

CONSOLIDATION TEST
ASTM D-2435

CLIENT Tetra Tech

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 10.0'
SAMPLE NO. B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
SAMPLE DIA.(in) 1.938

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 DPM
TEST FINISHED 04-25-08 DPM
CELL NUMBER ATT-15
INITIAL HT.(in) 1.000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST	LOAD (PSF)	CONSOL. (IN.)
Wt. Soil & Ring(s) (g)	344.4	341.5	155	0.0000
Wt. Ring(s) (g)	243.4	243.4	155	0.0175
Wt. Soil (g)	101.0	98.1	309	0.0179
Wet Density PCF	130.4	133.2	309	0.0196
			619	0.0231
Wt. Wet Soil & Pan (g)	104.1	101.2	1237	0.0307
Wt. Dry Soil & Pan (g)	88.3	88.3	2474	0.0398
Wt. Lost Moisture (g)	15.8	12.9	4948	0.0534
Wt. of Pan Only (g)	3.1	3.1	1237	0.0518
Wt. of Dry Soil (g)	85.2	85.2	309	0.0504
Moisture Content %	18.6	15.1	155	0.0492
Dry Density PCF	110.0	115.7		

	LOAD (PSF)	LOG p	CONSOL. (IN.)	DEFL. (IN.)	VOID RATIO e
Inundate	155	2.190	0.0000	0.0000	0.5041
	155	2.190	0.0175	-0.0175	0.4778
	309	2.490	0.0179	-0.0179	0.4772
	309	2.490	0.0196	-0.0196	0.4746
	619	2.792	0.0231	-0.0231	0.4694
	1237	3.092	0.0307	-0.0307	0.4580
	2474	3.393	0.0398	-0.0398	0.4443
	4948	3.694	0.0534	-0.0534	0.4238
	1237	3.092	0.0518	-0.0518	0.4262
	309	2.490	0.0504	-0.0504	0.4283
	155	2.190	0.0492	-0.0492	0.4301

% Saturation 97.6
Sp. Gr. (g/cc) 2.650
Init. Ht. Solids (cm) 1.689
Init. Ht. Voids (cm) 0.851
Init. Void Ratio 0.5041

Data entry by: SR
Data checked by: DPM
FileName: TTC0TT5

Date: 05/09/2008
Date: 5/9/08



CLIENT Tetra Tech

JOB NO. 2592-04

BORING NO. Tt-5
 DEPTH 10.0'
 SAMPLE NO. B
 SOIL DESCR. #114-181750
 LOCATION Rocky Flats OLF

SAMPLED 03-28-08 JLR
 TEST STARTED 04-18-08 DPM
 TEST FINISHED 04-25-08 DPM
 CELL NUMBER ATT-15

TIME READING DATA

619 psf Load

1237 psf Load

Elapsed Time (min)	SQRT Time (min)	Dial Reading (in)	Defl. (in)
0.0	0.00	0.0203	0.0000
0.1	0.32	0.0221	-0.0018
0.3	0.50	0.0224	-0.0021
0.5	0.71	0.0226	-0.0023
1.0	1.00	0.0228	-0.0025
2.0	1.41	0.0230	-0.0027
4.0	2.00	0.0232	-0.0029
9.0	3.00	0.0234	-0.0031
16.0	4.00	0.0236	-0.0033
30.0	5.48	0.0238	-0.0035
60.0	7.75	0.0240	-0.0037
120.0	10.95	0.0242	-0.0039
240.0	15.49	0.0245	-0.0042
480.0	21.91	0.0247	-0.0044

Elapsed Time (min)	SQRT Time (min)	Dial Reading (in)	Defl. (in)
0.0	0.00	0.0248	0.0000
0.1	0.32	0.0286	-0.0038
0.3	0.50	0.0292	-0.0044
0.5	0.71	0.0297	-0.0049
1.0	1.00	0.0302	-0.0054
2.0	1.41	0.0306	-0.0058
4.0	2.00	0.0310	-0.0062
10.0	3.16	0.0314	-0.0066
16.0	4.00	0.0318	-0.0070
30.0	5.48	0.0320	-0.0072
60.0	7.75	0.0323	-0.0075
120.0	10.95	0.0325	-0.0077
240.0	15.49	0.0328	-0.0080
480.0	21.91	0.0330	-0.0082

2474 psf Load

4948 psf Load

Elapsed Time (min)	SQRT Time (min)	Dial Reading (in)	Defl. (in)
0.0	0.00	0.0332	0.0000
0.1	0.32	0.0382	-0.0050
0.3	0.50	0.0389	-0.0057
0.5	0.71	0.0393	-0.0061
1.0	1.00	0.0399	-0.0067
2.0	1.41	0.0404	-0.0072
4.0	2.00	0.0408	-0.0076
9.0	3.00	0.0415	-0.0083
16.0	4.00	0.0418	-0.0086
30.0	5.48	0.0422	-0.0090
60.0	7.75	0.0425	-0.0093
120.0	10.95	0.0429	-0.0097
240.0	15.49	0.0431	-0.0099
480.0	21.91	0.0434	-0.0102

Elapsed Time (min)	SQRT Time (min)	Dial Reading (in)	Defl. (in)
0.0	0.00	0.0436	0.0000
0.1	0.32	0.0507	-0.0071
0.3	0.50	0.0517	-0.0081
0.5	0.71	0.0525	-0.0089
1.0	1.00	0.0533	-0.0097
2.0	1.41	0.0540	-0.0104
4.0	2.00	0.0550	-0.0114
9.0	3.00	0.0557	-0.0121
16.0	4.00	0.0562	-0.0126
30.0	5.48	0.0567	-0.0131
60.0	7.75	0.0572	-0.0136
120.0	10.95	0.0576	-0.0140
240.0	15.49	0.0580	-0.0144
480.0	21.91	0.0583	-0.0147

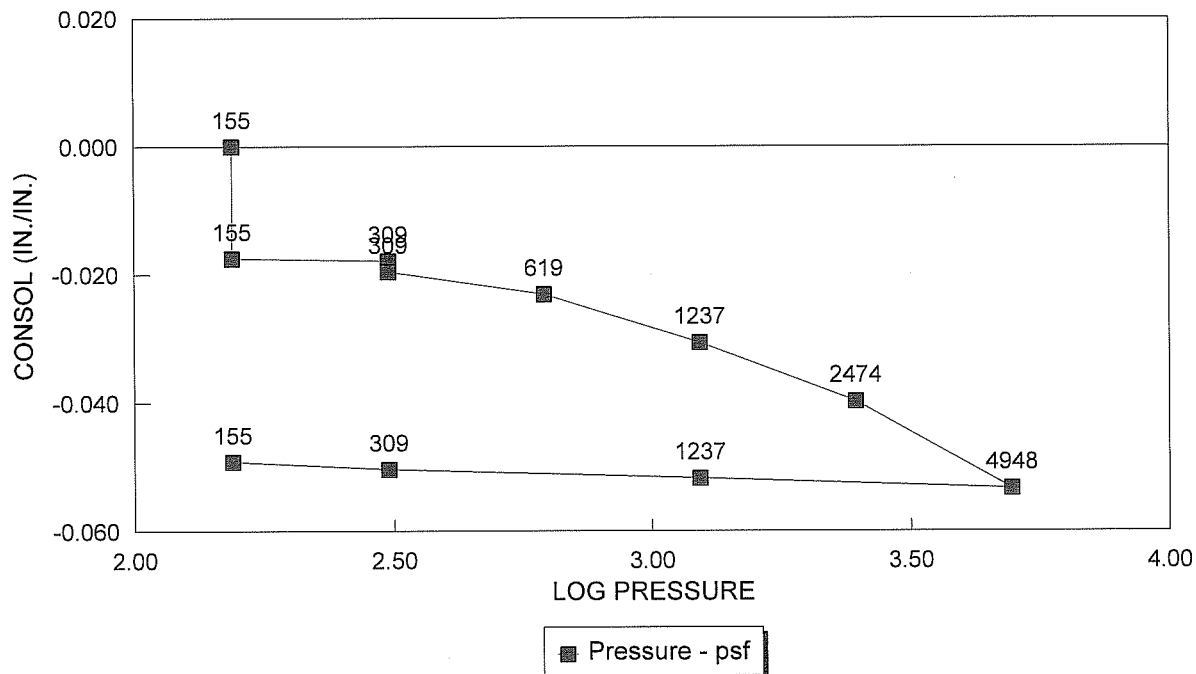
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 Data checked by: DAM
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Date: 05/09/2008
 Date: 5/9/08



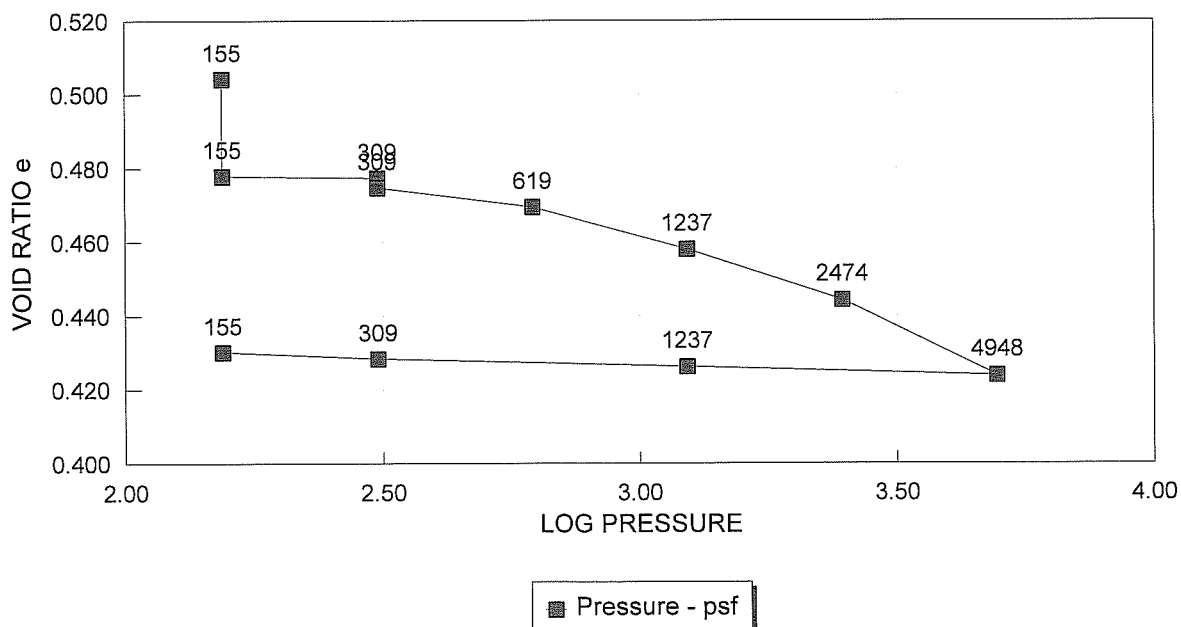
CONSOLIDATION TEST DATA

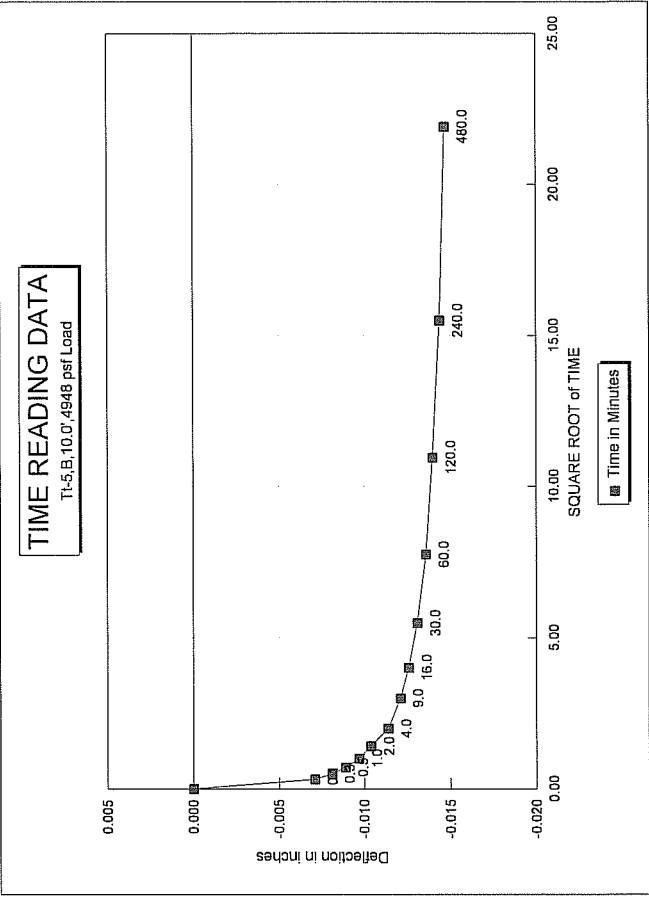
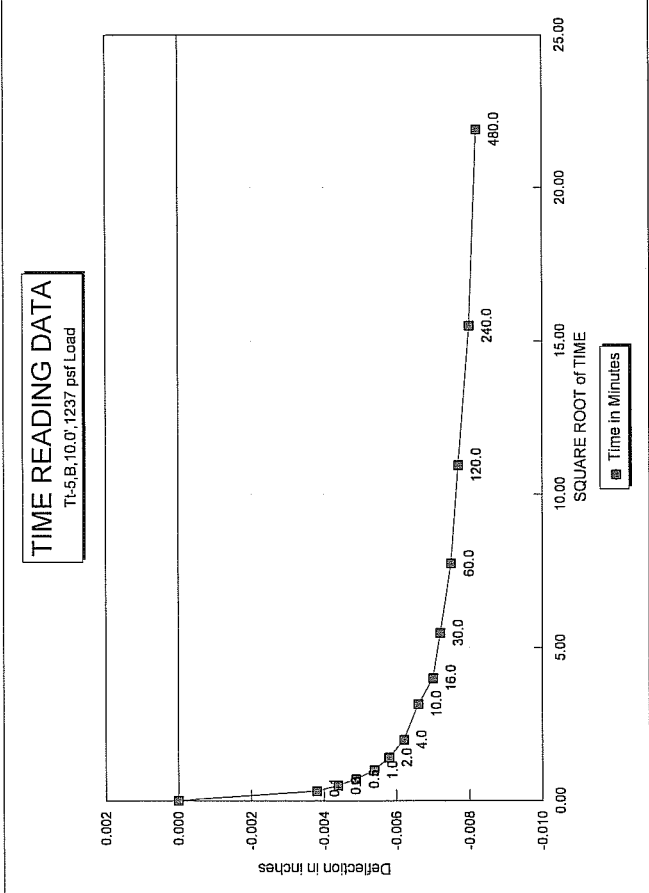
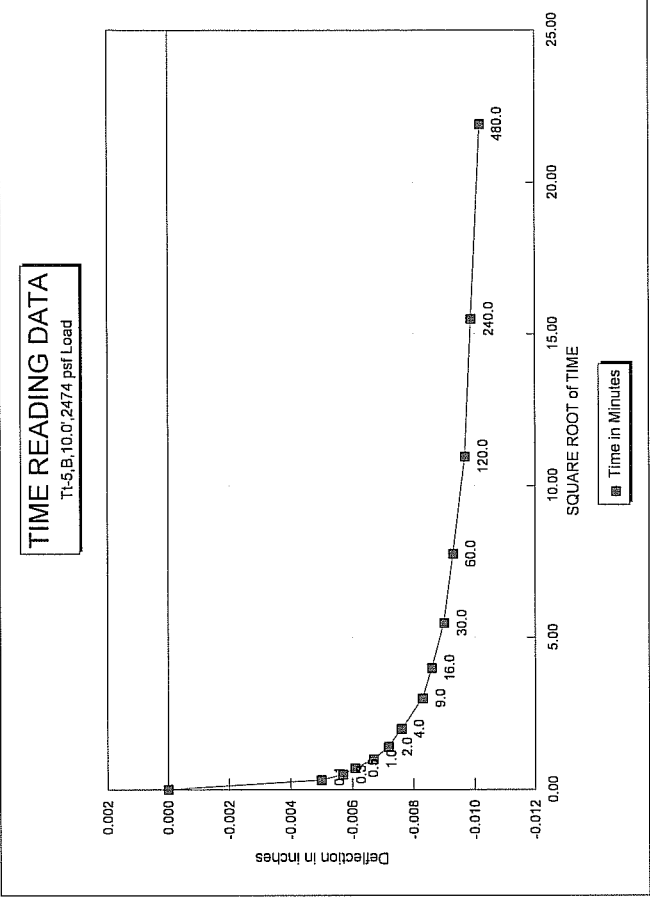
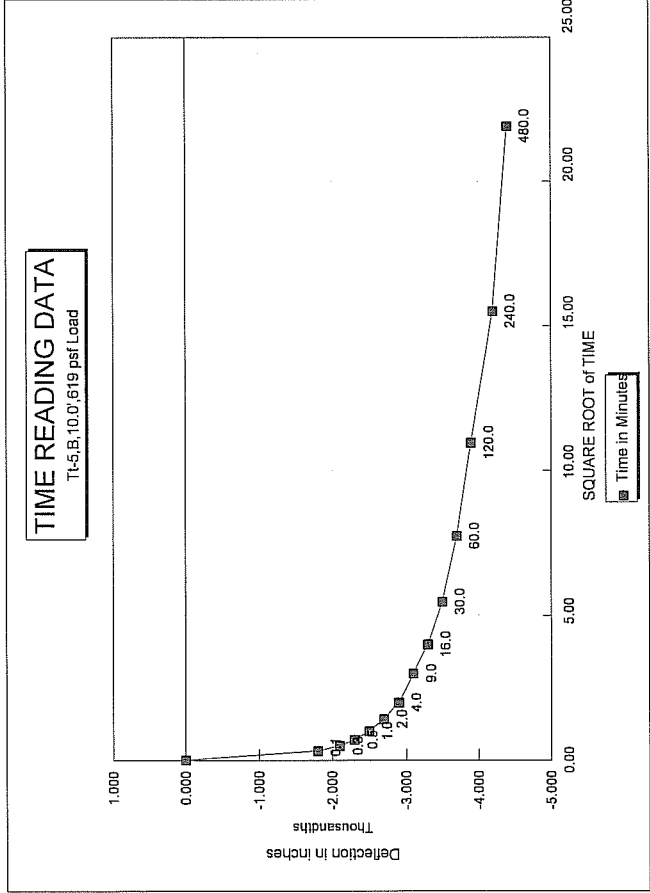
Tt-5,B,10.0'



