Hill	SAMPLED	-
DEPTH	35-45'	TEST STARTED	4/05/14 CAL
SAMPLE NO.	DH-B1-10 90%	TEST FINISHED	4/18/14 CAL
LOCATION	Church Rock	CELL NUMBER	10P
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)	425.3	451.3
Wt. Wet Soil & Pan (g)	432.3	458.3
Wt. Dry Soil & Pan (g)	387.9	387.9
Wt. Lost Moisture (g)	44.4	70.4
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	380.9	380.9
Moisture Content %	11.6	18.5
Wet Density PCF	117.6	131.7
Dry Density PCF	105.4	111.1

* Note:
Unable to achieve requested density (very dense), further compaction attempts bend mold.

Init. Diameter (in)	2.410	(cm)	6.121
Init. Area (sq in)	4.562	(sq cm)	29.432
Init. Height (in)	3.019	(cm)	7.668
Vol. Bef. Consol. (cu ft)	0.00797		
Vol. After Consol. (cu ft)	0.00756		
Porosity %	32.92		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	8
Percentage of Pump setting	100
Q (cc/s)	5.70E-04
Height	3.001
Diameter	2.354
Pressure (psi)	0.695
Area after consol. (cm*cm)	28.068
Gradient	6.410
Permeability k (cm/s)	3.2E-06
Permeability k (m/s)	3.2E-08
Back Pressure (psi)	48.0
Cell Pressure (psi)	51.0
Ave. Effective Stress (psi)	2.653
Average temperature degree C:	23.0

Data entry by: SKL Date: 04/23/2014
Checked by: CAL Date: 4/23/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_21.xls

ATT
ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	Dilco Hill	SAMPLED	-
DEPTH	35-45'	TEST STARTED	4/05/14 CAL
SAMPLE NO.	DH-B1-10 90%	TEST FINISHED	4/18/14 CAL
LOCATION	Church Rock	SETUP NO.	10P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	3.1	12.6				
50.0	48.0	19.2	20.2	38.7	47.7	9.0	0.90
60.0		20.4	20.4	48.1	57.7	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	1.10	0.00
0.25	0.50	1.20	-0.10
0.5	0.71	1.30	-0.20
1	1.00	1.30	-0.20
2	1.41	1.30	-0.20
4	2.00	1.35	-0.25
9	3.00	1.40	-0.30
16	4.00	1.40	-0.30
30	5.48	1.40	-0.30
60	7.75	1.40	-0.30
120	10.95	1.40	-0.30
240	15.49	1.40	-0.30
360	18.97	1.40	-0.30

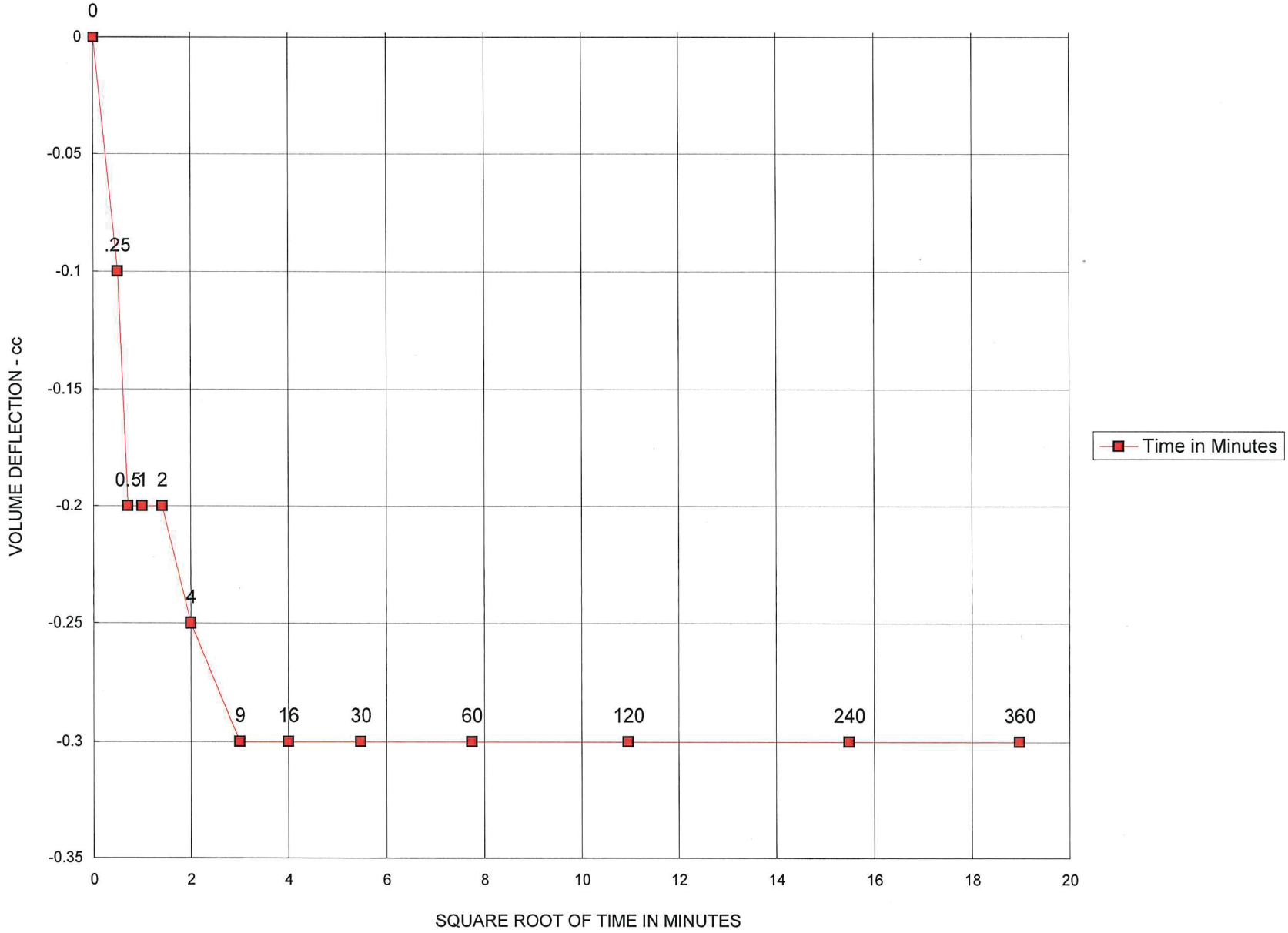
Initial Height (in)	3.019	Init. Vol. (CC)	225.718
Height Change (in)	0.018	Vol. Change (CC)	18.600
Ht. After Cons. (in)	3.001	Cell Exp. (CC)	6.867
Initial Area (sq in)	4.562	Net Change (CC)	11.733
Area After Cons. (sq in)	4.350	Cons. Vol. (CC)	213.985

Data entry by: SKL Date: 04/23/2014
Checked by: CAL Date: 4/23/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_21.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