CONSOLIDATION TEST DATA

Tt-5,B,10.0'





DIRECT SHEAR TEST DATA
ASTM D 3080

CLIENT Tetra Tech

JOB NO. 2592-04

BORING NO.	Tt-1	SAMPLED	03-27-08 JLR
DEPTH	17.0'	TEST STARTED	04-29-08 DPM
SAMPLE NO.	B	TEST FINISHED	04-29-08 DPM
POINT	A	CELL NUMBER	Geomatic
SOIL DESCR.	#114-181750	SATURATED TEST	Yes
LOCATION	Rocky Flats OLF	TEST TYPE	CD
NORMAL STRESS (psf)	5992		

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	104.3	105.7
Wt. Wet Soil & Pan (g)	112.4	113.9
Wt. Dry Soil & Pan (g)	97.6	97.6
Wt. Lost Moisture (g)	14.9	16.3
Wt. of Pan Only (g)	8.2	8.2
Wt. of Dry Soil (g)	89.4	89.4
Moisture Content %	16.6	18.2
Wet Density (pcf)	134.7	138.4
Dry Density (pcf)	115.5	117.1

Init. Diameter (in)	1.938
Init. Area (sq in)	2.950
Init. Height (in)	1.000
Vol. Bef. Consol. (cu ft)	0.00171
Final Height (in)	0.986
Vol. After Consol. (cu ft)	0.00168

Test Set Up: Continuous Increasing Deflection Control
Shear Speed: 0.00200 in/min

Notes & Comments:

Data File Name: TTDST17A.DAT

Normal Stress:	5992 psf	41.61 psi
Peak Stress:	5147 psf	35.74 psi
Ultimate Stress:	3580 psf	24.86 psi

Data entry by: SR
Data checked by: DPM
FileName: TTDSTT1

Date: 05/07/2008
Date: 5/07/08



DIRECT SHEAR TEST DATA
ASTM D 3080

CLIENT Tetra Tech

JOB NO. 2592-04

BORING NO.	Tt-1	SAMPLED	03-27-08 JLR
DEPTH	17.0'	TEST STARTED	04-29-08 DPM
SAMPLE NO.	B	TEST FINISHED	04-30-08 DPM
POINT	B	CELL NUMBER	Geomatic
SOIL DESCR.	#114-181750	SATURATED TEST	Yes
LOCATION	Rocky Flats OLF	TEST TYPE	CD
NORMAL STRESS (psf)	2977		

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	105.2	107.7
Wt. Wet Soil & Pan (g)	111.8	114.3
Wt. Dry Soil & Pan (g)	98.0	98.0
Wt. Lost Moisture (g)	13.8	16.3
Wt. of Pan Only (g)	6.6	6.6
Wt. of Dry Soil (g)	91.4	91.4
Moisture Content %	15.1	17.9
Wet Density (pcf)	135.8	139.9
Dry Density (pcf)	118.0	118.7

Init. Diameter (in)	1.938
Init. Area (sq in)	2.950
Init. Height (in)	1.000
Vol. Bef. Consol. (cu ft)	0.00171
Final Height (in)	0.994
Vol. After Consol. (cu ft)	0.00170

Test Set Up: Continuous Increasing Deflection Control
Shear Speed: 0.00200 in/min

Notes & Comments:

Data File Name: TTDST17B.DAT

Normal Stress:	2977 psf	20.67 psi
Peak Stress:	3562 psf	24.74 psi
Ultimate Stress:	1921 psf	13.34 psi

Data entry by: SR
Data checked by: DPM
FileName: TTDSTT1

Date: 05/07/2008
Date: 5/07/08



DIRECT SHEAR TEST DATA
ASTM D 3080

CLIENT Tetra Tech

JOB NO. 2592-04

BORING NO.	Tt-1	SAMPLED	03-27-08 JLR
DEPTH	17.0'	TEST STARTED	04-29-08 DPM
SAMPLE NO.	B	TEST FINISHED	04-30-08 DPM
POINT	C	CELL NUMBER	Geomatic
SOIL DESCR.	#114-181750	SATURATED TEST	Yes
LOCATION	Rocky Flats OLF	TEST TYPE	CD
NORMAL STRESS (psf)	1469		

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	102.8	104.8
Wt. Wet Soil & Pan (g)	111.0	113.1
Wt. Dry Soil & Pan (g)	95.8	95.8
Wt. Lost Moisture (g)	15.2	17.3
Wt. of Pan Only (g)	8.3	8.3
Wt. of Dry Soil (g)	87.6	87.6
Moisture Content %	17.3	19.7
Wet Density (pcf)	132.7	135.3
Dry Density (pcf)	113.1	113.0

Init. Diameter (in)	1.938
Init. Area (sq in)	2.950
Init. Height (in)	1.000
Vol. Bef. Consol. (cu ft)	0.00171
Final Height (in)	1.001
Vol. After Consol. (cu ft)	0.00171

Test Set Up: Continuous Increasing Deflection Control
Shear Speed: 0.00200 in/min

Notes & Comments:

Data File Name: TTDST17C.DAT

Normal Stress:	1469 psf	10.20 psi
Peak Stress:	2126 psf	14.76 psi
Ultimate Stress:	858 psf	5.96 psi

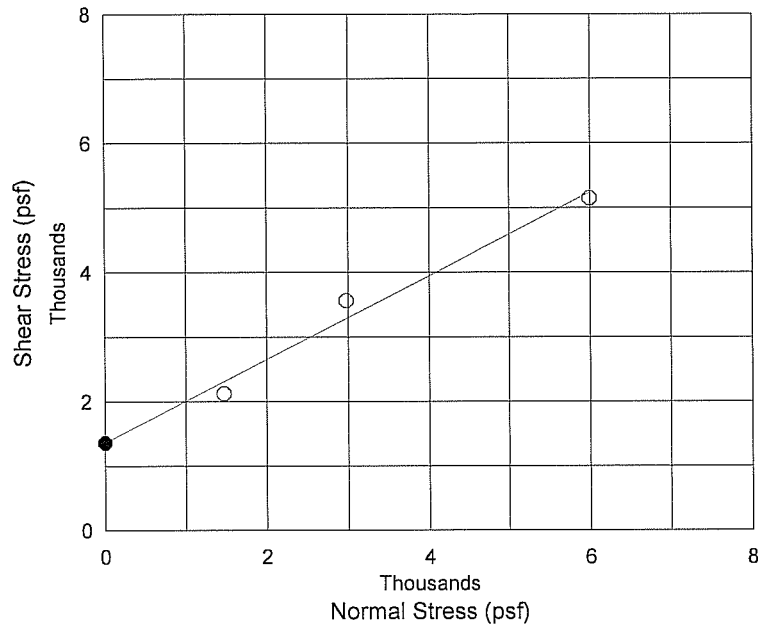
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Data checked by: DPM
FileName: TTDSTT1

Date: 05/07/2008
Date: 5/07/08



Normal Stress vs. Peak Shear Stress

Tt-1,B,17.0'



○ Shear Data

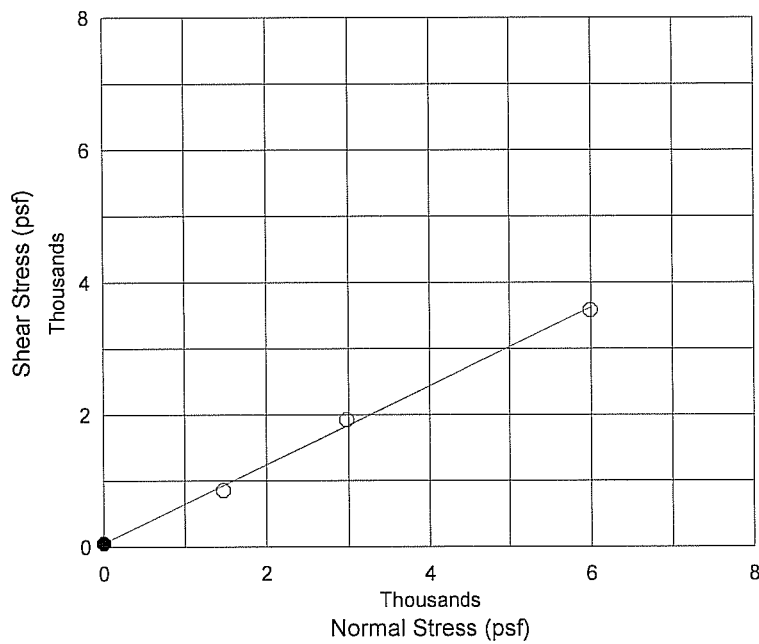
— Best Fit Line

● $c = 1358.4$ psf

$\Phi = 32.9$ degrees

Normal Stress vs. Ultimate Shear Stress

Tt-1,B,17.0'



○ Shear Data

— Best Fit Line

● $c = 51.4$ psf

$\Phi = 30.7$ degrees

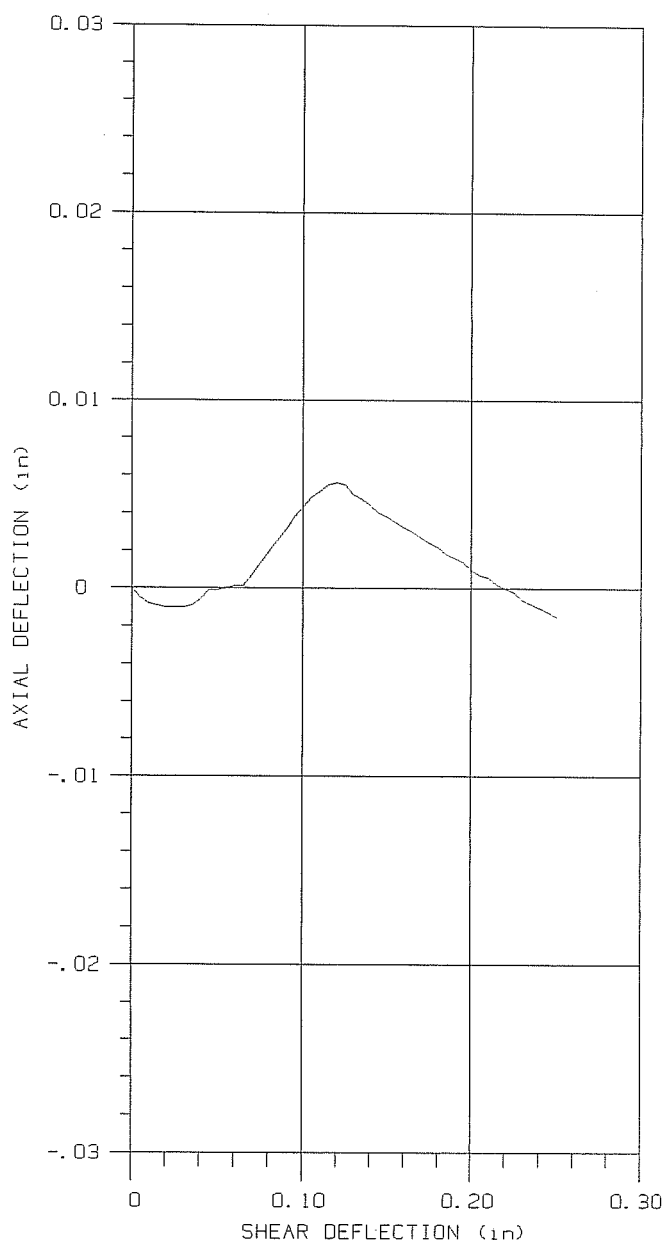
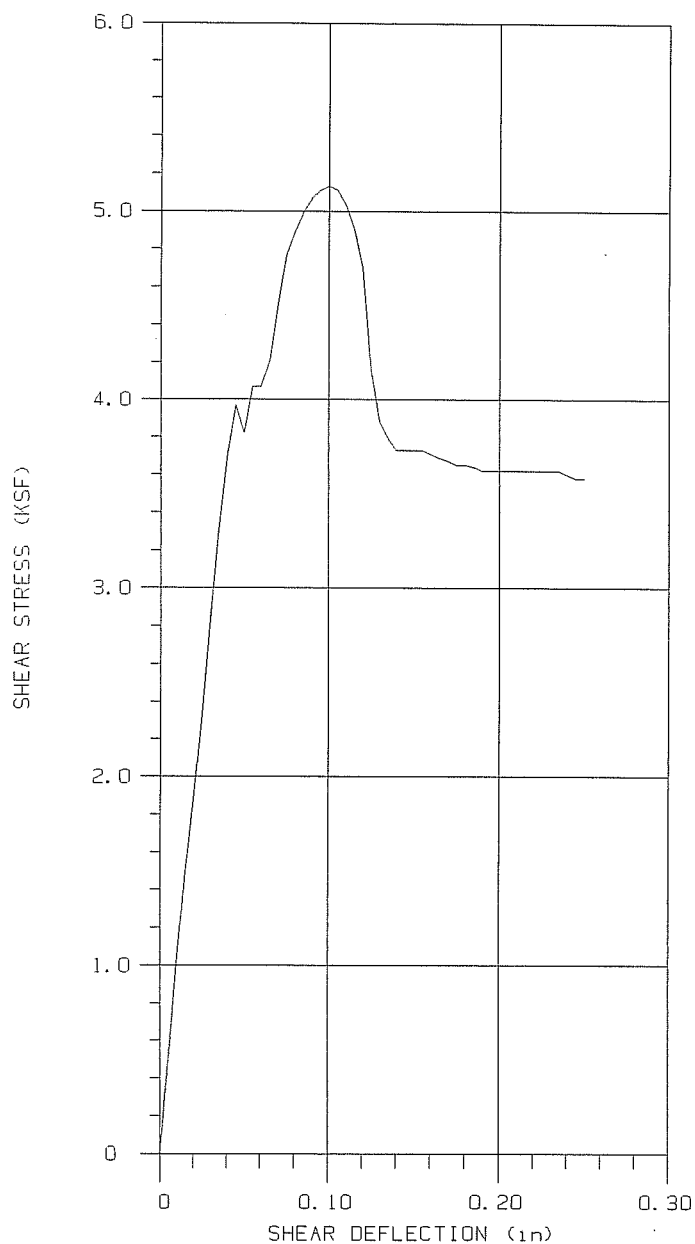
ADVANCED TERRA TESTING

Direct Shear Test

Client..... Tetra Tech
Location..... Rocky Flats OLF

Soil Type..... 114-181750
Depth..... 17.0 (ft)
Confining Pressure.. 5992 (psf)
Shear Rate..... .0020 (in/min)
Date Tested..... 04-29-2008

Job Number..... 2592-04
Sample Number... B Pt. A
Boring..... Tt-1
File Name..... ttdst17a.DAT
Tested By..... DPM



Pass Number and Line Type....	1	2	3	4
Maximum Shear Stress.....	5147	.0000	.0000	.0000
Shear Deflection @ Max Stress.	.0977	.0000	.0000	.0000

OMATIC Direct Shear Data

File Name.....ttdst17a.DAT
 Client.....Tetra Tech
 Job Number....2592-04
 Location.....Rocky Flats OLF
 Date.....04-29-2008
 Technician....DPM
 Sample Diameter (in).....1.938
 Confining Pressure (psf)..5992
 Number of Passes.....1
 Near Distance (in).....0.25
 Near Rate (in/min).....0020
 Soil Type.....114-181750
 Spring Number.....Tt-1
 Sample Number.....B Pt. A
 Depth (ft).....17.0

SHEAR DEFLECTION (in)	SHEAR STRESS (lb/sqFT)	AXIAL DEFLECTION (in)
0.005	503	-.0005
0.010	1007	-.0008
0.015	1492	-.0009
0.020	1883	-.0010
0.025	2331	-.0010
0.030	2834	-.0010
0.035	3301	-.0009
0.040	3711	-.0006
0.045	3972	-.0001
0.050	3823	-.0001
0.055	4065	0.0000
0.060	4065	0.0001
0.065	4214	0.0001
0.070	4513	0.0007
0.075	4774	0.0013
0.080	4886	0.0019
0.085	4998	0.0025
0.090	5072	0.0031
0.095	5109	0.0038
0.100	5128	0.0043
0.105	5109	0.0048
0.110	5035	0.0051
0.115	4904	0.0055
0.120	4699	0.0056
0.125	4158	0.0055
0.130	3879	0.0050
0.135	3786	0.0047
0.140	3730	0.0044
0.145	3730	0.0040
0.150	3730	0.0038
0.155	3730	0.0035
0.160	3711	0.0032
0.165	3692	0.0030
0.170	3674	0.0027
0.175	3655	0.0024