Dilco Hill, 35-45', DH-B1-10 90%

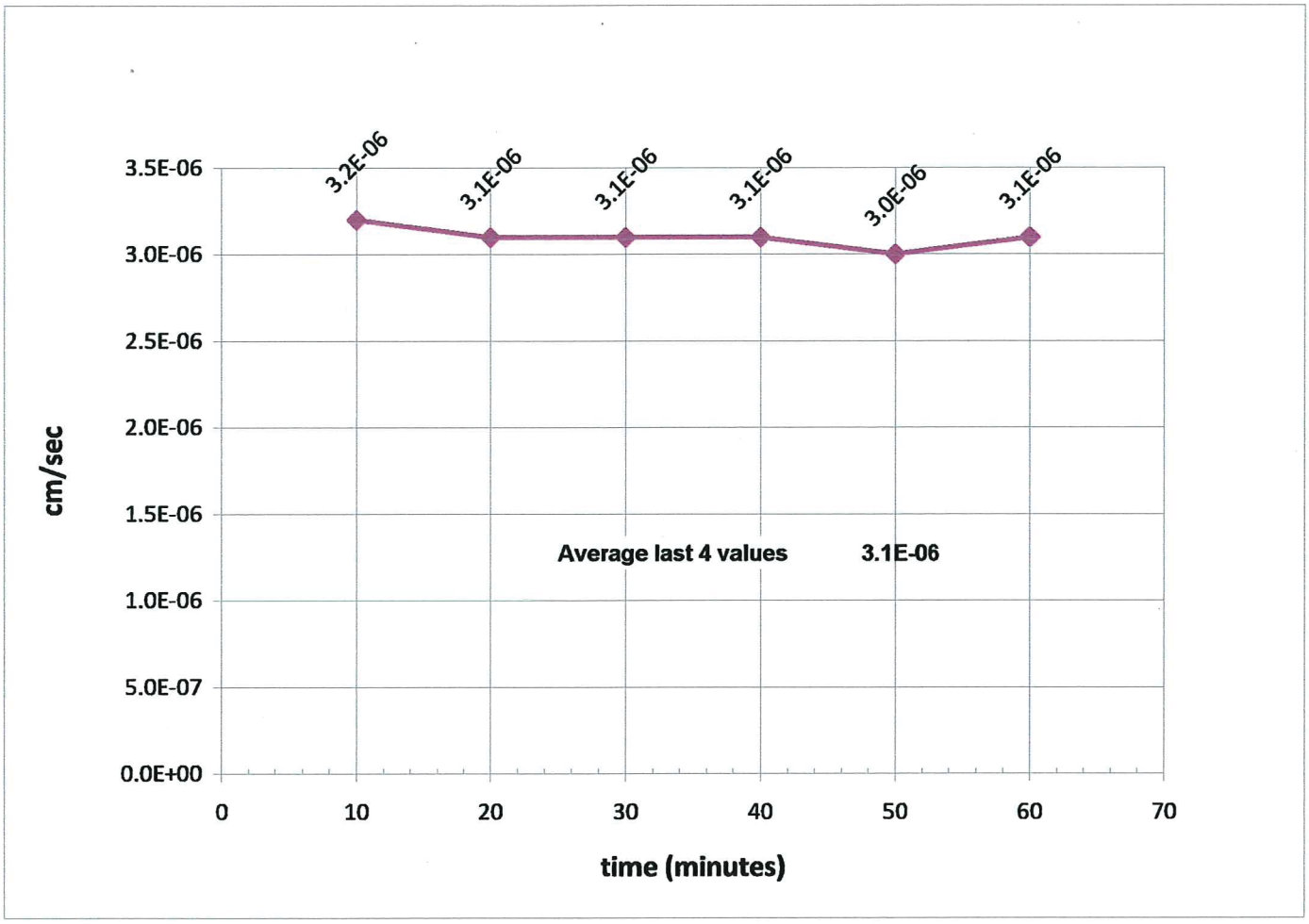


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	Dilco Hill		
Job Number:	2512-77	Depth:	35-45'		
Project:	--	Sample Number:	DH-B1-10 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/18/2014	Technician:	CAL



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Date: 4/18/2014
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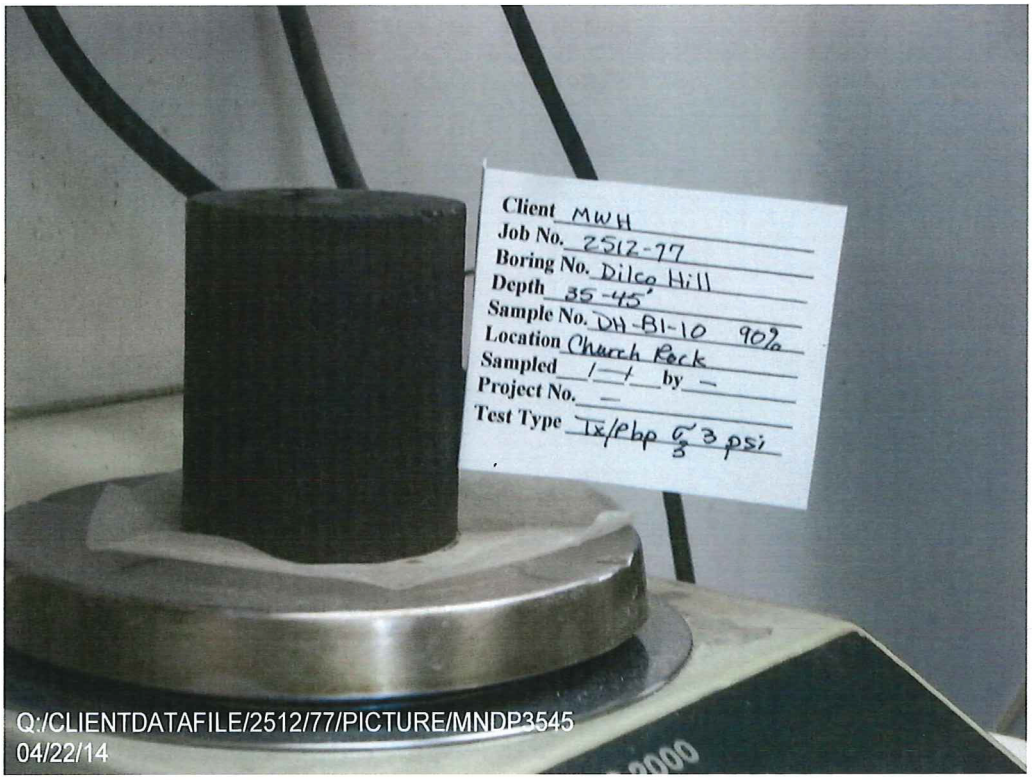
Date: 4/21/14


Client MWH
Job No. 2512-77
Boring No. Dilco Hill
Depth 35-45'
Sample No. DH-B1-10 90%
Location Church Rock
Sampled / / by –
Project No. –
Test Type Tx/Pbp σ3 3 psi
Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP3545
04/22/14

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	4/08/14 CAL
SAMPLE NO.	DH-B1-03 90%	TEST FINISHED	4/22/14 CAL
LOCATION	Church Rock	CELL NUMBER	5P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	-#4 Remolded	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	398.8	464.1
Wt. Wet Soil & Pan (g)	405.7	471.1
Wt. Dry Soil & Pan (g)	386.6	386.6
Wt. Lost Moisture (g)	19.1	84.5
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	379.6	379.6
Moisture Content %	5.0	22.2
Wet Density PCF	112.2	133.5
Dry Density PCF	106.8	109.2