Continued next page.

ass 1 Continued

SHEAR DEFLECTION (in)	SHEAR STRESS (lb/sqFT)	AXIAL DEFLECTION (in)
0.180	3655	0.0022
0.185	3636	0.0018
0.190	3618	0.0016
0.195	3618	0.0014
0.200	3618	0.0010
0.205	3618	0.0007
0.210	3618	0.0006
0.215	3618	0.0002
0.220	3618	0.0000
0.225	3618	-.0002
0.230	3618	-.0006
0.235	3618	-.0008
0.240	3599	-.0010
0.245	3580	-.0012
0.250	3580	-.0015

ass 1 completed with max load = 5147 psf at deflection of .0977 in

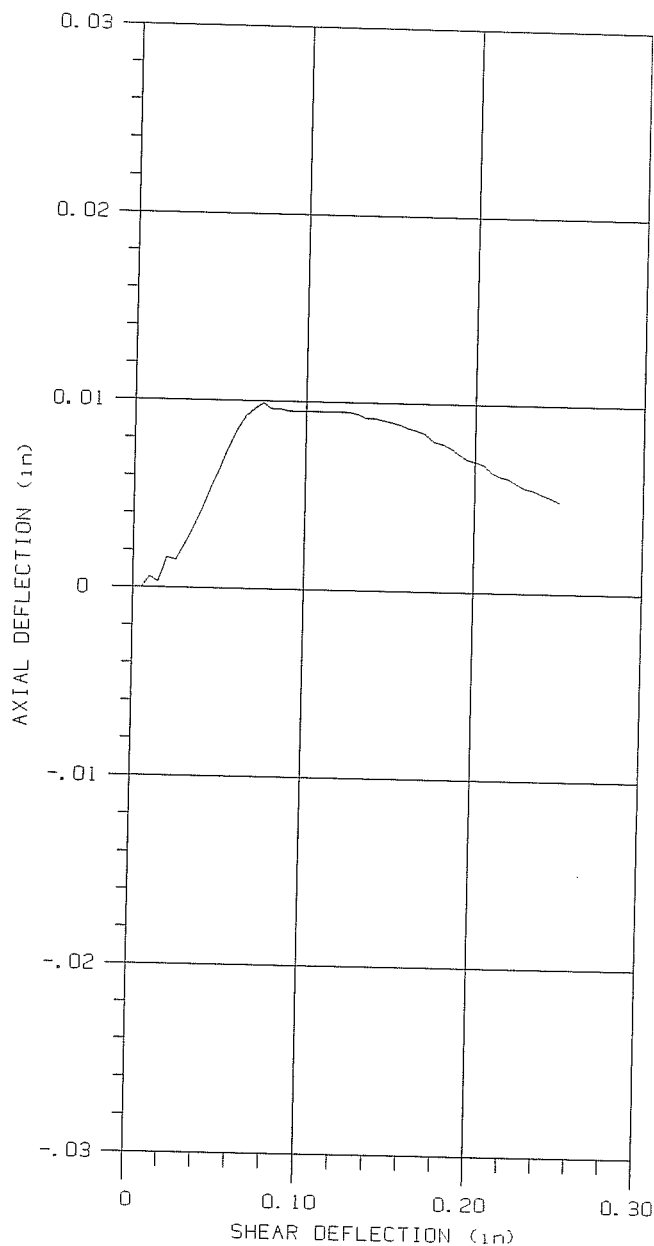
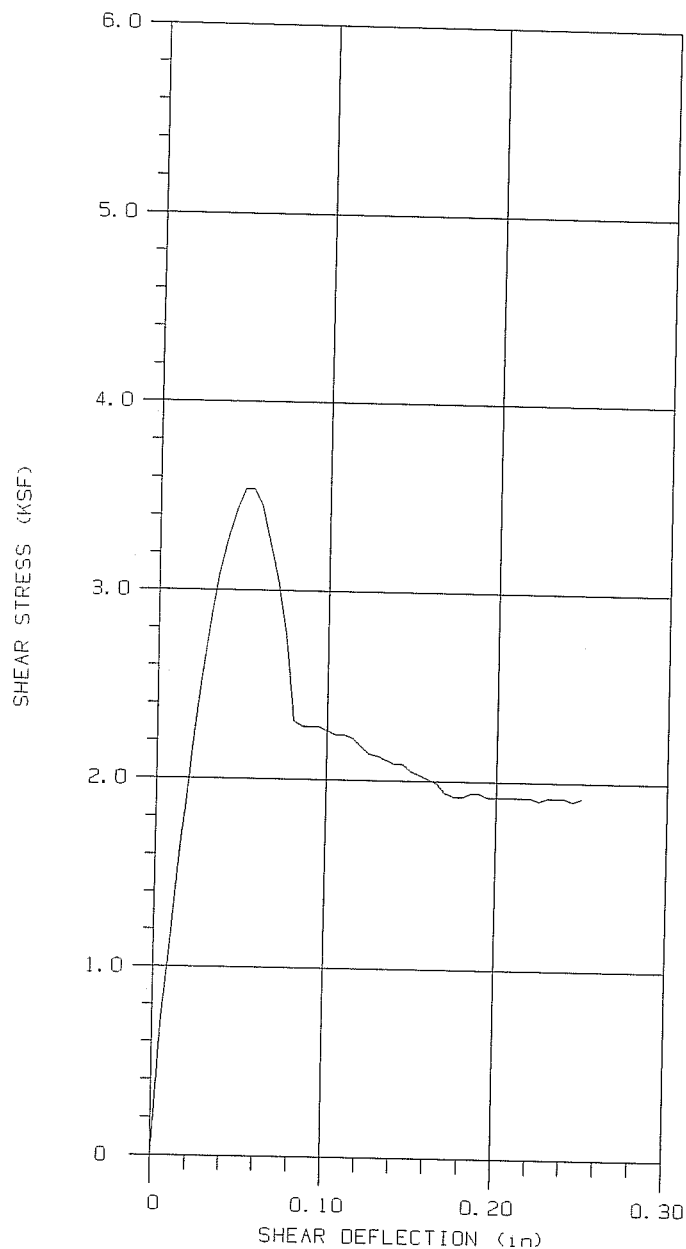
ADVANCED TERRA TESTING

Direct Shear Test

Client..... Tetra Tech
Location..... Rocky Flats OLF

Soil Type..... 114-181750
Depth..... 17.0 (ft)
Confining Pressure.. 2977 (psf)
Shear Rate..... .0020 (in/min)
Date Tested..... 04-30-2008

Job Number..... 2592-04
Sample Number... B Pt. B
Boring..... Tt-1
File Name..... ttdst17b.DAT
Tested By..... DPM



Pass Number and Line Type....	1 ———	2 - - - - -	3 ———	4 - - - - -
Maximum Shear Stress.....	3562	.0000	.0000	.0000
Shear Deflection @ Max Stress.	.0504	.0000	.0000	.0000

OMATIC Direct Shear Data

File Name.....ttdst17b.DAT
 Client.....Tetra Tech
 Job Number....2592-04
 Location.....Rocky Flats OLF
 Date.....04-30-2008
 Technician....DPM
 Sample Diameter (in).....1.938
 Confining Pressure (psf)..2977
 Number of Passes.....1
 Shear Distance (in).....0.25
 Shear Rate (in/min).....0020
 Soil Type.....114-181750
 Spring Number.....Tt-1
 Sample Number.....B Pt. B
 Depth (ft).....17.0

SHEAR DEFLECTION (in)	SHEAR STRESS (lb/sqFT)	AXIAL DEFLECTION (in)
0.005	690	0.0000
0.010	1138	0.0006
0.015	1678	0.0003
0.020	2126	0.0016
0.025	2499	0.0015
0.030	2797	0.0023
0.035	3077	0.0032
0.040	3282	0.0042
0.045	3431	0.0054
0.050	3543	0.0064
0.055	3543	0.0075
0.060	3450	0.0085
0.065	3245	0.0092
0.070	3040	0.0096
0.075	2760	0.0099
0.080	2312	0.0096
0.085	2275	0.0096
0.090	2275	0.0095
0.095	2275	0.0095
0.100	2256	0.0095
0.105	2238	0.0095
0.110	2238	0.0095
0.115	2219	0.0095
0.120	2182	0.0095
0.125	2144	0.0095
0.130	2126	0.0094
0.135	2107	0.0092
0.140	2089	0.0092
0.145	2089	0.0091
0.150	2051	0.0090
0.155	2033	0.0089
0.160	2014	0.0087
0.165	1995	0.0086
0.170	1939	0.0084
0.175	1921	0.0080

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ss 1 Continued

SHEAR DEFLECTION (in)	SHEAR STRESS (lb/sqFT)	AXIAL DEFLECTION (in)
0.180	1921	0.0079
0.185	1939	0.0077
0.190	1939	0.0074
0.195	1921	0.0071
0.200	1921	0.0070
0.205	1921	0.0068
0.210	1921	0.0064
0.215	1921	0.0062
0.220	1921	0.0061
0.225	1902	0.0058
0.230	1921	0.0056
0.235	1921	0.0055
0.240	1921	0.0053
0.245	1902	0.0051
0.250	1921	0.0049

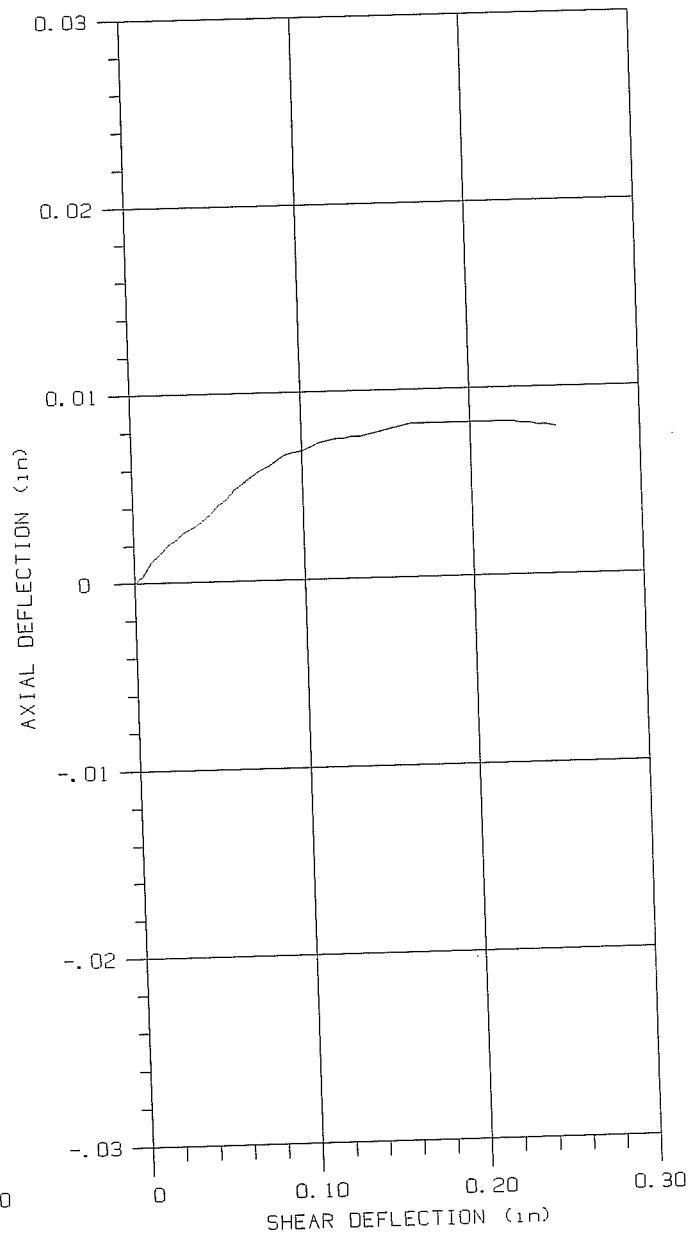
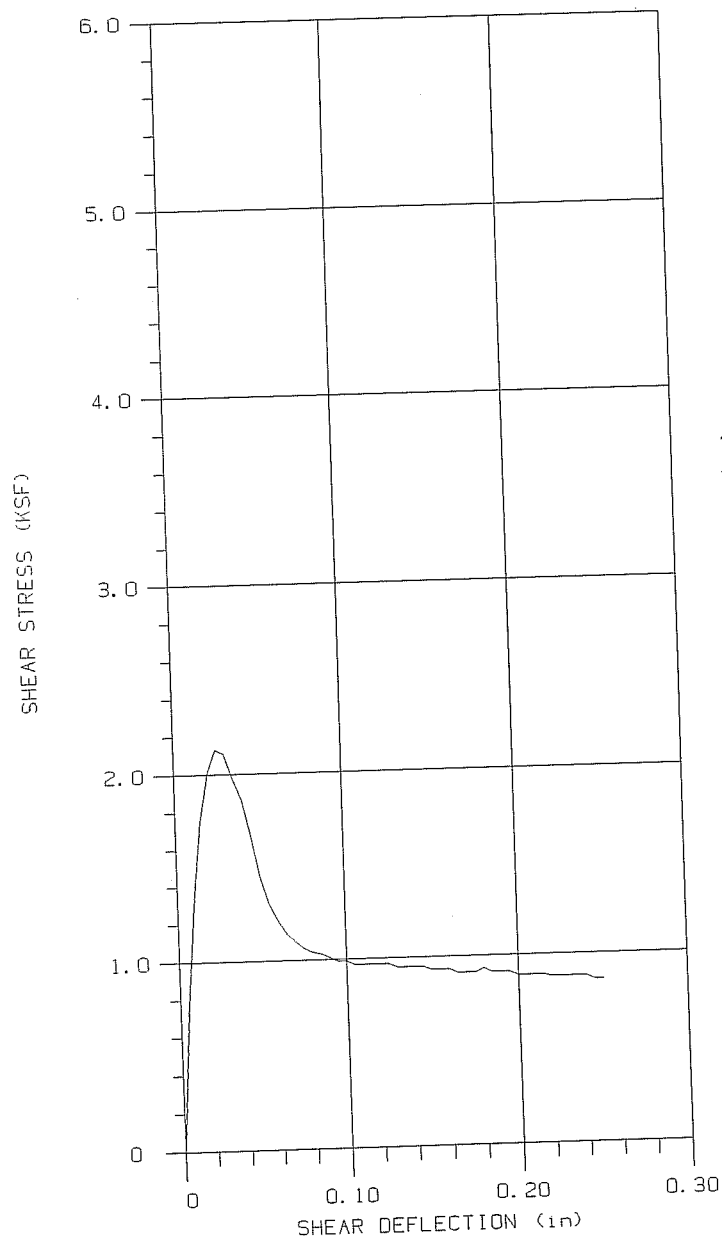
ss 1 completed with max load = 3562 psf at deflection of .0504 in

ADVANCED TERRA TESTING

Direct Shear Test

Client..... Tetra Tech
 Location..... Rocky Flats OLF
 Soil Type..... 114-181750
 Depth..... 17.0 (ft)
 Confining Pressure.. 1469 (psf)
 Shear Rate..... .0020 (in/min)
 Date Tested..... 04-30-2008

Job Number..... 2592-04
 Sample Number... B Pt. C
 Boring..... Tt-1
 File Name..... ttdst17c.DAT
 Tested By..... DPM



Pass Number and Line Type....	1	2	3	4
Maximum Shear Stress.....	2126	.0000	.0000	.0000
Shear Deflection @ Max Stress.	.0240	.0000	.0000	.0000

OMATIC Direct Shear Data

File Name.....ttdst17c.DAT
 Client.....Tetra Tech
 Job Number....2592-04
 Location.....Rocky Flats OLF
 Date.....04-30-2008
 Technician....DPM
 Sample Diameter (in).....1.938
 Confining Pressure (psf)..1469
 Number of Passes.....1
 Shear Distance (in).....0.25
 Shear Rate (in/min).....0020
 Soil Type.....114-181750
 Spring Number.....Tt-1
 Sample Number.....B Pt. C
 Depth (ft).....17.0

SHEAR DEFLECTION (in)	SHEAR STRESS (lb/sqFT)	AXIAL DEFLECTION (in)
0.005	783	0.0004
0.010	1343	0.0011
0.015	1753	0.0015
0.020	2014	0.0020
0.025	2126	0.0023
0.030	2107	0.0027
0.035	1977	0.0029
0.040	1865	0.0032
0.045	1660	0.0036
0.050	1436	0.0041
0.055	1305	0.0044
0.060	1212	0.0049
0.065	1138	0.0052
0.070	1100	0.0056
0.075	1063	0.0059
0.080	1044	0.0061
0.085	1026	0.0064
0.090	1007	0.0067
0.095	988	0.0068
0.100	988	0.0069
0.105	970	0.0071
0.110	970	0.0073
0.115	970	0.0074
0.120	970	0.0075
0.125	970	0.0075
0.130	951	0.0076
0.135	951	0.0076
0.140	951	0.0077
0.145	951	0.0078
0.150	932	0.0079
0.155	932	0.0080
0.160	932	0.0081
0.165	914	0.0082
0.170	914	0.0082
0.175	914	0.0082

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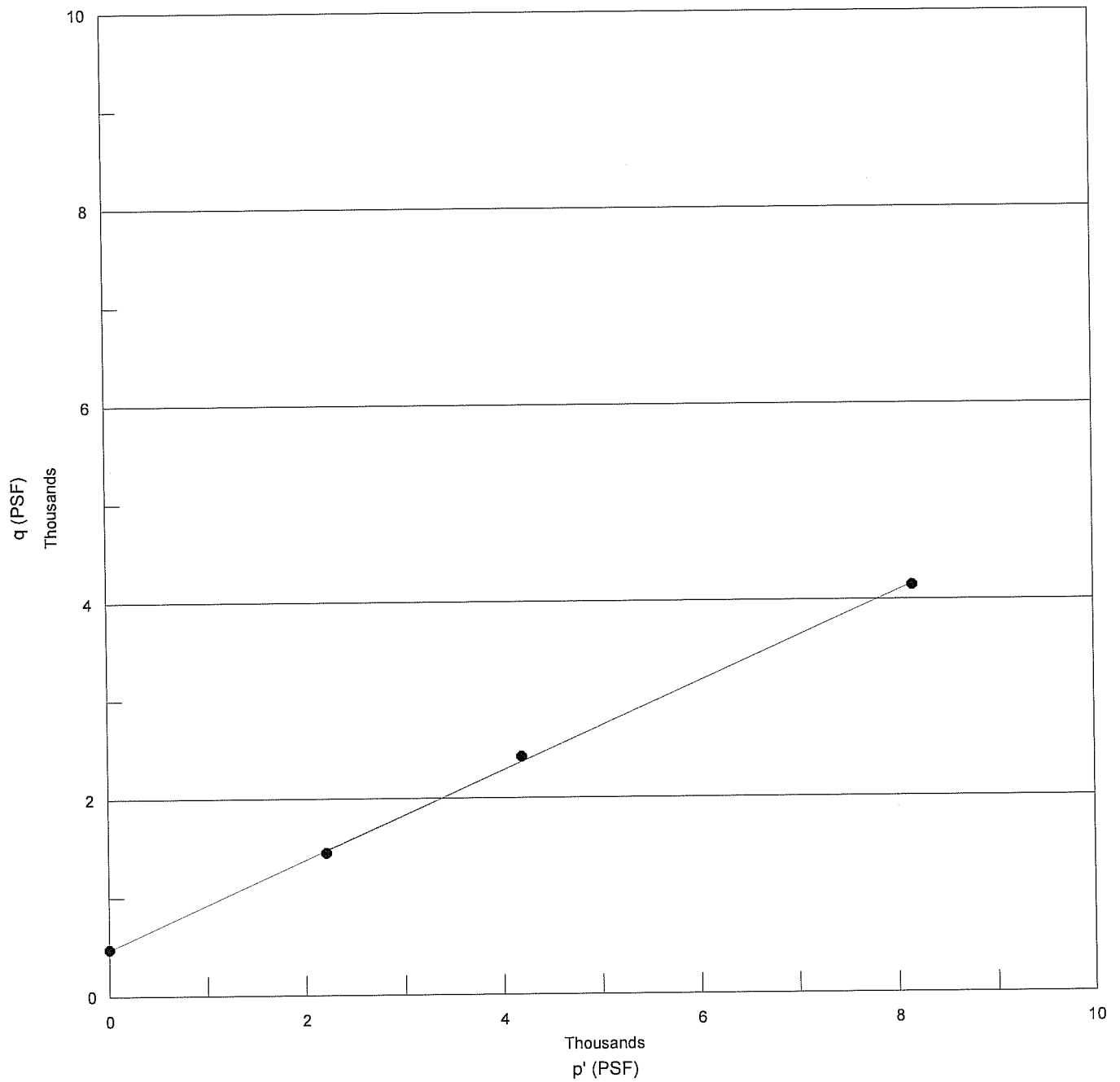
ss 1 Continued

SHEAR FLECTION (in)	SHEAR STRESS (lb/sqFT)	AXIAL DEFLECTION (in)
0.180	932	0.0082
0.185	914	0.0082
0.190	914	0.0082
0.195	914	0.0082
0.200	895	0.0082
0.205	895	0.0082
0.210	895	0.0082
0.215	895	0.0082
0.220	876	0.0082
0.225	876	0.0082
0.230	876	0.0081
0.235	876	0.0081
0.240	876	0.0080
0.245	858	0.0080
0.250	858	0.0079

ass 1 completed with max load = 2126 psf at deflection of .0240 in

Effective Stress Path Analysis - p' q Regression Plot

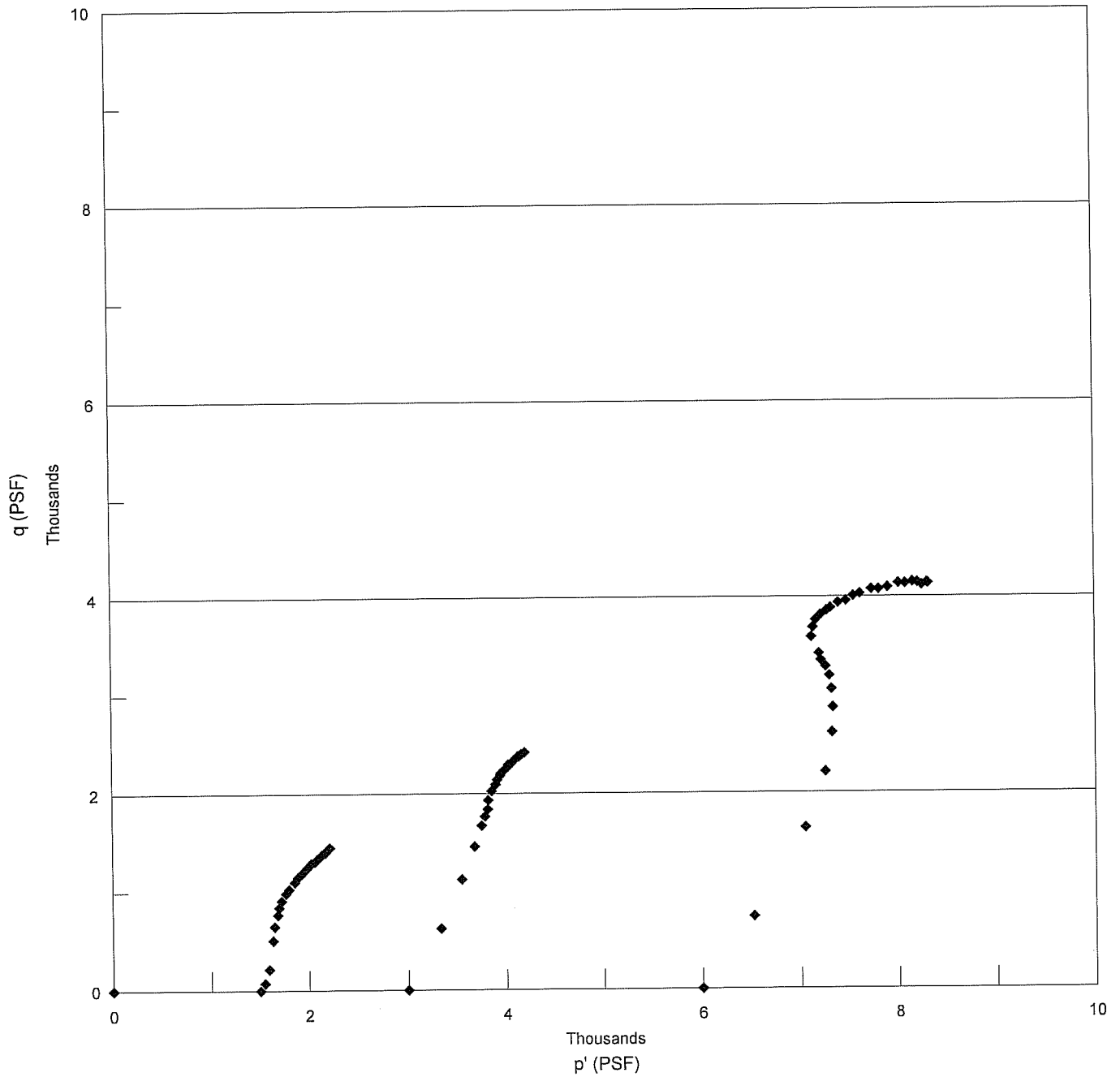
Tetra Tech MM (Fort Collins), Tt-4, 10.0', Stage 1 of 3, B, Stage 2 of 3, B, Stage 3 of 3, B



● Shear Data - Best Fit Line Tau = 24.3 degrees $a = 479.3$ PSF

Effective Stress Path Analysis - p' q Plots

Tetra Tech MM (Fort Collins), Tt-4, 10.0', Stage 1 of 3, B, Stage 2 of 3, B, Stage 3 of 3, B



◆ Stress Paths of Stages 1, 2, & 3, B

EFFECTIVE STRESS PATH ANALYSIS TEST DATA
ASTM D4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stages 1, 2 & 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF

SAMPLED 03-29-08 JLR
SATURATED TEST Yes
TEST TYPE TX/CUpp

				Peak Points	
				p'	q
				PSF	PSF
CONF. PRES. PSF	STAGE 1,B	1500	STAGE 1,B	2213	1448
	STAGE 2,B	3000	STAGE 2,B	4195	2419
	STAGE 3,B	6000	STAGE 3,B	8160	4147

STAGE 1,B				STAGE 2,B				STAGE 3,B			
σ 3'	σ 1'	p'	q	σ 3'	σ 1'	p'	q	σ 3'	σ 1'	p'	q
PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF
1500	1500	1500	0	3000	3000	3000	0	6000	6000	6000	0
1471	1616	1544	73	2712	3957	3335	623	5784	7258	6521	737
1370	1805	1588	218	2424	4673	3548	1124	5410	8687	7048	1639
1126	2140	1633	507	2222	5138	3680	1458	5050	9462	7256	2206
996	2298	1647	651	2078	5422	3750	1672	4718	9932	7325	2607
910	2452	1681	771	2021	5554	3787	1767	4474	10203	7338	2865
852	2537	1694	842	1978	5650	3814	1836	4272	10374	7323	3051
809	2636	1723	914	1891	5751	3821	1930	4114	10493	7303	3190
780	2750	1765	985	1834	5880	3857	2023	3984	10546	7265	3281
766	2829	1798	1032	1805	5989	3897	2092	3869	10566	7217	3348
751	2957	1854	1103	1776	6051	3914	2138	3782	10614	7198	3416
737	3036	1886	1150	1762	6127	3944	2183	3538	10710	7124	3586
737	3129	1933	1196	1747	6156	3951	2204	3451	10820	7136	3685
737	3223	1980	1243	1747	6246	3997	2249	3408	10925	7167	3759
737	3316	2026	1289	1747	6288	4018	2271	3408	11025	7217	3809
751	3375	2063	1312	1733	6317	4025	2292	3422	11138	7280	3858
751	3420	2086	1334	1747	6373	4060	2313	3437	11204	7320	3884
751	3512	2132	1381	1747	6416	4082	2334	3466	11329	7397	3932
766	3572	2169	1403	1747	6505	4126	2379	3523	11436	7479	3956
766	3616	2191	1425	1762	6515	4138	2377	3552	11558	7555	4003
766	3661	2213	1448	1762	6557	4159	2398	3595	11648	7622	4027
				1776	6613	4195	2419	3667	11812	7740	4072
								3739	11884	7812	4072
								3811	11998	7904	4093
								3883	12151	8017	4134
								3955	12216	8086	4131
								4013	12307	8160	4147
								4070	12353	8212	4141
								4142	12371	8257	4114
								4171	12445	8308	4137
								4186	12450	8318	4132

Data entry by: SR
Data checked by: ae
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 1 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 1500

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	408.9	406.6
Wt. Wet Soil & Pan (g)	417.0	414.8
Wt. Dry Soil & Pan (g)	351.7	351.7
Wt. Lost Moisture (g)	65.4	63.1
Wt. of Pan Only (g)	8.2	8.2
Wt. of Dry Soil (g)	343.5	343.5
Moisture Content %	19.0	18.4
Wet Density PCF	131.9	130.8
Dry Density PCF	110.8	110.5

Init. Diameter (in)	1.939
Init. Area (sq in)	2.953
Init. Height (in)	4.000
Vol. Bef. Consol. (cu ft)	0.00684
Vol. After Consol. (cu ft)	0.00685

Notes & Comments:

Data entry by: SR
Data checked by: ce
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 1 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 1500

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)	Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open	
40.0	38.0	1.6	8.0			
50.0	48.0	8.6	9.5	38.5	47.7	9.2
60.0	58.0	9.7	10.5	48.4	57.8	9.4
70.0		10.3	10.3	58.5	68.2	9.7

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	10.3	0.00
0.25	0.5	11.4	-1.05
0.50	0.7	11.5	-1.15
1	1.0	11.5	-1.20
2	1.4	11.7	-1.40
4	2.0	11.9	-1.55
9	3.0	12.1	-1.80
16	4.0	12.4	-2.10
30	5.5	12.7	-2.40
60	7.7	13.1	-2.80
120	11.0	13.5	-3.20
240	15.5	13.7	-3.40
360	19.0	13.8	-3.50

Initial Height (in)	4.000	Init. Vol. (CC)	193.59
Height Change (in)	0.016	Vol. Change (CC)	13.20
Ht. After Cons. (in)	3.984	Cell Exp. (CC)	13.74
Initial Area (sq in)	2.953	Net Change (CC)	-0.54
Area After Cons. (sq in)	2.973	Cons. Vol. (CC)	194.14

Data entry by: SR

Date: 05/05/2008

Data checked by: ae

Date: 5/6/08

FileName: TTT0TT4



TRIAXIAL COMPRESSION TEST DATA

CLIENT	Tetra Tech MM (Fort Collins)	JOB NO.	2592-04
BORING NO.	Tt-4	SAMPLED	03-29-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 1 of 3, B	TEST FINISHED	05-02-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	16S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	1500

Init. Ht. (in)	4.000	Init. Area (sq in)	2.953
Consol. Ht. (in)	3.984	Consol. Area (sq in)	2.973
Back Pres. PSI	58.8	Strain Rate (in/min)	0.002

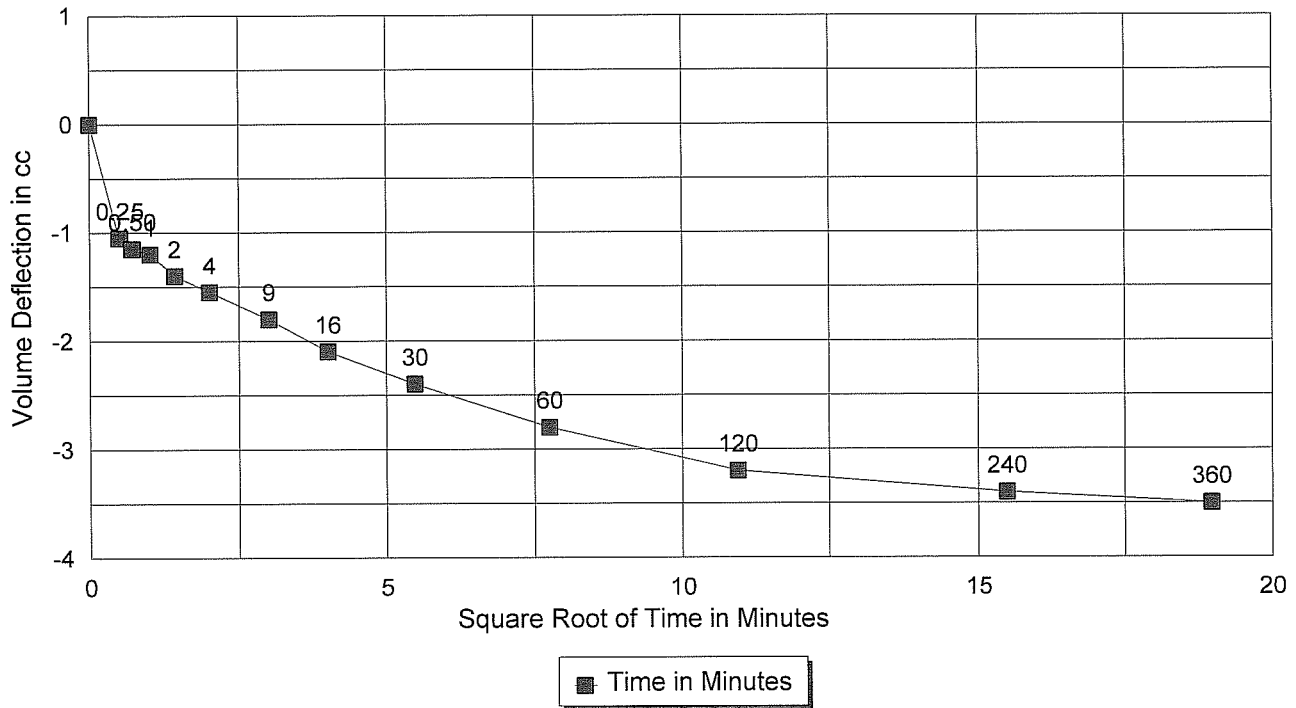
Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	2.973	0	58.8	0	1500	1500	1.00
3.0	145	0.004	0.10	2.976	145	59.0	29	1471	1616	1.10
9.0	436	0.008	0.20	2.979	435	59.7	130	1370	1805	1.32
21.0	1017	0.012	0.30	2.982	1014	61.4	374	1126	2140	1.90
27.0	1308	0.016	0.40	2.985	1302	62.3	504	996	2298	2.31
32.0	1550	0.020	0.50	2.988	1542	62.9	590	910	2452	2.70
35.0	1695	0.024	0.60	2.991	1685	63.3	648	852	2537	2.98
38.0	1841	0.028	0.70	2.994	1828	63.6	691	809	2636	3.26
41.0	1986	0.032	0.80	2.997	1970	63.8	720	780	2750	3.53
43.0	2083	0.036	0.90	3.000	2064	63.9	734	766	2829	3.70
46.0	2228	0.040	1.00	3.003	2206	64.0	749	751	2957	3.94
48.0	2325	0.044	1.10	3.006	2299	64.1	763	737	3036	4.12
50.0	2422	0.048	1.20	3.009	2393	64.1	763	737	3129	4.25
52.0	2519	0.052	1.31	3.012	2486	64.1	763	737	3223	4.37
54.0	2615	0.056	1.41	3.015	2579	64.1	763	737	3316	4.50
55.0	2664	0.060	1.51	3.019	2624	64.0	749	751	3375	4.49
56.0	2712	0.064	1.61	3.022	2669	64.0	749	751	3420	4.55
58.0	2809	0.068	1.71	3.025	2761	64.0	749	751	3512	4.68
59.0	2858	0.072	1.81	3.028	2806	63.9	734	766	3572	4.67
60.0	2906	0.076	1.91	3.031	2851	63.9	734	766	3616	4.72
61.0	2955	0.080	2.01	3.034	2895	63.9	734	766	3661	4.78