Init. Diameter (in)	2.409	(cm)	6.119
Init. Area (sq in)	4.558	(sq cm)	29.407
Init. Height (in)	2.970	(cm)	7.544
Vol. Bef. Consol. (cu ft)	0.00783		
Vol. After Consol. (cu ft)	0.00766		
Porosity %	38.92		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	4
Percentage of Pump setting	100
Q (cc/s)	1.16E-02
Height	2.953
Diameter	2.389
Pressure (psi)	0.173
Area after consol. (cm*cm)	28.925
Gradient	1.622
Permeability k (cm/s)	2.5E-04
Permeability k (m/s)	2.5E-06
Back Pressure (psi)	108.0
Cell Pressure (psi)	111.0
Ave. Effective Stress (psi)	2.914
Average temperature degree C:	23.2

Data entry by: SKL Date: 04/23/2014

Checked by: CAL Date: 4/23/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_23.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	4/08/14 CAL
SAMPLE NO.	DH-B1-03 90%	TEST FINISHED	4/22/14 CAL
LOCATION	Church Rock	SETUP NO.	5P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	-#4 Remolded	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	3.0	9.7				
50.0	48.0	11.0	13.0	37.9	43.7	5.8	0.58
60.0	58.0	14.7	15.6	47.7	54.4	6.7	0.67
70.0	68.0	17.0	17.8	57.8	65.4	7.6	0.76
80.0	78.0	18.2	18.9	67.9	76.1	8.2	0.82
90.0	88.0	19.3	20.0	77.8	86.3	8.5	0.85
100.0	98.0	21.1	21.8	87.8	96.7	8.9	0.89
110.0	108.0	22.2	22.9	97.8	106.9	9.1	0.91
120.0		24.0	24.1	107.7	117.2	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.40	0.00
0.25	0.50	0.60	-0.20
0.5	0.71	0.60	-0.20
1	1.00	0.60	-0.20
2	1.41	0.60	-0.20
4	2.00	0.60	-0.20
9	3.00	0.70	-0.30
16	4.00	0.70	-0.30
30	5.48	0.70	-0.30
60	7.75	0.70	-0.30
120	10.95	0.70	-0.30
240	15.49	0.70	-0.30
360	18.97	0.70	-0.30

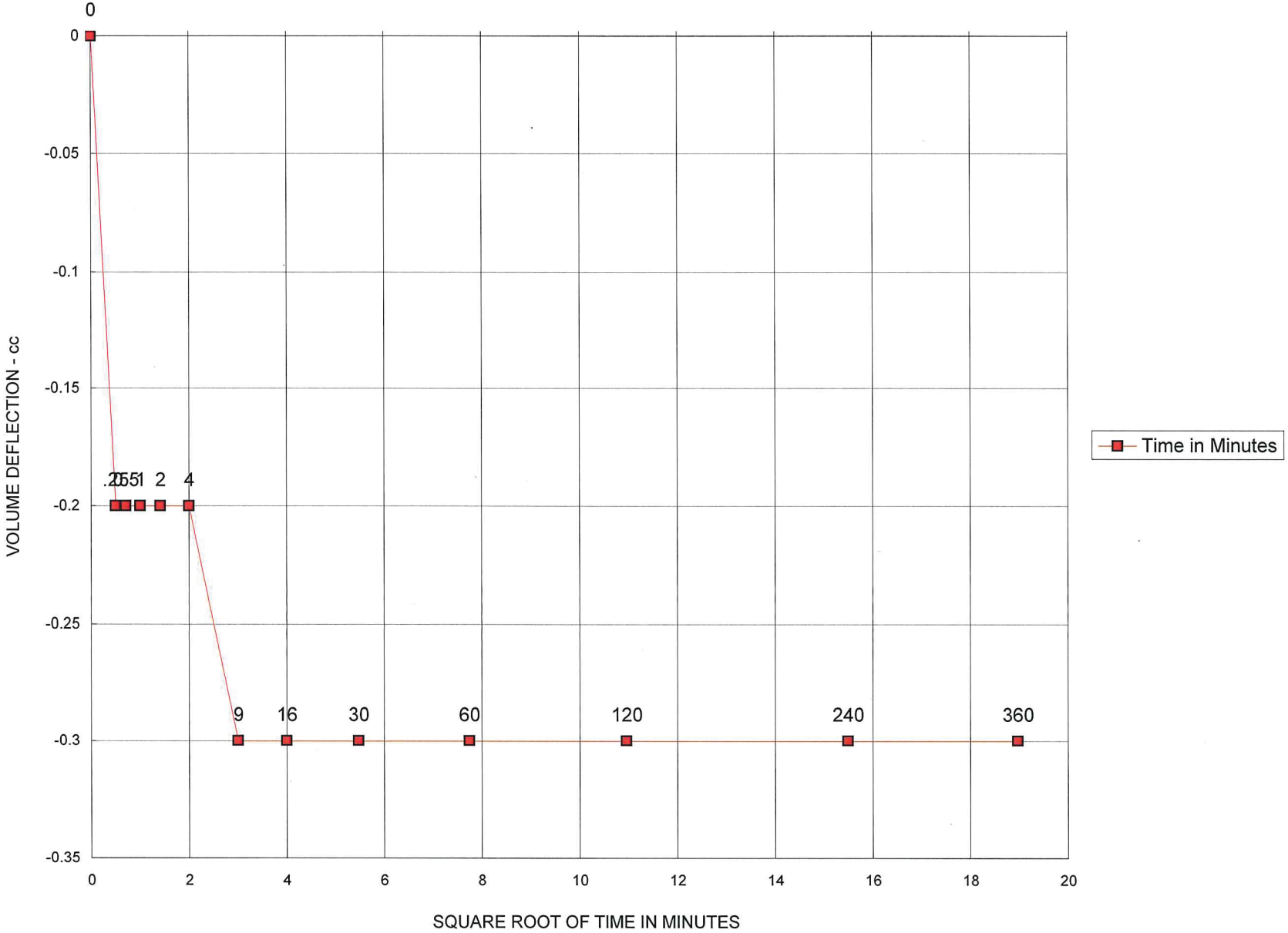
Initial Height (in)	2.970	Init. Vol. (CC)	221.870
Height Change (in)	0.017	Vol. Change (CC)	21.700
Ht. After Cons. (in)	2.953	Cell Exp. (CC)	16.825
Initial Area (sq in)	4.558	Net Change (CC)	4.875
Area After Cons. (sq in)	4.483	Cons. Vol. (CC)	216.995

Data entry by: SKL Date: 04/23/2014
Checked by: CAL Date: 4/23/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_23.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