Data entry by: SR Date: 05/05/2008
 Data checked by: ce Date: 5/6/08
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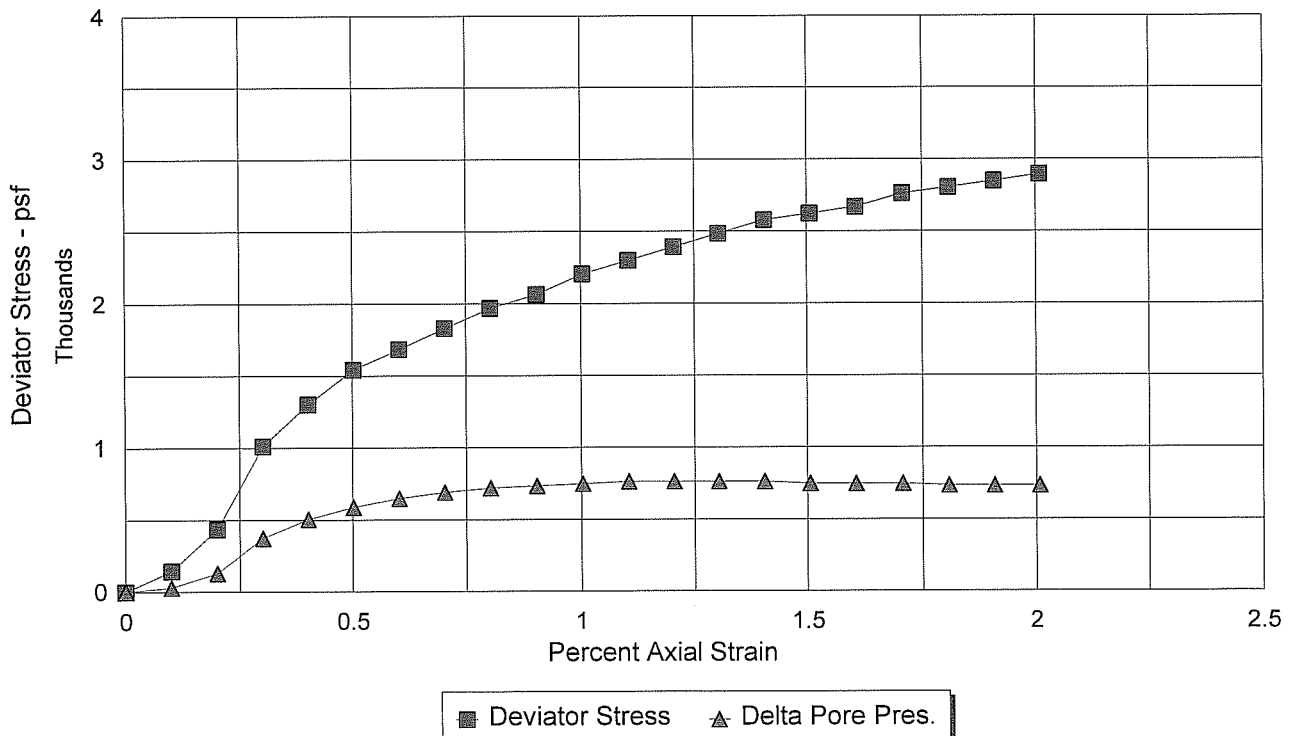
CONSOLIDATION DATA

Tt-4, 10.0', Stage 1 of 3, B



TRIAXIAL TEST - TX/CUpp

Tt-4, 10.0', Stage 1 of 3, B



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 2 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 3000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	408.9	406.6
Wt. Wet Soil & Pan (g)	417.0	414.8
Wt. Dry Soil & Pan (g)	351.7	351.7
Wt. Lost Moisture (g)	65.4	63.1
Wt. of Pan Only (g)	8.2	8.2
Wt. of Dry Soil (g)	343.5	343.5
Moisture Content %	19.0	18.4
Wet Density PCF	131.5	131.8
Dry Density PCF	110.5	111.4

Init. Diameter (in)	1.965
Init. Area (sq in)	3.034
Init. Height (in)	3.904
Vol. Bef. Consol. (cu ft)	0.00685
Vol. After Consol. (cu ft)	0.00680

Notes & Comments:

Data entry by: SR
Data checked by: ce
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



TRIAxIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-4	SAMPLED	03-29-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 2 of 3, B	TEST FINISHED	05-02-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	16S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	3000

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	15.8	0.00
0.25	0.5	16.6	-0.75
0.5	0.7	16.6	-0.80
1	1.0	16.7	-0.85
2	1.4	16.8	-1.00
4	2.0	16.9	-1.05
9	3.0	17.0	-1.20
16	4.0	17.2	-1.40
30	5.5	17.4	-1.60
60	7.7	17.7	-1.90
120	11.0	17.9	-2.10
240	15.5	18.0	-2.20
360	19.0	18.1	-2.30

Initial Height (in)	3.904	Init. Vol. (CC)	194.14
Height Change (in)	-0.008	Vol. Change (CC)	2.50
Ht. After Cons. (in)	3.912	Cell Exp. (CC)	0.95
Initial Area (sq in)	3.034	Net Change (CC)	1.55
Area After Cons. (sq in)	3.004	Cons. Vol. (CC)	192.58

Data entry by: SR
Data checked by: ae
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO.

2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 2 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 3000

Init. Ht. (in)	3.904	Init. Area (sq in)	3.034
Consol. Ht. (in)	3.912	Consol. Area (sq in)	3.004
Back Pres. PSI	58.5	Strain Rate (in/min)	0.002

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	3.004	0	58.5	0	3000	3000	1.00
26.0	1246	0.004	0.10	3.007	1245	60.5	288	2712	3957	1.46
47.0	2253	0.008	0.20	3.010	2249	62.5	576	2424	4673	1.93
61.0	2924	0.012	0.31	3.013	2916	63.9	778	2222	5138	2.31
70.0	3356	0.014	0.36	3.014	3344	64.9	922	2078	5422	2.61
74.0	3548	0.016	0.41	3.016	3533	65.3	979	2021	5554	2.75
77.0	3692	0.020	0.51	3.019	3673	65.6	1022	1978	5650	2.86
81.0	3883	0.024	0.61	3.022	3859	66.2	1109	1891	5751	3.04
85.0	4075	0.028	0.72	3.025	4046	66.6	1166	1834	5880	3.21
88.0	4219	0.032	0.82	3.028	4184	66.8	1195	1805	5989	3.32
90.0	4315	0.036	0.92	3.032	4275	67.0	1224	1776	6051	3.41
92.0	4411	0.040	1.02	3.035	4366	67.1	1238	1762	6127	3.48
93.0	4459	0.044	1.12	3.038	4408	67.2	1253	1747	6156	3.52
95.0	4555	0.048	1.23	3.041	4499	67.2	1253	1747	6246	3.57
96.0	4602	0.052	1.33	3.044	4541	67.2	1253	1747	6288	3.60
97.0	4650	0.056	1.43	3.047	4584	67.3	1267	1733	6317	3.65
98.0	4698	0.060	1.53	3.050	4626	67.2	1253	1747	6373	3.65
99.0	4746	0.064	1.64	3.054	4669	67.2	1253	1747	6416	3.67
101.0	4842	0.068	1.74	3.057	4758	67.2	1253	1747	6505	3.72
101.0	4842	0.072	1.84	3.060	4753	67.1	1238	1762	6515	3.70
102.0	4890	0.076	1.94	3.063	4795	67.1	1238	1762	6557	3.72
103.0	4938	0.080	2.04	3.066	4837	67.0	1224	1776	6613	3.72

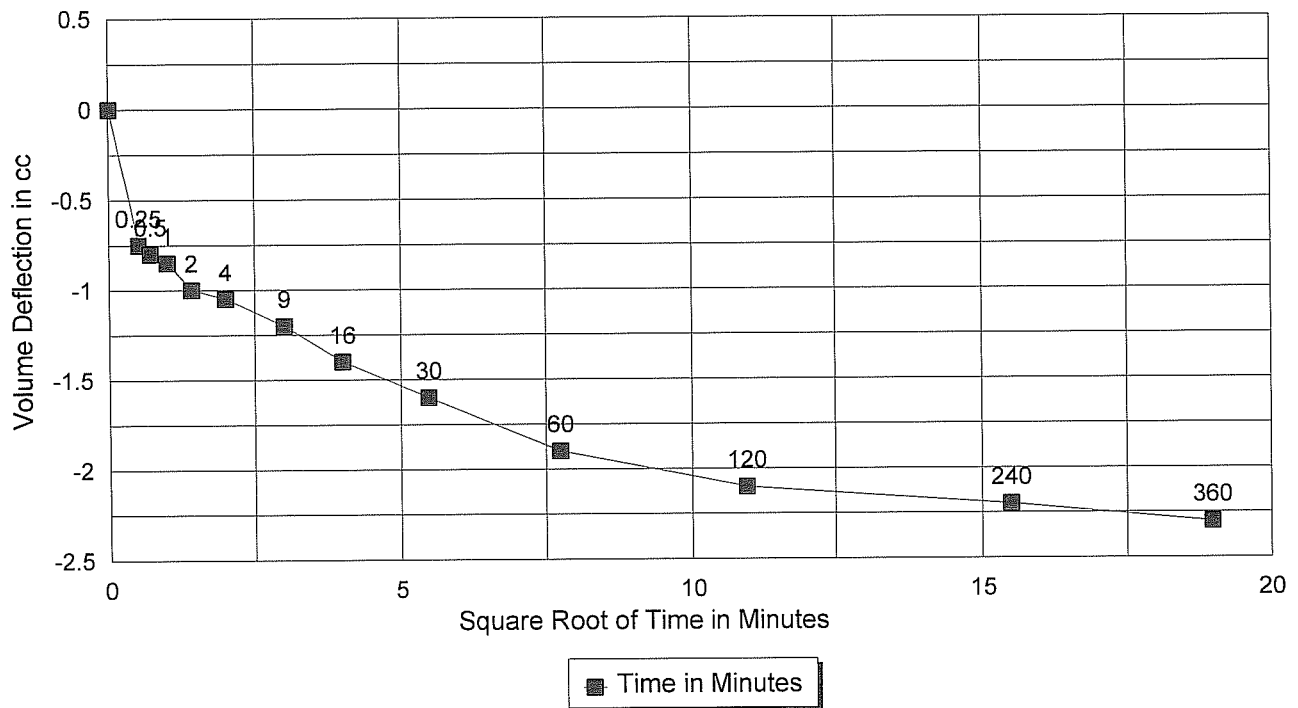
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FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



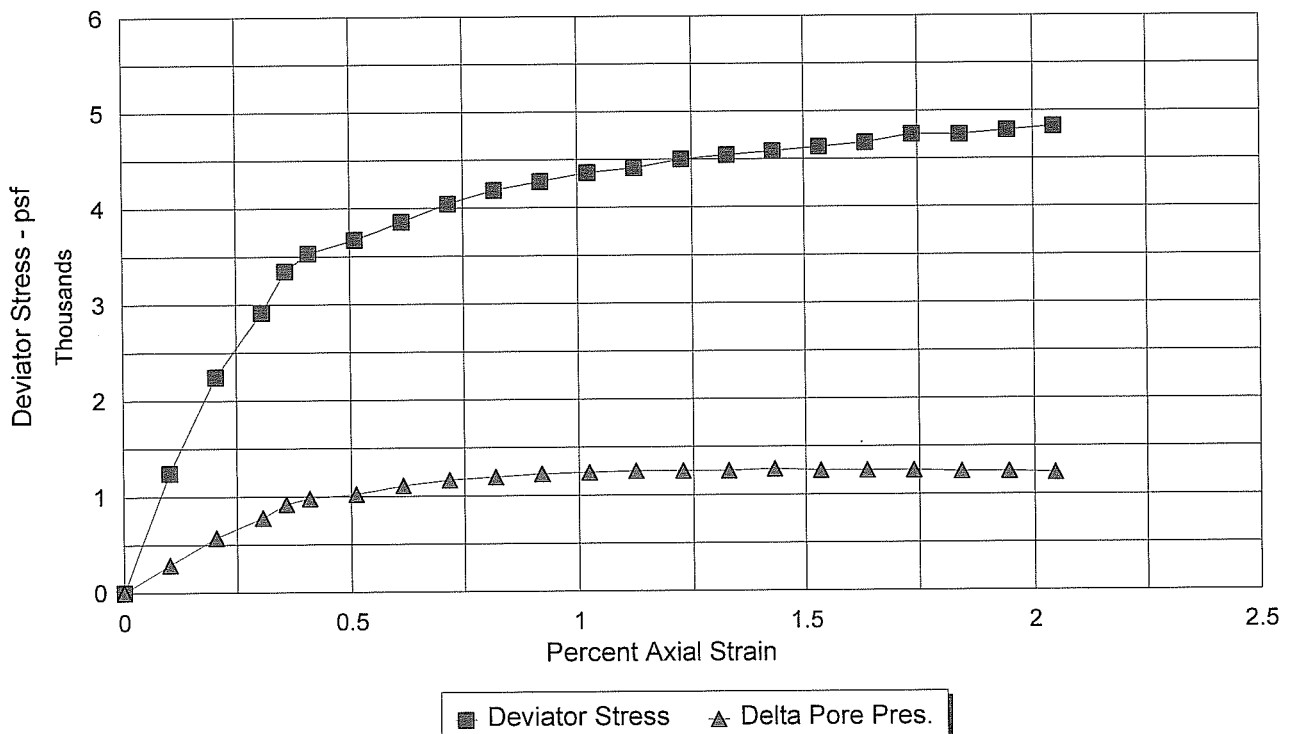
CONSOLIDATION DATA

Tt-4, 10.0', Stage 2 of 3, B



TRIAXIAL TEST - TX/CUpp

Tt-4, 10.0', Stage 2 of 3, B



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 3 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 6000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	408.9	406.6
Wt. Wet Soil & Pan (g)	417.0	414.8
Wt. Dry Soil & Pan (g)	351.7	351.7
Wt. Lost Moisture (g)	65.4	63.1
Wt. of Pan Only (g)	8.2	8.2
Wt. of Dry Soil (g)	343.5	343.5
Moisture Content %	19.0	18.4
Wet Density PCF	132.6	133.3
Dry Density PCF	111.4	112.6

Init. Diameter (in)	1.976
Init. Area (sq in)	3.066
Init. Height (in)	3.832
Vol. Bef. Consol. (cu ft)	0.00680
Vol. After Consol. (cu ft)	0.00672

Notes & Comments:

Data entry by: SR
Data checked by: ce
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 3 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 6000

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	19.20	0.00
0.25	0.5	20.60	-1.40
0.5	0.7	20.65	-1.45
1	1.0	20.70	-1.50
2	1.4	20.80	-1.60
4	2.0	20.90	-1.70
9	3.0	21.10	-1.90
16	4.0	21.30	-2.10
30	5.5	21.60	-2.40
60	7.7	21.90	-2.70
120	11.0	22.30	-3.10
240	15.5	22.60	-3.40
360	19.0	22.60	-3.40

Initial Height (in)	3.832	Init. Vol. (CC)	192.58
Height Change (in)	-0.007	Vol. Change (CC)	4.10
Ht. After Cons. (in)	3.839	Cell Exp. (CC)	1.91
Initial Area (sq in)	3.066	Net Change (CC)	2.19
Area After Cons. (sq in)	3.026	Cons. Vol. (CC)	190.39

Data entry by: SR
Data checked by: me
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO.

2592-04

BORING NO. Tt-4
DEPTH 10.0'
SAMPLE NO. Stage 3 of 3, B
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-29-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-02-08 CAL
CELL NUMBER 16S
SATURATED TEST Yes
CONF. PRES. PSF 6000

Init. Ht. (in) 3.832
Consol. Ht. (in) 3.839
Back Pres. PSI 58.6

Init. Area (sq in) 3.066
Consol. Area (sq in) 3.026
Strain Rate (in/min) 0.002

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	3.026	0	58.6	0	6000	6000	1.00
31.0	1475	0.004	0.10	3.029	1474	60.1	216	5784	7258	1.25
69.0	3284	0.008	0.20	3.032	3277	62.7	590	5410	8687	1.61
93.0	4426	0.012	0.30	3.035	4413	65.2	950	5050	9462	1.87
110.0	5235	0.015	0.40	3.038	5214	67.5	1282	4718	9932	2.11
121.0	5758	0.019	0.50	3.041	5730	69.2	1526	4474	10203	2.28
129.0	6139	0.023	0.60	3.044	6102	70.6	1728	4272	10374	2.43
135.0	6425	0.027	0.70	3.047	6380	71.7	1886	4114	10493	2.55
139.0	6615	0.031	0.80	3.050	6562	72.6	2016	3984	10546	2.65
142.0	6758	0.035	0.90	3.053	6697	73.4	2131	3869	10566	2.73
145.0	6900	0.038	1.00	3.056	6832	74.0	2218	3782	10614	2.81
153.0	7281	0.058	1.50	3.072	7172	75.7	2462	3538	10710	3.03
158.0	7519	0.077	2.00	3.087	7369	76.3	2549	3451	10820	3.14
162.0	7709	0.096	2.50	3.103	7517	76.6	2592	3408	10925	3.21
165.0	7852	0.115	3.00	3.119	7617	76.6	2592	3408	11025	3.24
168.0	7995	0.134	3.49	3.135	7716	76.5	2578	3422	11138	3.25
170.0	8090	0.153	3.99	3.152	7767	76.4	2563	3437	11204	3.26
173.0	8233	0.172	4.49	3.168	7863	76.2	2534	3466	11329	3.27
175.0	8328	0.192	4.99	3.185	7912	75.8	2477	3523	11436	3.25
178.0	8471	0.211	5.49	3.202	8006	75.6	2448	3552	11558	3.25
180.0	8566	0.230	5.99	3.219	8053	75.3	2405	3595	11648	3.24
184.0	8756	0.268	6.99	3.253	8145	74.8	2333	3667	11812	3.22
186.0	8852	0.307	7.99	3.289	8145	74.3	2261	3739	11884	3.18
189.0	8994	0.345	8.98	3.325	8186	73.8	2189	3811	11998	3.15
193.0	9185	0.383	9.98	3.361	8268	73.3	2117	3883	12151	3.13
195.0	9280	0.422	10.98	3.399	8261	72.8	2045	3955	12216	3.09
198.0	9423	0.460	11.98	3.438	8294	72.4	1987	4013	12307	3.07
200.0	9518	0.498	12.98	3.477	8283	72.0	1930	4070	12353	3.03
201.0	9565	0.537	13.97	3.517	8229	71.5	1858	4142	12371	2.99
204.0	9708	0.567	14.77	3.550	8274	71.3	1829	4171	12445	2.98
204.0	9708	0.571	14.87	3.555	8264	71.2	1814	4186	12450	2.97

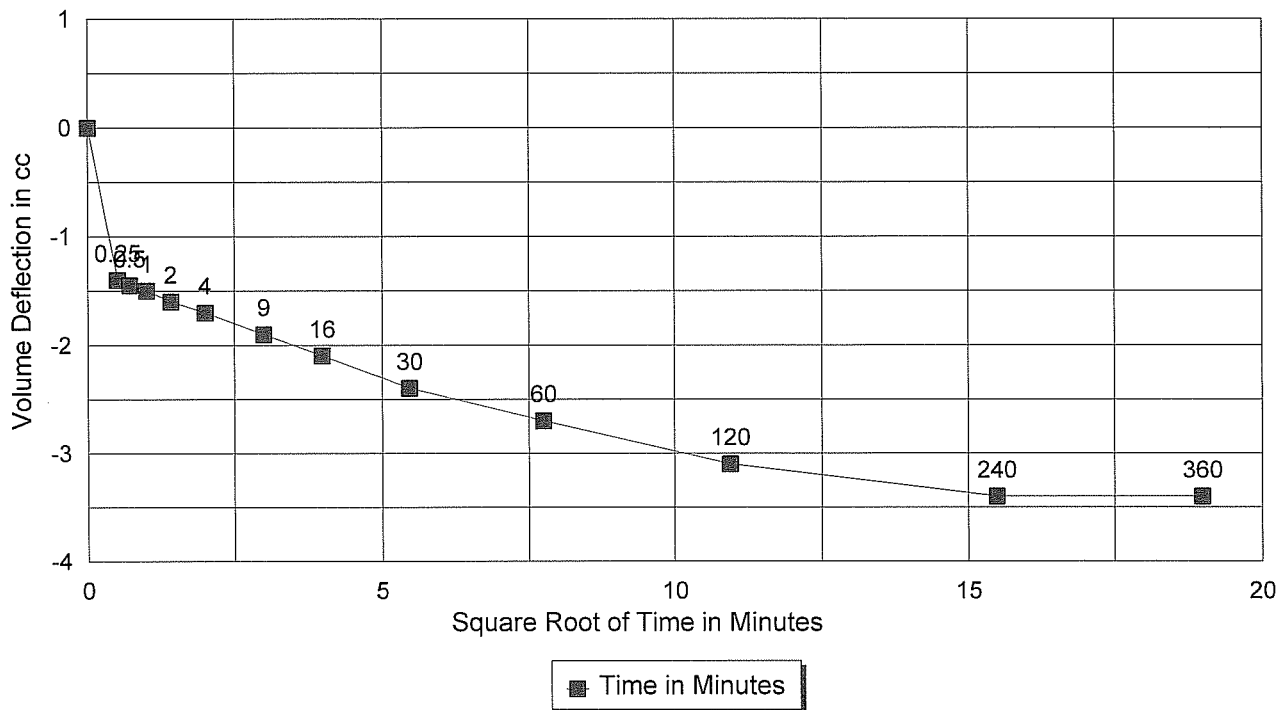
Data entry by: SR
Data checked by: ce
FileName: TTT0TT4

Date: 05/05/2008
Date: 5/6/08



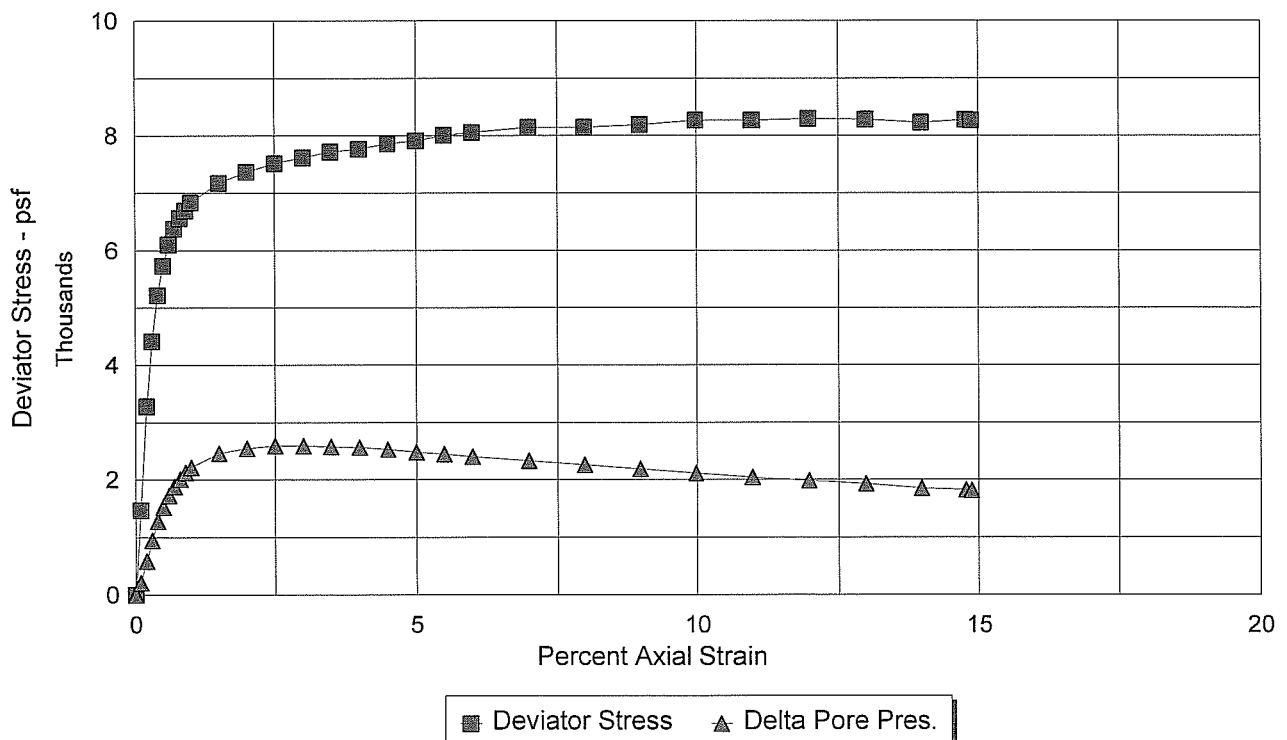
CONSOLIDATION DATA

Tt-4, 10.0', Stage 3 of 3, B



TRIAXIAL TEST - TX/CUpp

Tt-4, 10.0', Stage 3 of 3, B

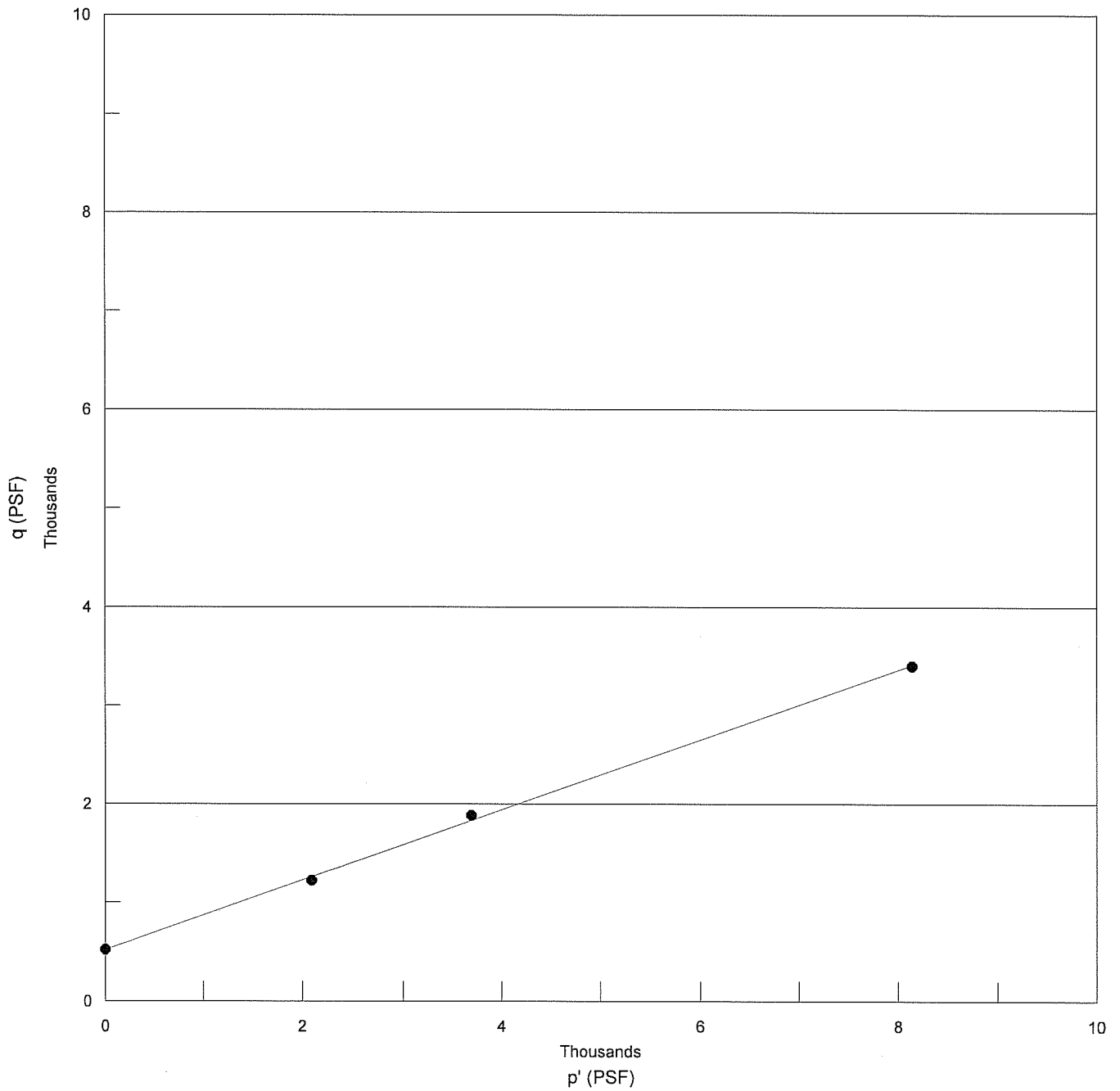


Client Tetra Tech AM
Job No. 2592-04
Boring No. TE-4
Depth 10'
Sample No. B
Project Rocky Flats OLF
Sampled 03/29/08 by JLR
Prepped 04/18/08 by CAL
Project No. 114-181750
3 stage TRKupp
 σ'_v 10.4, 20.8, 41.7 psi

TT2592\TTDP410B.jpg
05-05-08

Effective Stress Path Analysis - p' q Regression Plot

Tetra Tech MM (Fort Collins), Tt-7, 10.0', Stage 1 of 3, A, Stage 2 of 3, A, Stage 3 of 3, A



● Shear Data

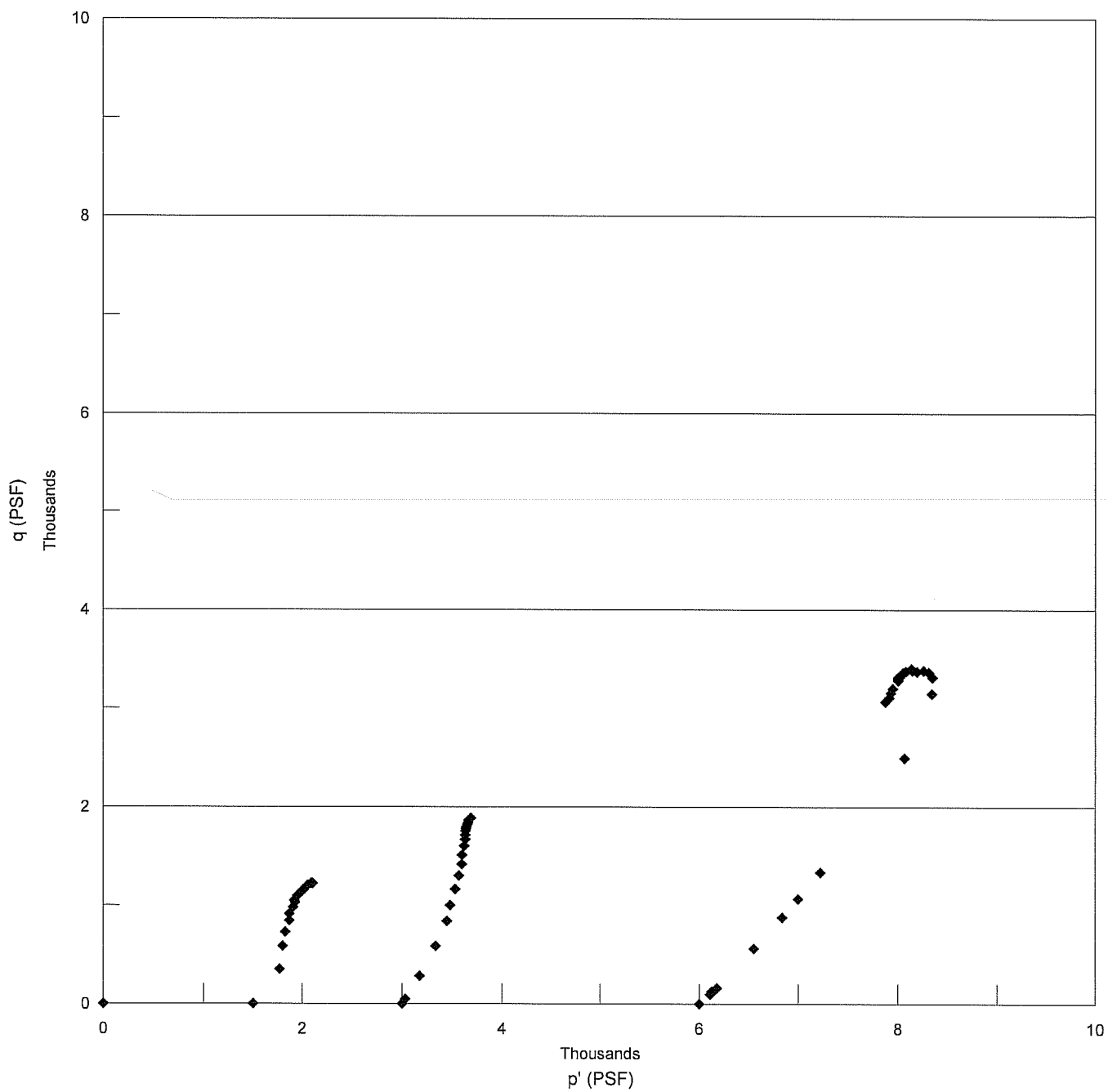
— Best Fit Line

$\tau = 19.6$ degrees

$a = 519.0$ PSF

Effective Stress Path Analysis - p' q Plots

Tetra Tech MM (Fort Collins), Tt-7, 10.0', Stage 1 of 3, A, Stage 2 of 3, A, Stage 3 of 3, A