Dilco Hill, 0-10', DH-B1-03 90%

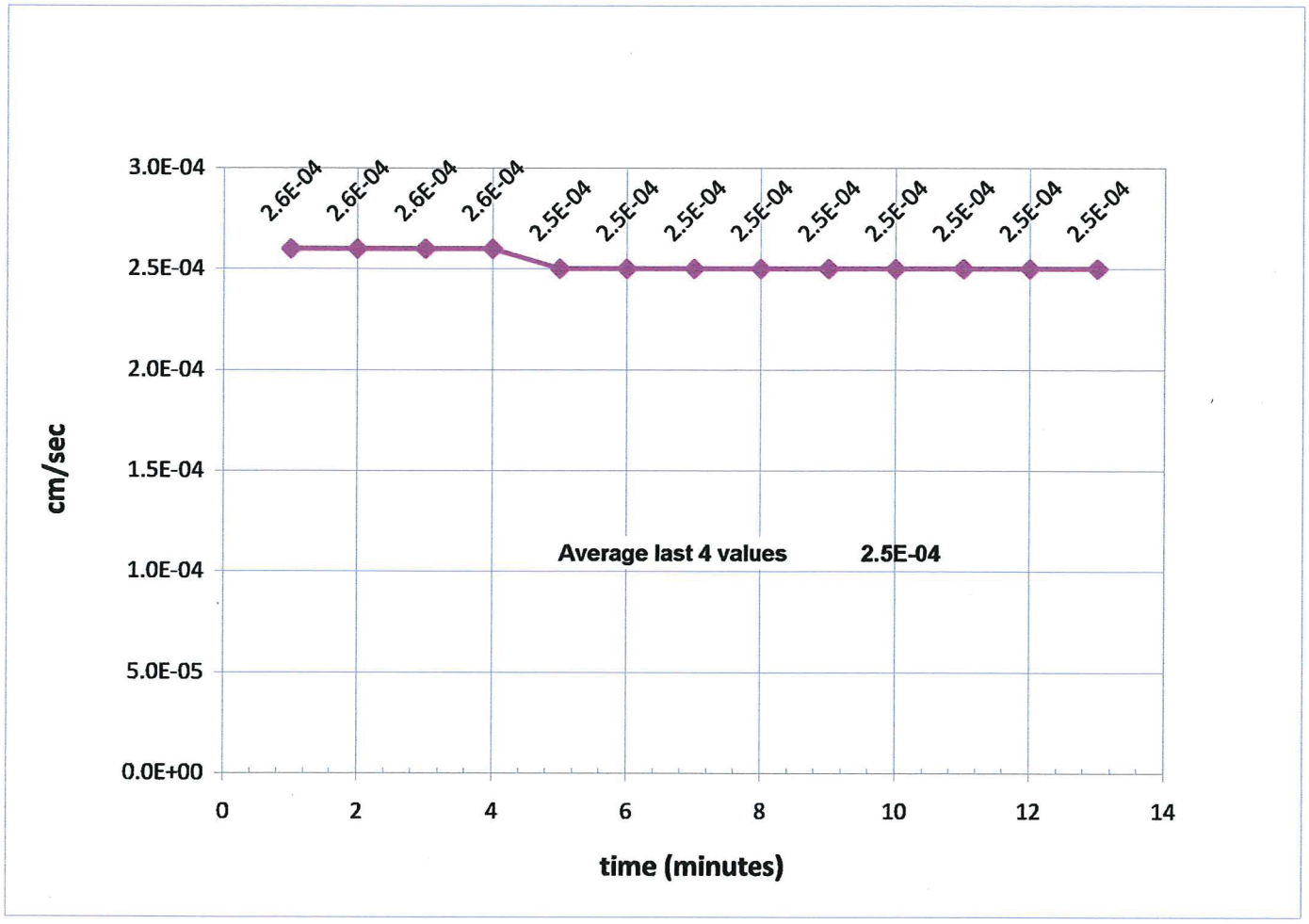


ATT
ADVANCED TERRA TESTING

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 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/22/2014	Technician:	CAL



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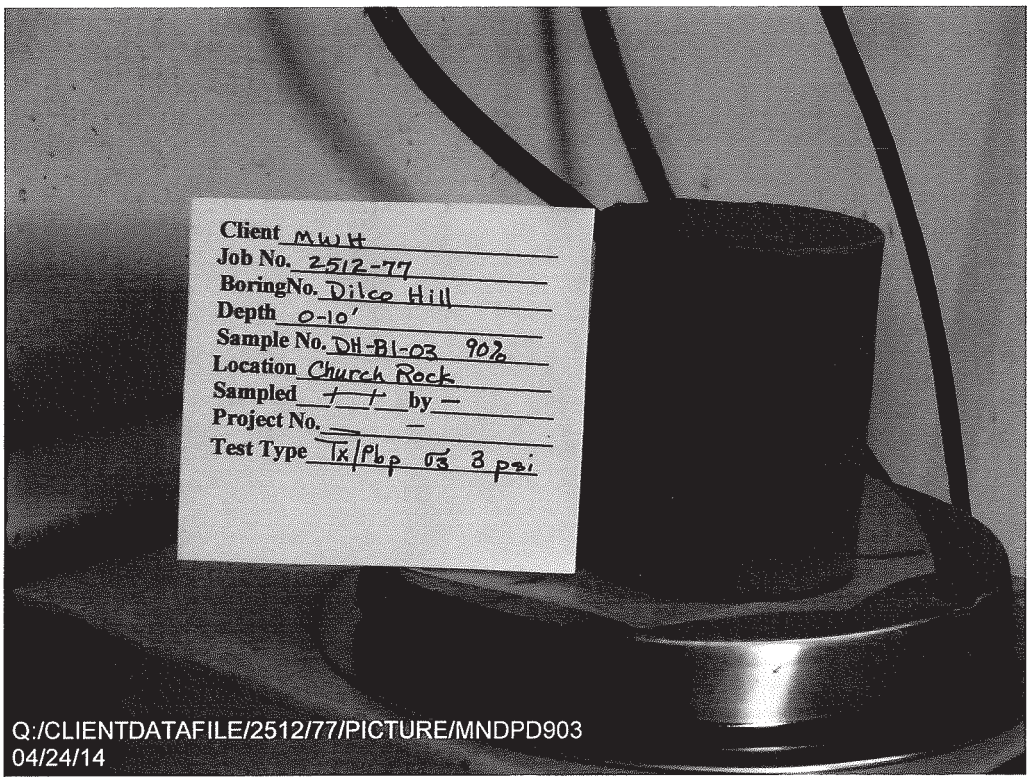
Date: 4/23/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDPD903
04/24/14

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	4/08/14 CAL
SAMPLE NO.	EB-B6-03 90%	TEST FINISHED	4/22/14 CAL
LOCATION	Church Rock	CELL NUMBER	2P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	-#4 Remolded	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	405.0	462.6
Wt. Wet Soil & Pan (g)	412.0	469.6
Wt. Dry Soil & Pan (g)	378.1	378.1
Wt. Lost Moisture (g)	33.9	91.5
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	371.1	371.1
Moisture Content %	9.1	24.6
Wet Density PCF	113.1	129.3
Dry Density PCF	103.6	103.7

Init. Diameter (in)	2.408	(cm)	6.116
Init. Area (sq in)	4.554	(sq cm)	29.383
Init. Height (in)	2.995	(cm)	7.607
Vol. Bef. Consol. (cu ft)	0.00789		
Vol. After Consol. (cu ft)	0.00789		
Porosity %	40.95		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	7
Percentage of Pump setting	100
Q (cc/s)	1.14E-03
Height	2.995
Diameter	2.407
Pressure (psi)	0.145
Area after consol. (cm*cm)	29.361
Gradient	1.340
Permeability k (cm/s)	2.9E-05
Permeability k (m/s)	2.9E-07
Back Pressure (psi)	108.0
Cell Pressure (psi)	111.0
Ave. Effective Stress (psi)	2.928
Average temperature degree C:	23.3