◆ Stress Paths of Stages 1, 2, & 3, A

EFFECTIVE STRESS PATH ANALYSIS TEST DATA
ASTM D4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-7
DEPTH 10.0'
SAMPLE NO. Stages 1, 2 & 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF

SAMPLED 04-08-08 JLR
SATURATED TEST Yes
TEST TYPE TX/CUpp

Peak Points

					p'	q
					PSF	PSF
CONF. PRES. PSF	STAGE 1, A	1500	STAGE 1, A	2093	1226	
	STAGE 2, A	3000	STAGE 2, A	3690	1885	
	STAGE 3, A	6000	STAGE 3, A	8136	3404	

STAGE 1, A				STAGE 2, A				STAGE 3, A			
σ 3'	σ 1'	p'	q	σ 3'	σ 1'	p'	q	σ 3'	σ 1'	p'	q
PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF
1500	1500	1500	0	3000	3000	3000	0	6000	6000	6000	0
1414	2119	1767	353	2986	3079	3032	47	6000	6253	6127	127
1212	2387	1800	588	2899	3461	3180	281	6014	6206	6110	96
1097	2553	1825	728	2755	3925	3340	585	6014	6230	6122	108
1025	2714	1869	844	2611	4293	3452	841	6014	6337	6176	161
953	2780	1867	914	2482	4489	3485	1004	5986	7111	6548	563
924	2890	1907	983	2366	4698	3532	1166	5957	7712	6834	878
895	2953	1924	1029	2266	4874	3570	1304	5928	8065	6996	1068
866	2969	1917	1051	2179	5017	3598	1419	5885	8556	7220	1336
852	3045	1948	1096	2093	5114	3603	1511	5568	10563	8066	2498
852	3090	1971	1119	2021	5224	3623	1602	5194	11489	8341	3148
852	3134	1993	1141	1963	5303	3633	1670	5035	11660	8348	3312
852	3178	2015	1163	1920	5348	3634	1714	4949	11672	8311	3362
852	3176	2014	1162	1877	5394	3635	1759	4877	11639	8258	3381
852	3220	2036	1184	1862	5422	3642	1780	4819	11565	8192	3373
852	3217	2035	1183	1848	5450	3649	1801	4762	11529	8145	3384
852	3261	2056	1204	1834	5478	3656	1822	4733	11540	8136	3404
866	3319	2093	1226	1819	5506	3663	1843	4704	11457	8080	3376
866	3317	2091	1225	1805	5534	3669	1864	4690	11411	8050	3361
881	3328	2105	1224	1805	5576	3690	1885	4690	11365	8027	3338
881	3326	2103	1222	1805	5571	3688	1883	4690	11314	8002	3312
								4704	11331	8018	3314
								4704	11298	8001	3297
								4718	11286	8002	3284
								4747	11149	7948	3201
								4776	11086	7931	3155
								4805	11022	7913	3108
								4805	10941	7873	3068

Data entry by: SR Date: 05/07/2008
Data checked by: Cue Date: 5/7/08
FileName: TTT0TT7



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-7	SAMPLED	04-08-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 1 of 3, A	TEST FINISHED	05-06-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	13S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	1500

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	379.8	385.3
Wt. Wet Soil & Pan (g)	386.5	392.0
Wt. Dry Soil & Pan (g)	317.4	317.4
Wt. Lost Moisture (g)	69.1	74.6
Wt. of Pan Only (g)	6.8	6.8
Wt. of Dry Soil (g)	310.7	310.7
Moisture Content %	22.2	24.0
Wet Density PCF	128.1	123.9
Dry Density PCF	104.8	99.9

Init. Diameter (in)	1.928
Init. Area (sq in)	2.919
Init. Height (in)	3.867
Vol. Bef. Consol. (cu ft)	0.00653
Vol. After Consol. (cu ft)	0.00685

Notes & Comments:

Data entry by: SR
Data checked by: ce
FileName: TTT0TT7

Date: 05/07/2008
Date: 5/07/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-7	SAMPLED	04-08-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 1 of 3, A	TEST FINISHED	05-06-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	13S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	1500

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.0	5.1				
50.0		-4.0	-3.9	38.1	47.6	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	0.8	0.00
0.25	0.5	1.5	-0.70
0.50	0.7	1.6	-0.80
1	1.0	1.7	-0.90
2	1.4	1.8	-0.95
4	2.0	1.9	-1.10
9	3.0	2.1	-1.30
16	4.0	2.4	-1.60
30	5.5	2.7	-1.90
60	7.7	3.2	-2.40
120	11.0	3.8	-3.00
240	15.5	4.3	-3.50
360	19.0	4.6	-3.80

Initial Height (in)	3.867	Init. Vol. (CC)	185.04
Height Change (in)	-0.007	Vol. Change (CC)	-0.10
Ht. After Cons. (in)	3.874	Cell Exp. (CC)	8.97
Initial Area (sq in)	2.919	Net Change (CC)	-9.07
Area After Cons. (sq in)	3.057	Cons. Vol. (CC)	194.11

Data entry by: SR Date: 05/07/2008
Data checked by: ae Date: 5/07/08
FileName: TTT0TT7



TRIAXIAL COMPRESSION TEST DATA

CLIENT	Tetra Tech MM (Fort Collins)	JOB NO.	2592-04
BORING NO.	Tt-7	SAMPLED	04-08-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 1 of 3, A	TEST FINISHED	05-06-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	13S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	1500

Init. Ht. (in)	3.867	Init. Area (sq in)	2.919
Consol. Ht. (in)	3.874	Consol. Area (sq in)	3.057
Back Pres. PSI	38.8	Strain Rate (in/min)	0.001

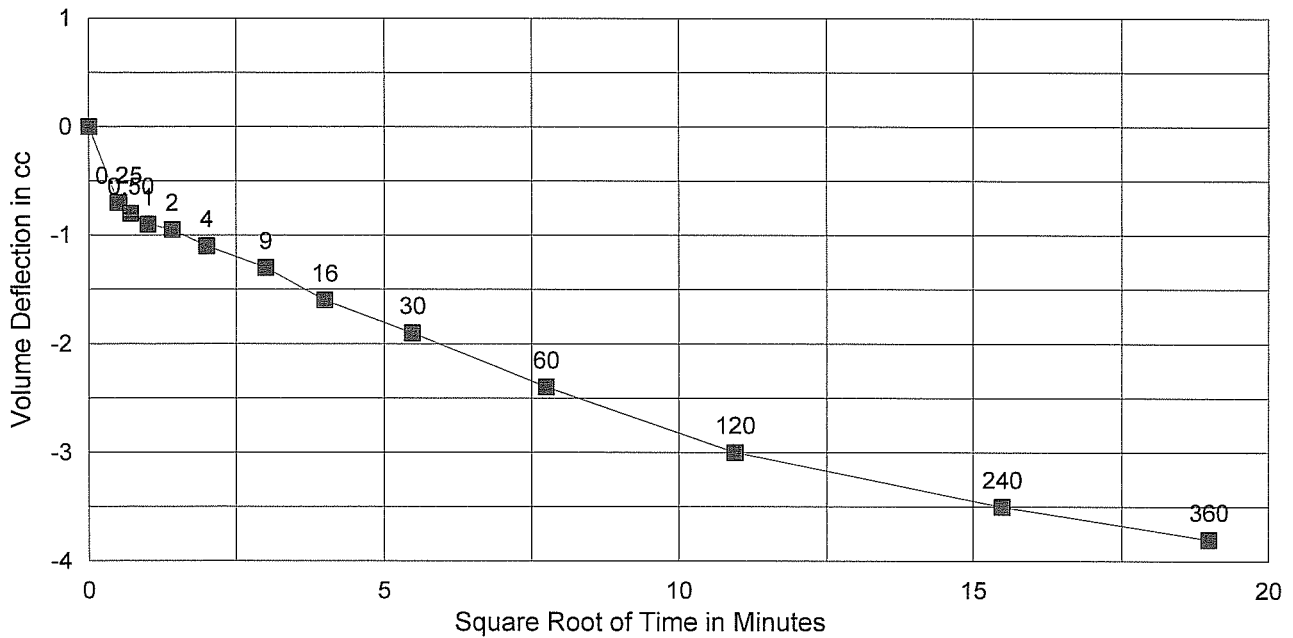
Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	3.057	0	38.8	0	1500	1500	1.00
15.0	707	0.004	0.10	3.060	706	39.4	86	1414	2119	1.50
25.0	1178	0.008	0.21	3.063	1175	40.8	288	1212	2387	1.97
31.0	1460	0.012	0.31	3.067	1456	41.6	403	1097	2553	2.33
36.0	1696	0.016	0.41	3.070	1689	42.1	475	1025	2714	2.65
39.0	1837	0.020	0.52	3.073	1828	42.6	547	953	2780	2.92
42.0	1978	0.024	0.62	3.076	1966	42.8	576	924	2890	3.13
44.0	2073	0.028	0.72	3.079	2058	43.0	605	895	2953	3.30
45.0	2120	0.032	0.83	3.083	2102	43.2	634	866	2969	3.43
47.0	2214	0.037	0.95	3.086	2193	43.3	648	852	3045	3.57
48.0	2261	0.040	1.03	3.089	2238	43.3	648	852	3090	3.63
49.0	2308	0.044	1.14	3.092	2282	43.3	648	852	3134	3.68
50.0	2355	0.048	1.24	3.095	2326	43.3	648	852	3178	3.73
50.0	2355	0.052	1.34	3.099	2324	43.3	648	852	3176	3.73
51.0	2402	0.056	1.45	3.102	2368	43.3	648	852	3220	3.78
51.0	2402	0.060	1.55	3.105	2365	43.3	648	852	3217	3.78
52.0	2449	0.064	1.65	3.108	2409	43.3	648	852	3261	3.83
53.0	2497	0.068	1.76	3.112	2453	43.2	634	866	3319	3.83
53.0	2497	0.072	1.86	3.115	2450	43.2	634	866	3317	3.83
53.0	2497	0.076	1.96	3.118	2448	43.1	619	881	3328	3.78
53.0	2497	0.080	2.07	3.122	2445	43.1	619	881	3326	3.78

Data entry by: SR Date: 05/07/2008
 Data checked by: ce Date: 5/07/08
 FileName: TTT0TT7



CONSOLIDATION DATA

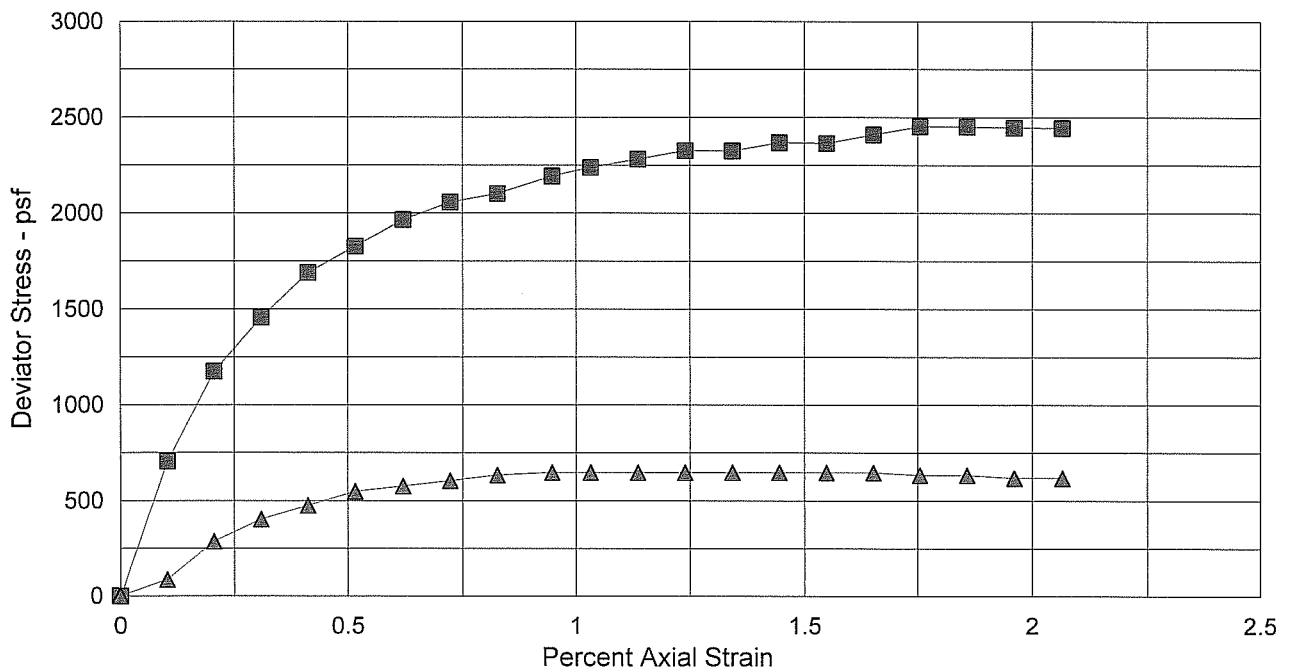
Tt-7, 10.0', Stage 1 of 3, A



■ Time in Minutes

TRIAXIAL TEST - TX/CUpp

Tt-7, 10.0', Stage 1 of 3, A



■ Deviator Stress ▲ Delta Pore Pres.

TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-7	SAMPLED	04-08-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 2 of 3, A	TEST FINISHED	05-06-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	13S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	3000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	379.8	385.3
Wt. Wet Soil & Pan (g)	386.5	392.0
Wt. Dry Soil & Pan (g)	317.4	317.4
Wt. Lost Moisture (g)	69.1	74.6
Wt. of Pan Only (g)	6.8	6.8
Wt. of Dry Soil (g)	310.7	310.7
Moisture Content %	22.2	24.0
Wet Density PCF	122.2	125.8
Dry Density PCF	99.9	101.4

Init. Diameter (in)	1.994
Init. Area (sq in)	3.122
Init. Height (in)	3.794
Vol. Bef. Consol. (cu ft)	0.00685
Vol. After Consol. (cu ft)	0.00675

Notes & Comments:

Data entry by: SR
Data checked by: ae
FileName: TTT0TT7

Date: 05/07/2008
Date: 5/07/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-7	SAMPLED	04-08-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 2 of 3, A	TEST FINISHED	05-06-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	13S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUp	CONF. PRES. PSF	3000

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	6.4	0.00
0.25	0.5	7.1	-0.70
0.5	0.7	7.1	-0.70
1	1.0	7.1	-0.73
2	1.4	7.2	-0.80
4	2.0	7.2	-0.80
9	3.0	7.3	-0.90
16	4.0	7.4	-1.00
30	5.5	7.6	-1.20
60	7.7	7.9	-1.50
120	11.0	8.2	-1.80
262	16.2	8.8	-2.40
360	19.0	9.1	-2.70

Initial Height (in)	3.794	Init. Vol. (CC)	194.11
Height Change (in)	-0.009	Vol. Change (CC)	3.70
Ht. After Cons. (in)	3.803	Cell Exp. (CC)	0.88
Initial Area (sq in)	3.122	Net Change (CC)	2.82
Area After Cons. (sq in)	3.069	Cons. Vol. (CC)	191.29

Data entry by: SR

Date: 05/07/2008

Data checked by: ae

Date: 5/07/08

FileName: TTT0TT7



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO.