Data entry by: SKL Date: 04/23/2014
Checked by: CAL Date: 4/23/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_24.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	4/08/14 CAL
SAMPLE NO.	EB-B6-03 90%	TEST FINISHED	4/22/14 CAL
LOCATION	Church Rock	SETUP NO.	2P
PROJECT NO.	-	SATURATED TEST	Yes
SOIL DESCR.	-#4 Remolded	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	1.3	10.3				
50.0	48.0	9.1	11.2	38.0	45.3	7.3	0.73
60.0	58.0	11.0	12.6	47.9	55.5	7.6	0.76
70.0	68.0	12.6	13.8	58.2	66.4	8.2	0.82
80.0	78.0	13.7	14.9	68.4	77.0	8.6	0.86
90.0	88.0	14.8	16.0	78.3	87.3	9.0	0.90
100.0	98.0	16.2	17.4	88.2	97.3	9.1	0.91
110.0	108.0	17.5	18.6	98.2	107.3	9.1	0.91
120.0		19.3	19.4	107.5	117.0	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.60	0.00
0.25	0.50	0.90	-0.30
0.5	0.71	0.90	-0.30
1	1.00	0.90	-0.30
2	1.41	0.90	-0.30
4	2.00	0.90	-0.30
9	3.00	0.90	-0.30
16	4.00	0.95	-0.35
30	5.48	0.95	-0.35
60	7.75	0.95	-0.35
120	10.95	0.95	-0.35
240	15.49	0.95	-0.35
360	18.97	0.95	-0.35

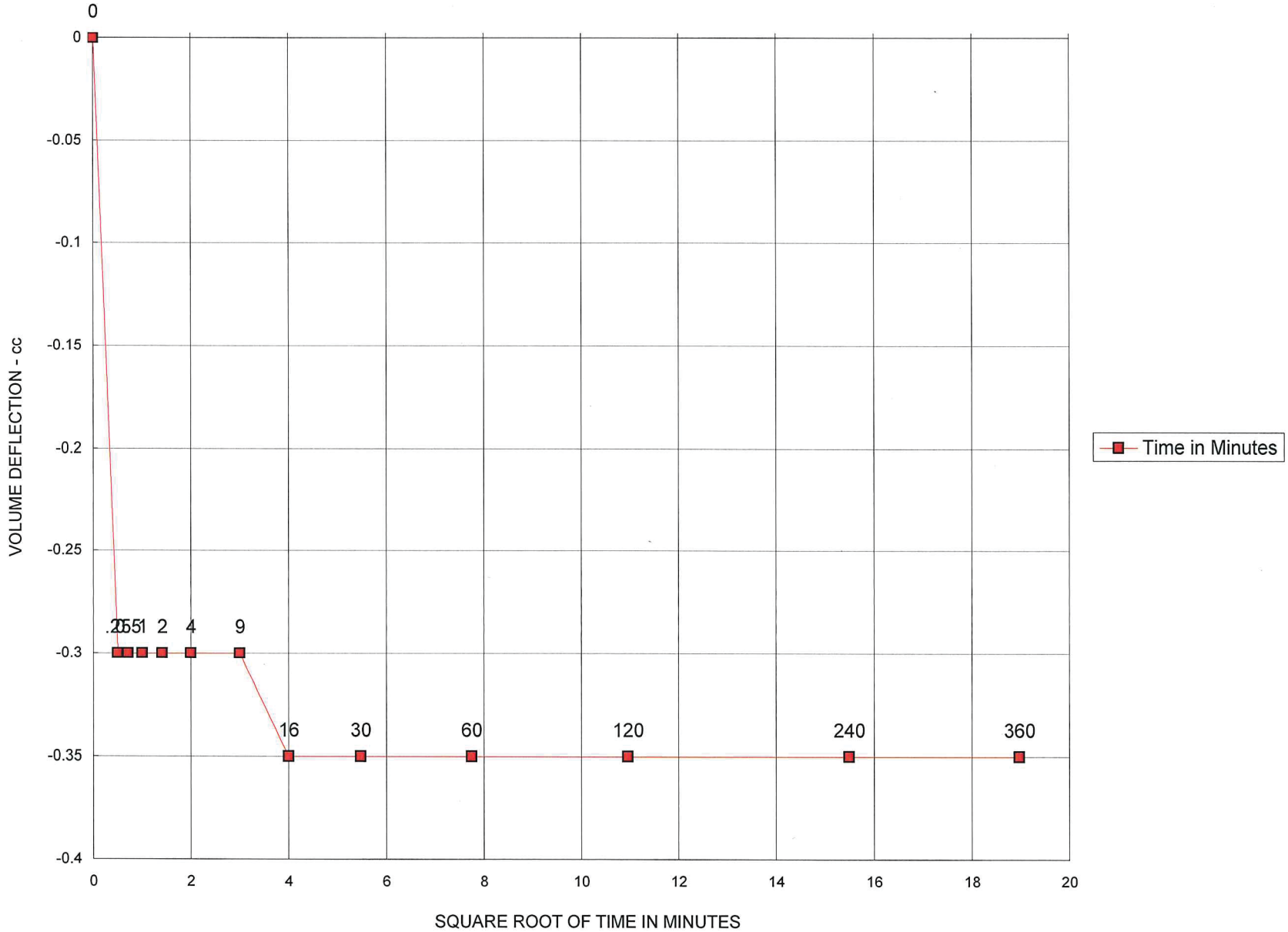
Initial Height (in)	2.995	Init. Vol. (CC)	223.552
Height Change (in)	0.000	Vol. Change (CC)	18.600
Ht. After Cons. (in)	2.995	Cell Exp. (CC)	18.444
Initial Area (sq in)	4.554	Net Change (CC)	0.156
Area After Cons. (sq in)	4.551	Cons. Vol. (CC)	223.396

Data entry by: SKL Date: 04/23/2014
Checked by: ok Date: 4/23/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_24.xls

ATT ADVANCED TERRA TESTING

CONSOLIDATION DATA

East Borrow, 0-10', EB-B6-03 90%

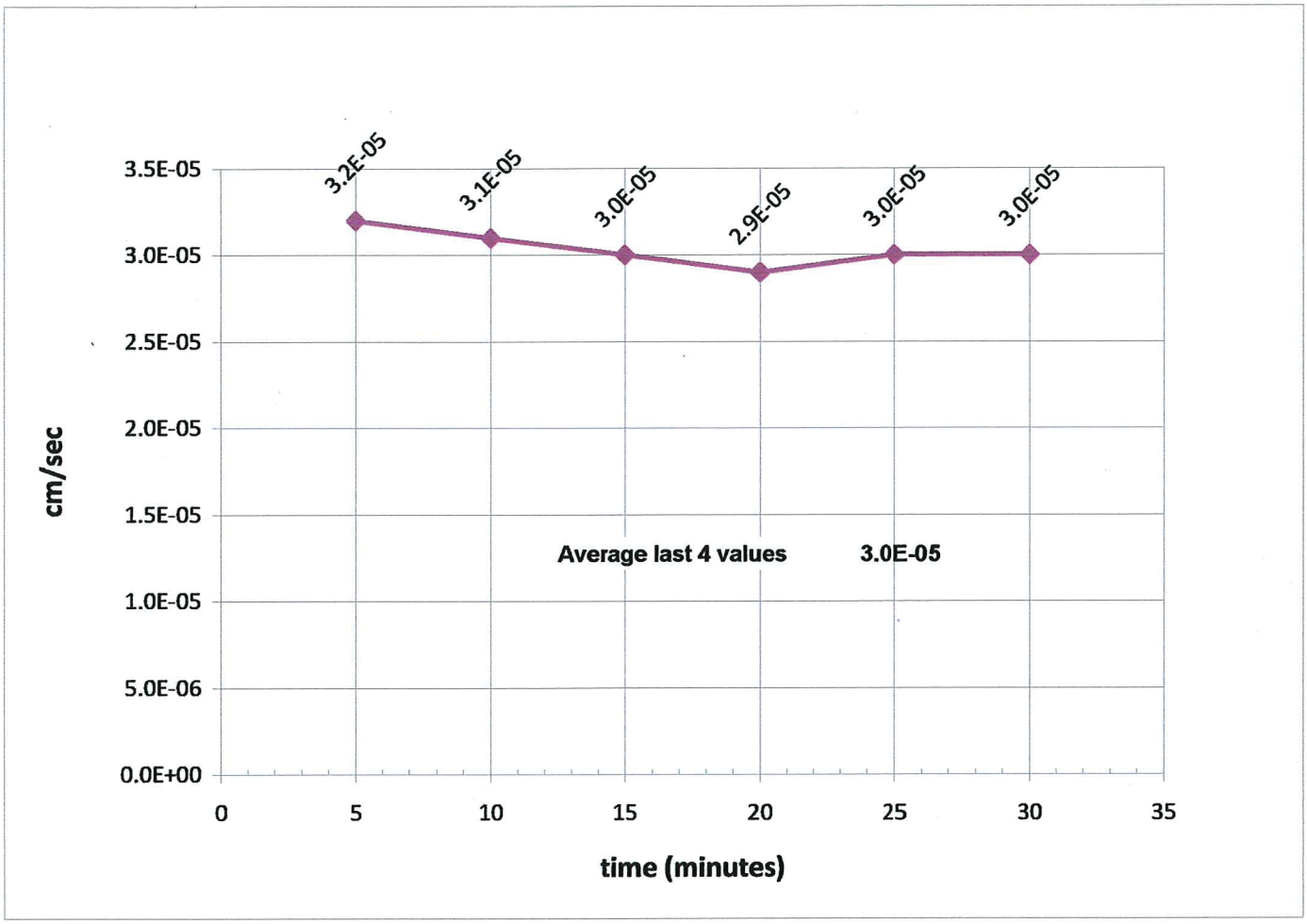


ATT
ADVANCED TERRA TESTING

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 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/22/2014	Technician:	CAL



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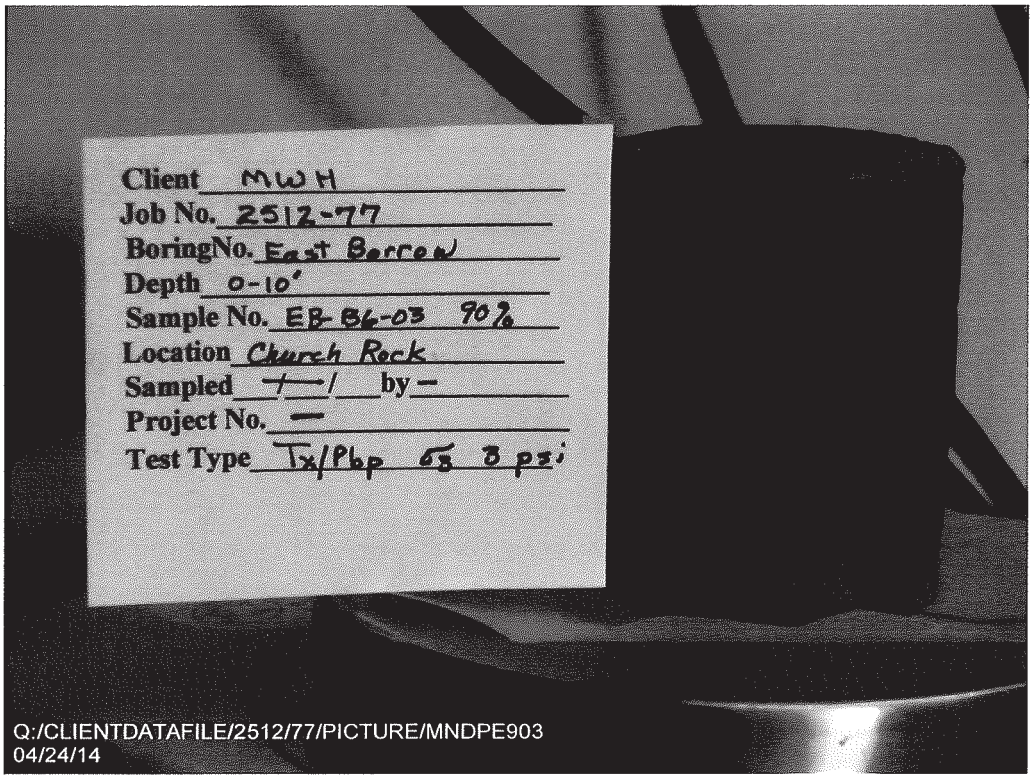


Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDPE903
04/24/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-15'	TEST STARTED	04/11/14 CAL
SAMPLE NO.	SB-B-4-01 90%	TEST FINISHED	04/28/14 CAL
LOCATION	Church Rock	CELL NUMBER	17S
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	412.0	457.2
Wt. Wet Soil & Pan (g)	418.9	464.2
Wt. Dry Soil & Pan (g)	374.8	374.8
Wt. Lost Moisture (g)	44.1	89.4
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	367.8	367.8
Moisture Content %	12.0	24.3
Wet Density PCF	115.7	130.6
Dry Density PCF	103.3	105.1

Init. Diameter (in)	2.403	(cm)	6.104
Init. Area (sq in)	4.535	(sq cm)	29.261
Init. Height (in)	2.991	(cm)	7.597
Vol. Bef. Consol. (cu ft)	0.00785		
Vol. After Consol. (cu ft)	0.00772		
Porosity %	40.89		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	2.991
Diameter	2.382
Pressure (psi)	0.294
Area after consol. (cm*cm)	28.758
Gradient	2.721
Permeability k (cm/s)	7.4E-05
Permeability k (m/s)	7.4E-07
Back Pressure (psi)	108.0
Cell Pressure (psi)	111.0
Ave. Effective Stress (psi)	2.853
Average temperature degree C:	21.6

Data entry by: DAW Date: 04/29/2014

Checked by: CM Date: 4/29/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084_R1_28.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-15'	TEST STARTED	04/11/14 CAL
SAMPLE NO.	SB-B-4-01 90%	TEST FINISHED	04/28/14 CAL
LOCATION	Church Rock	SETUP NO.	17S
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.4	12.4				
50.0	48.0	12.9	13.1	37.8	45.2	7.4	0.74
60.0	58.0	13.1	14.1	48.3	56.0	7.7	0.77
70.0	68.0	13.8	14.7	58.6	66.8	8.2	0.82
80.0	78.0	14.9	15.7	68.5	77.1	8.6	0.86
90.0	88.0	15.8	16.5	78.5	87.4	8.9	0.89
100.0	98.0	17.0	17.7	87.9	97.0	9.1	0.91
110.0	108.0	17.8	18.5	98.2	107.6	9.4	0.94
120.0		18.6	18.6	108.1	117.7	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.10	0.00
0.25	0.50	0.40	-0.30
0.5	0.71	0.40	-0.30
1	1.00	0.40	-0.30
2	1.41	0.40	-0.30
4	2.00	0.40	-0.30
9	3.00	0.40	-0.30
16	4.00	0.40	-0.30
30	5.48	0.45	-0.35
60	7.75	0.45	-0.35
120	10.95	0.45	-0.35
240	15.49	0.45	-0.35
360	18.97	0.45	-0.35

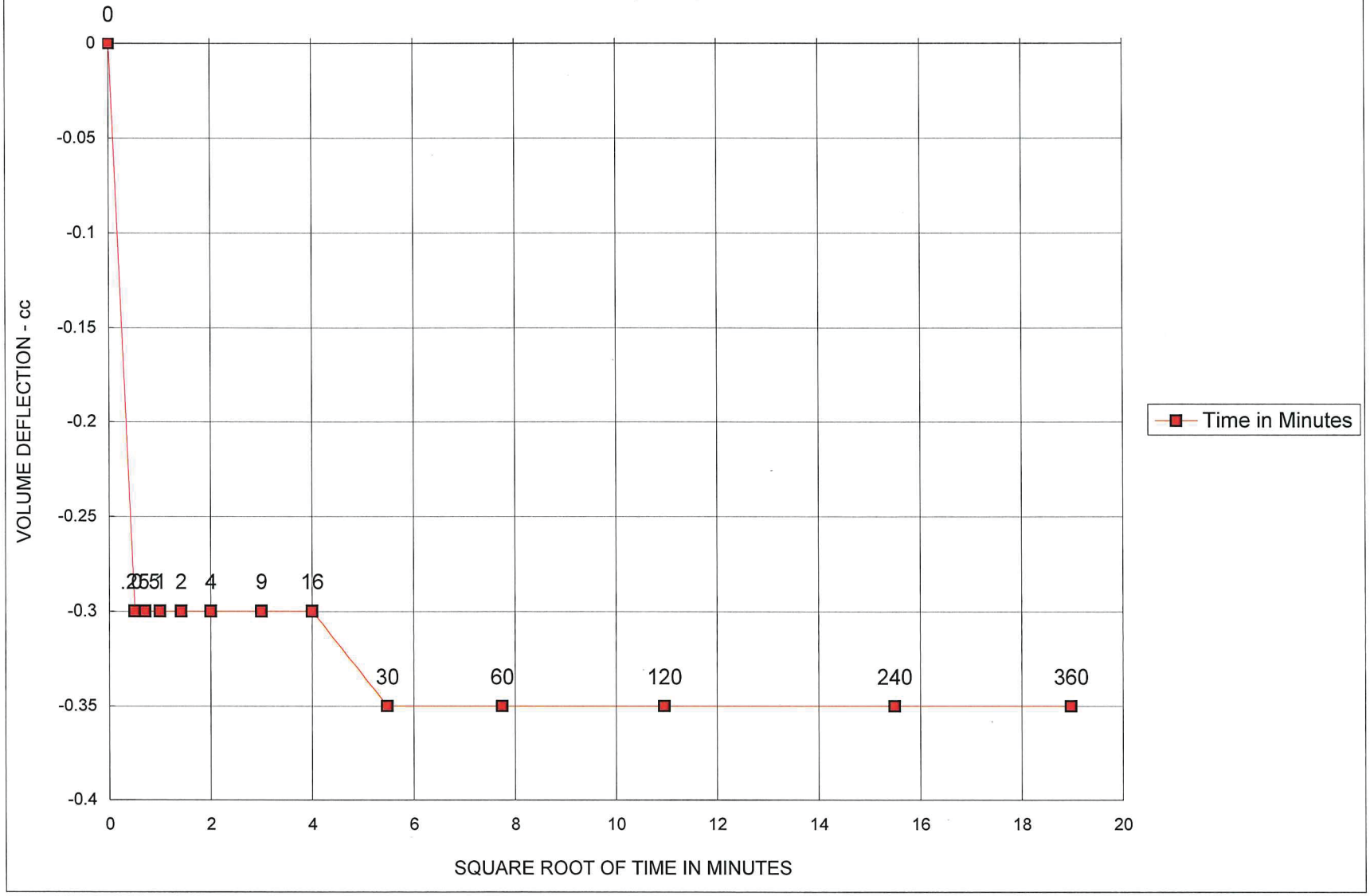
Initial Height (in)	2.991	Init. Vol. (CC)	222.327
Height Change (in)	0.000	Vol. Change (CC)	17.900
Ht. After Cons. (in)	2.991	Cell Exp. (CC)	14.087
Initial Area (sq in)	4.535	Net Change (CC)	3.813
Area After Cons. (sq in)	4.457	Cons. Vol. (CC)	218.515

Data entry by: DAW Date: 04/29/2014
Checked by: ar Date: 4/29/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084_R1_28.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

South Borrow, 0-15', SB-B-4-01 90%

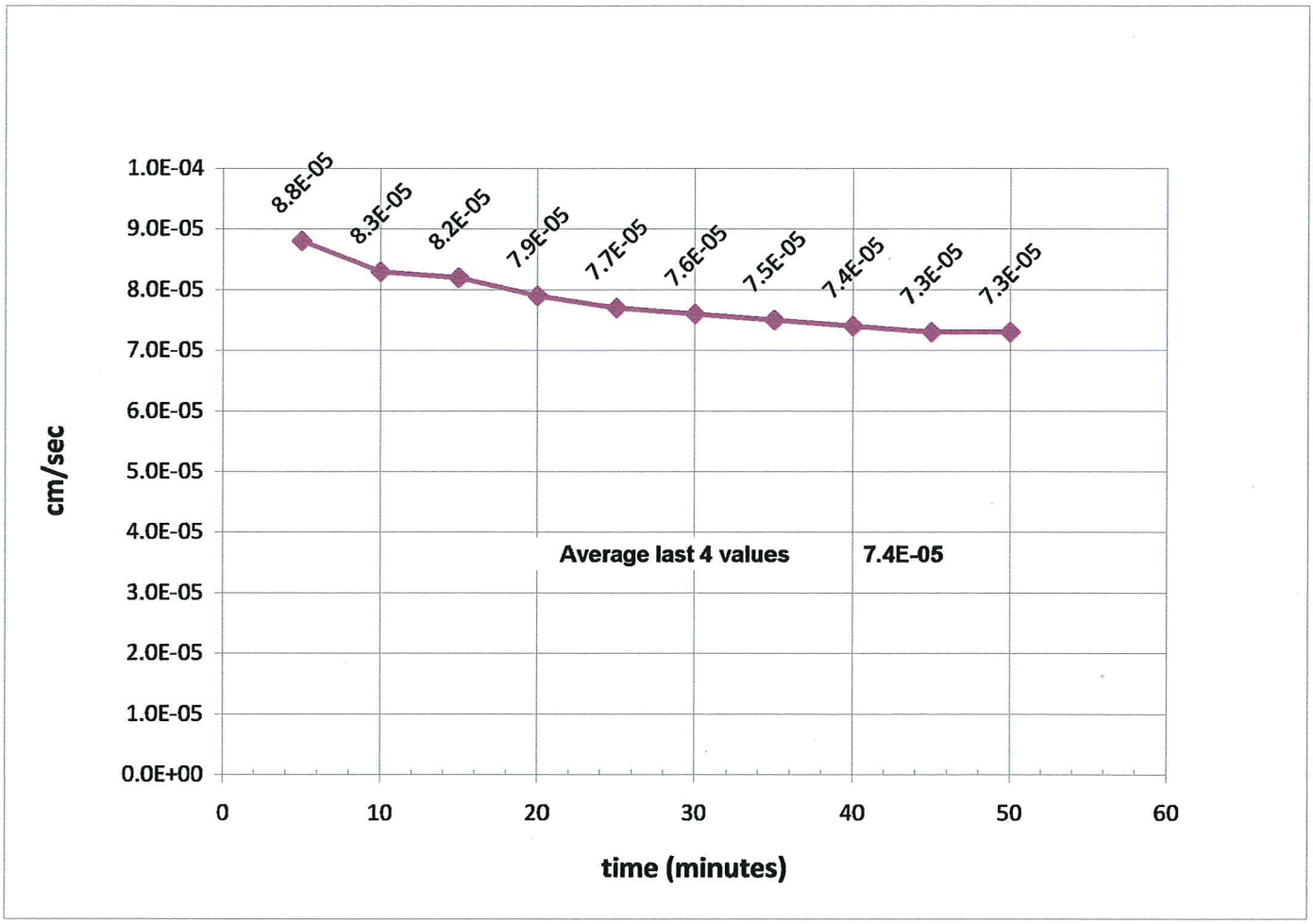


ATT
ADVANCED TERRA TESTING

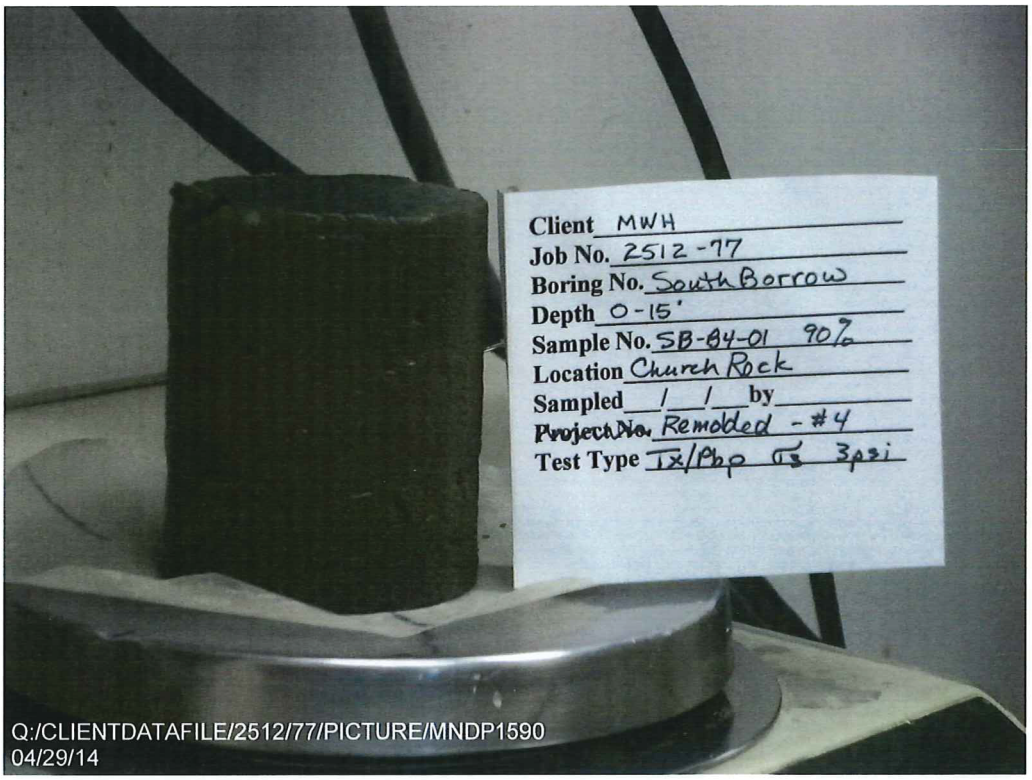
ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	South Borrow		
Job Number:	2512-77	Depth:	0-15'		
Project:	--	Sample Number:	SB-B4-01 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/28/2014	Technician:	CAL



Data Entered By:	CAL		
Date:	4/28/2014	Checked By:	DAW
File Name:	2512_77_PrelimPerm_ASTMD-5084-methodD_27.xls	Date:	4/29/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP1590
04/29/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT MWH

JOB NO. 2512-77

BORING NO.	North Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/08/14 CAL
SAMPLE NO.	NB-B2-04 90%	TEST FINISHED	04/28/14 CAL
LOCATION	Church Rock	CELL NUMBER	1P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	391.4	456.8
Wt. Wet Soil & Pan (g)	398.4	463.8
Wt. Dry Soil & Pan (g)	374.4	374.4
Wt. Lost Moisture (g)	24.0	89.4
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	367.4	367.4
Moisture Content %	6.5	24.3
Wet Density PCF	110.4	127.5
Dry Density PCF	103.7	102.6

Init. Diameter (in)	2.415	(cm)	6.134
Init. Area (sq in)	4.581	(sq cm)	29.554
Init. Height (in)	2.948	(cm)	7.488
Vol. Bef. Consol. (cu ft)	0.00781		
Vol. After Consol. (cu ft)	0.00790		
Porosity %	39.97		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	2.948
Diameter	2.428
Pressure (psi)	0.277
Area after consol. (cm*cm)	29.868
Gradient	2.601
Permeability k (cm/s)	7.5E-05
Permeability k (m/s)	7.5E-07
Back Pressure (psi)	128.0
Cell Pressure (psi)	131.0
Ave. Effective Stress (psi)	2.862
Average temperature degree C:	22.3

Data entry by: DAW Date: 04/29/2014

Checked by: CK Date: 4/29/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_27.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	North Borrow	SAMPLED	--
DEPTH	0-10'	TEST STARTED	04/08/14 CAL
SAMPLE NO.	NB-B2-04 90%	TEST FINISHED	04/28/14 CAL
LOCATION	Church Rock	SETUP NO.	1P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.1	5.9				
50.0	48.0	3.6	5.6	38.5	44.8	6.3	0.63
60.0	58.0	5.5	7.0	47.9	55.1	7.2	0.72
70.0	68.0	7.3	8.6	58.1	66.0	7.9	0.79
80.0	78.0	8.6	9.8	68.2	76.4	8.2	0.82
90.0	88.0	10.0	11.1	78.2	86.6	8.4	0.84
100.0	98.0	11.3	12.4	88.0	96.8	8.8	0.88
110.0	108.0	12.7	13.8	98.1	107.2	9.1	0.91
120.0	118.0	14.5	15.5	108.0	117.2	9.2	0.92
130.0	128.0	15.8	16.9	118.3	127.7	9.4	0.94
140.0		17.1	17.3	128.5	138.1	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	0.50	-0.30
0.5	0.71	0.50	-0.30
1	1.00	0.50	-0.30
2	1.41	0.50	-0.30
4	2.00	0.50	-0.30
9	3.00	0.60	-0.40
16	4.00	0.60	-0.40
30	5.48	0.60	-0.40
60	7.75	0.60	-0.40
120	10.95	0.60	-0.40
240	15.49	0.60	-0.40
360	18.97	0.60	-0.40

Initial Height (in)	2.948	Init. Vol. (CC)	221.325
Height Change (in)	0.000	Vol. Change (CC)	17.700
Ht. After Cons. (in)	2.948	Cell Exp. (CC)	20.066
Initial Area (sq in)	4.581	Net Change (CC)	-2.366
Area After Cons. (sq in)	4.630	Cons. Vol. (CC)	223.691

Data entry by: DAW Date: 04/29/2014
Checked by: cm Date: 4/29/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_27.xls

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ADVANCED TERRA TESTING