2592-04

BORING NO. Tt-7
DEPTH 10.0'
SAMPLE NO. Stage 2 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 04-08-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-06-08 CAL
CELL NUMBER 13S
SATURATED TEST Yes
CONF. PRES. PSF 3000

Init. Ht. (in)	3.794	Init. Area (sq in)	3.122
Consol. Ht. (in)	3.803	Consol. Area (sq in)	3.069
Back Pres. PSI	38.8	Strain Rate (in/min)	0.001

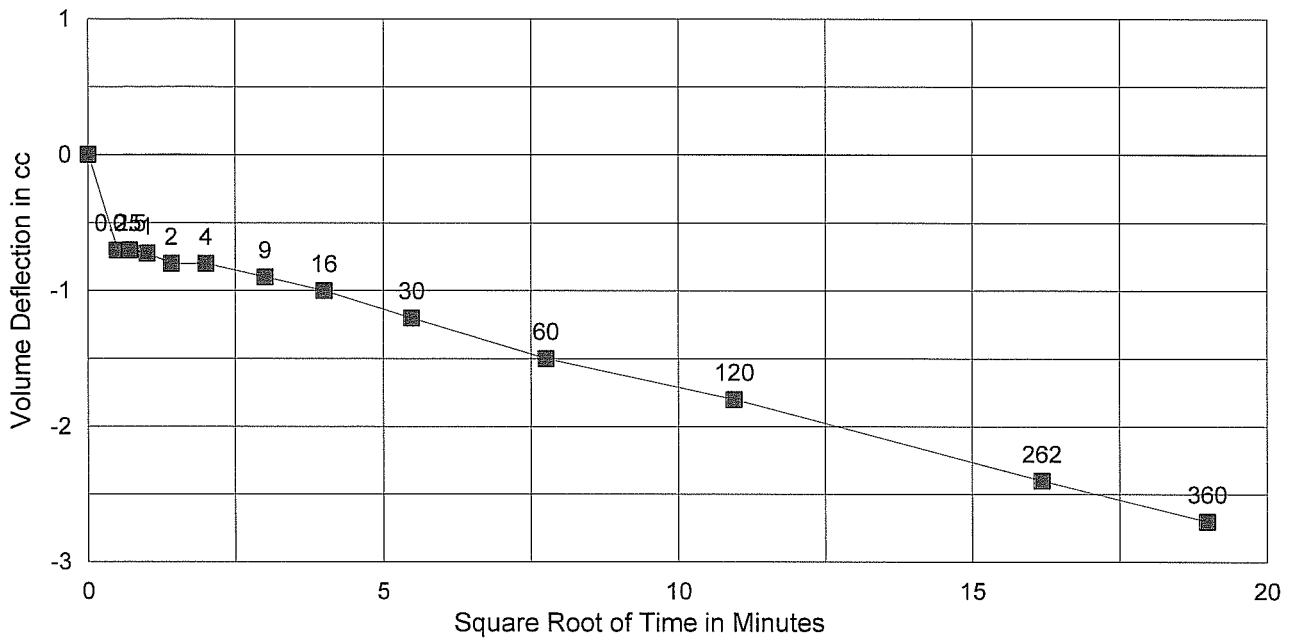
Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	3.069	0	38.8	0	3000	3000	1.00
2.0	94	0.004	0.11	3.072	94	38.9	14	2986	3079	1.03
12.0	563	0.008	0.21	3.075	562	39.5	101	2899	3461	1.19
25.0	1173	0.012	0.32	3.079	1169	40.5	245	2755	3925	1.42
36.0	1689	0.016	0.42	3.082	1682	41.5	389	2611	4293	1.64
43.0	2018	0.020	0.53	3.085	2007	42.4	518	2482	4489	1.81
50.0	2346	0.024	0.63	3.088	2331	43.2	634	2366	4698	1.99
56.0	2628	0.028	0.74	3.092	2608	43.9	734	2266	4874	2.15
61.0	2862	0.032	0.84	3.095	2838	44.5	821	2179	5017	2.30
65.0	3050	0.036	0.95	3.098	3021	45.1	907	2093	5114	2.44
69.0	3238	0.040	1.05	3.102	3204	45.6	979	2021	5224	2.59
72.0	3378	0.044	1.16	3.105	3339	46.0	1037	1963	5303	2.70
74.0	3472	0.048	1.26	3.108	3428	46.3	1080	1920	5348	2.79
76.0	3566	0.052	1.37	3.111	3517	46.6	1123	1877	5394	2.87
77.0	3613	0.056	1.47	3.115	3560	46.7	1138	1862	5422	2.91
78.0	3660	0.060	1.58	3.118	3602	46.8	1152	1848	5450	2.95
79.0	3707	0.064	1.68	3.121	3644	46.9	1166	1834	5478	2.99
80.0	3754	0.068	1.79	3.125	3687	47.0	1181	1819	5506	3.03
81.0	3801	0.072	1.89	3.128	3729	47.1	1195	1805	5534	3.07
82.0	3848	0.076	2.00	3.131	3771	47.1	1195	1805	5576	3.09
82.0	3848	0.080	2.10	3.135	3767	47.1	1195	1805	5571	3.09

Data entry by: SR Date: 05/07/2008
Data checked by: ce Date: 5/07/08
FileName: TTT0TT7



CONSOLIDATION DATA

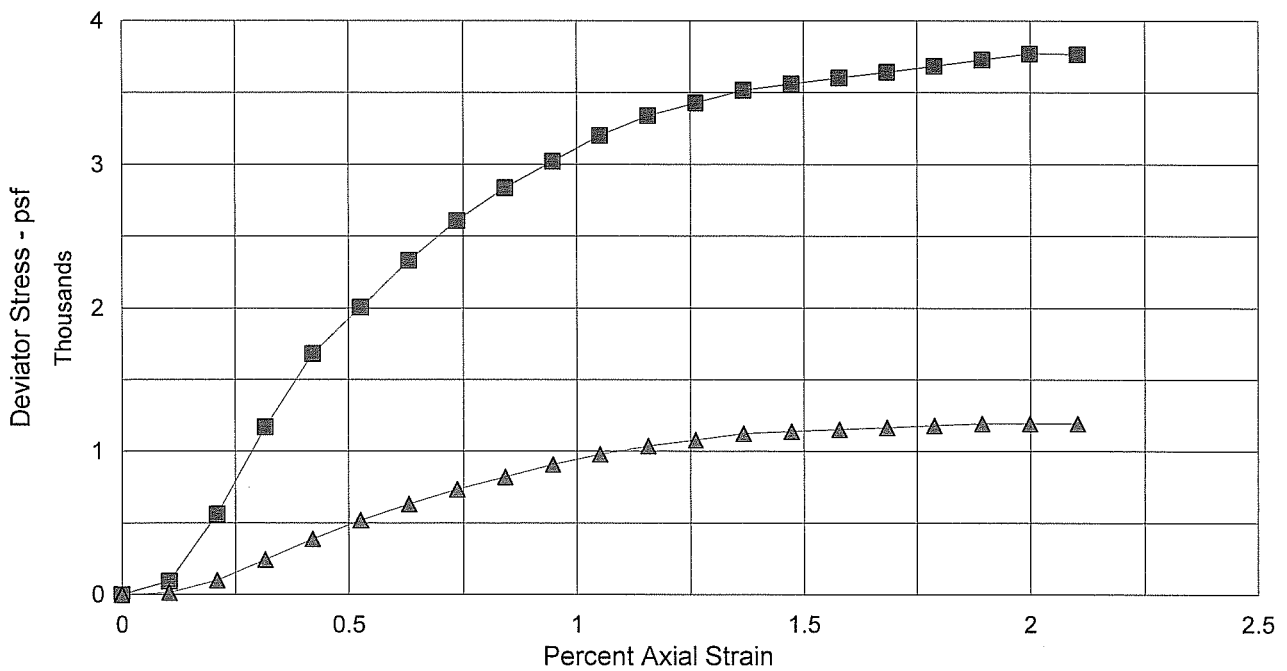
Tt-7, 10.0', Stage 2 of 3, A



■ Time in Minutes

TRIAXIAL TEST - TX/CUpp

Tt-7, 10.0', Stage 2 of 3, A



■ Deviator Stress ▲ Delta Pore Pres.

TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-7	SAMPLED	04-08-08 JLR
DEPTH	10.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 3 of 3, A	TEST FINISHED	05-06-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	13S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	6000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	379.8	385.3
Wt. Wet Soil & Pan (g)	386.5	392.0
Wt. Dry Soil & Pan (g)	317.4	317.4
Wt. Lost Moisture (g)	69.1	74.6
Wt. of Pan Only (g)	6.8	6.8
Wt. of Dry Soil (g)	310.7	310.7
Moisture Content %	22.2	24.0
Wet Density PCF	124.0	128.3
Dry Density PCF	101.4	103.4

Init. Diameter (in)	1.998
Init. Area (sq in)	3.135
Init. Height (in)	3.723
Vol. Bef. Consol. (cu ft)	0.00675
Vol. After Consol. (cu ft)	0.00662

Notes & Comments:

Data entry by: SR
Data checked by:
FileName: TTT0TT7

Date: 05/07/2008
Date: 5/07/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-7
DEPTH 10.0'
SAMPLE NO. Stage 3 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 04-08-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-06-08 CAL
CELL NUMBER 13S
SATURATED TEST Yes
CONF. PRES. PSF 6000

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	11.90	0.00
0.25	0.5	13.25	-1.35
0.5	0.7	13.30	-1.40
1	1.0	13.40	-1.50
2	1.4	13.50	-1.60
4	2.0	13.60	-1.70
9	3.0	13.60	-1.70
16	4.0	13.80	-1.90
30	5.5	13.90	-2.00
60	7.7	14.20	-2.30
120	11.0	14.60	-2.70
240	15.5	15.20	-3.30
360	19.0	15.65	-3.75

Initial Height (in)	3.723	Init. Vol. (CC)	191.29
Height Change (in)	-0.008	Vol. Change (CC)	5.50
Ht. After Cons. (in)	3.731	Cell Exp. (CC)	1.77
Initial Area (sq in)	3.135	Net Change (CC)	3.73
Area After Cons. (sq in)	3.067	Cons. Vol. (CC)	187.56

Data entry by: SR

Date: 05/07/2008

Data checked by: cel

Date: 5/07/08

FileName: TTT0TT7



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO.

2592-04

BORING NO. Tt-7
DEPTH 10.0'
SAMPLE NO. Stage 3 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 04-08-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-06-08 CAL
CELL NUMBER 13S
SATURATED TEST Yes
CONF. PRES. PSF 6000

Init. Ht. (in) 3.723
Consol. Ht. (in) 3.731
Back Pres. PSI 38.1

Init. Area (sq in) 3.135
Consol. Area (sq in) 3.067
Strain Rate (in/min) 0.002

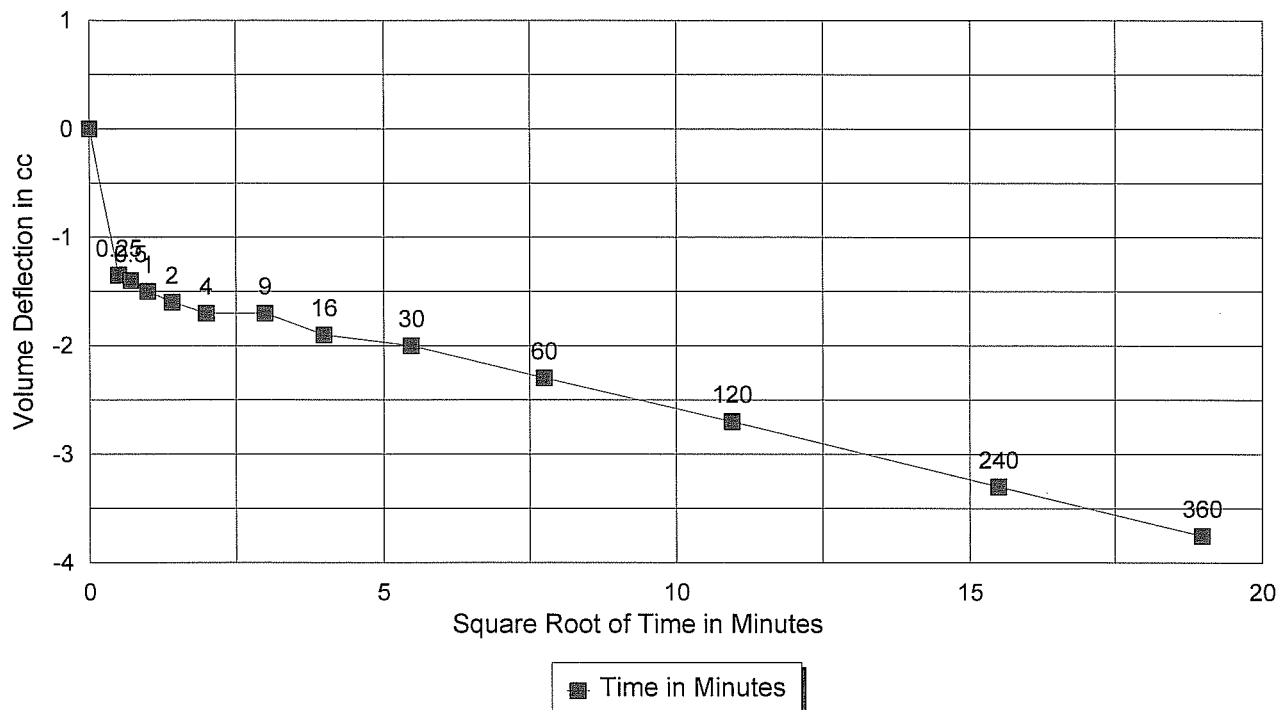
Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	3.067	0	38.1	0	6000	6000	1.00
5.4	254	0.005	0.13	3.071	253	38.1	0	6000	6253	1.04
4.1	192	0.008	0.21	3.074	192	38.0	-14	6014	6206	1.03
4.6	216	0.011	0.29	3.076	215	38.0	-14	6014	6230	1.04
6.9	324	0.016	0.43	3.080	323	38.0	-14	6014	6337	1.05
24.1	1131	0.019	0.51	3.083	1126	38.2	14	5986	7111	1.19
37.6	1765	0.021	0.56	3.085	1755	38.4	43	5957	7712	1.29
45.8	2150	0.023	0.62	3.086	2137	38.6	72	5928	8065	1.36
57.3	2690	0.026	0.70	3.089	2671	38.9	115	5885	8556	1.45
107.9	5066	0.052	1.39	3.111	4995	41.1	432	5568	10563	1.90
137.4	6451	0.090	2.41	3.143	6295	43.7	806	5194	11489	2.21
145.8	6845	0.120	3.22	3.169	6625	44.8	965	5035	11660	2.32
149.0	6995	0.145	3.89	3.191	6723	45.4	1051	4949	11672	2.36
151.0	7089	0.172	4.61	3.215	6762	45.9	1123	4877	11639	2.39
151.9	7131	0.202	5.41	3.243	6745	46.3	1181	4819	11565	2.40
153.7	7216	0.232	6.22	3.271	6767	46.7	1238	4762	11529	2.42
155.9	7319	0.261	7.00	3.298	6807	46.9	1267	4733	11540	2.44
156.0	7324	0.291	7.80	3.327	6753	47.1	1296	4704	11457	2.44
156.6	7352	0.320	8.58	3.355	6722	47.2	1310	4690	11411	2.43
156.9	7366	0.350	9.38	3.385	6675	47.2	1310	4690	11365	2.42
157.1	7376	0.380	10.18	3.415	6624	47.2	1310	4690	11314	2.41
158.3	7432	0.404	10.83	3.440	6627	47.1	1296	4704	11331	2.41
159.0	7465	0.435	11.66	3.472	6594	47.1	1296	4704	11298	2.40
160.1	7516	0.471	12.62	3.510	6568	47.0	1282	4718	11286	2.39
157.9	7413	0.509	13.64	3.552	6402	46.8	1253	4747	11149	2.35
157.5	7394	0.547	14.66	3.594	6310	46.6	1224	4776	11086	2.32
156.2	7333	0.568	15.22	3.618	6217	46.4	1195	4805	11022	2.29
154.6	7258	0.577	15.47	3.628	6136	46.4	1195	4805	10941	2.28

Data entry by: SR Date: 05/07/2008
Data checked by: ce Date: 5/07/08
FileName: TTT0TT7



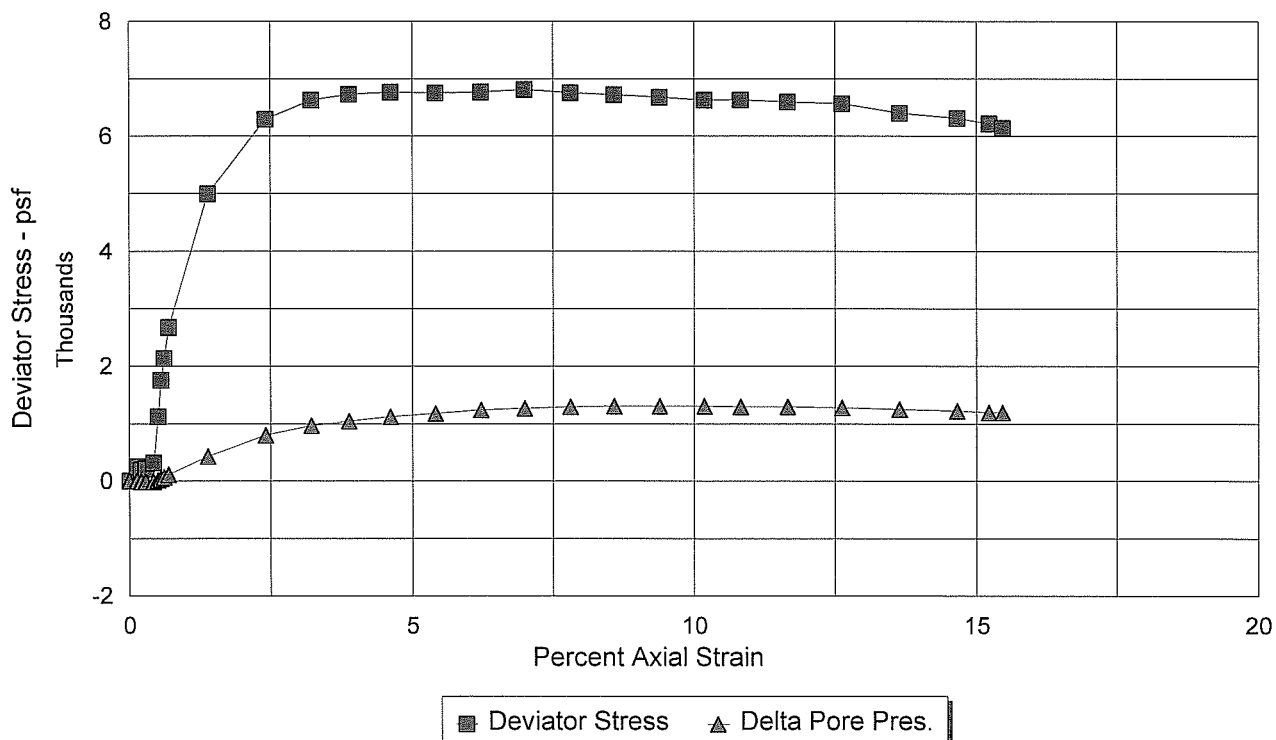
CONSOLIDATION DATA

Tt-7, 10.0', Stage 3 of 3, A



TRIAXIAL TEST - TX/CUpp

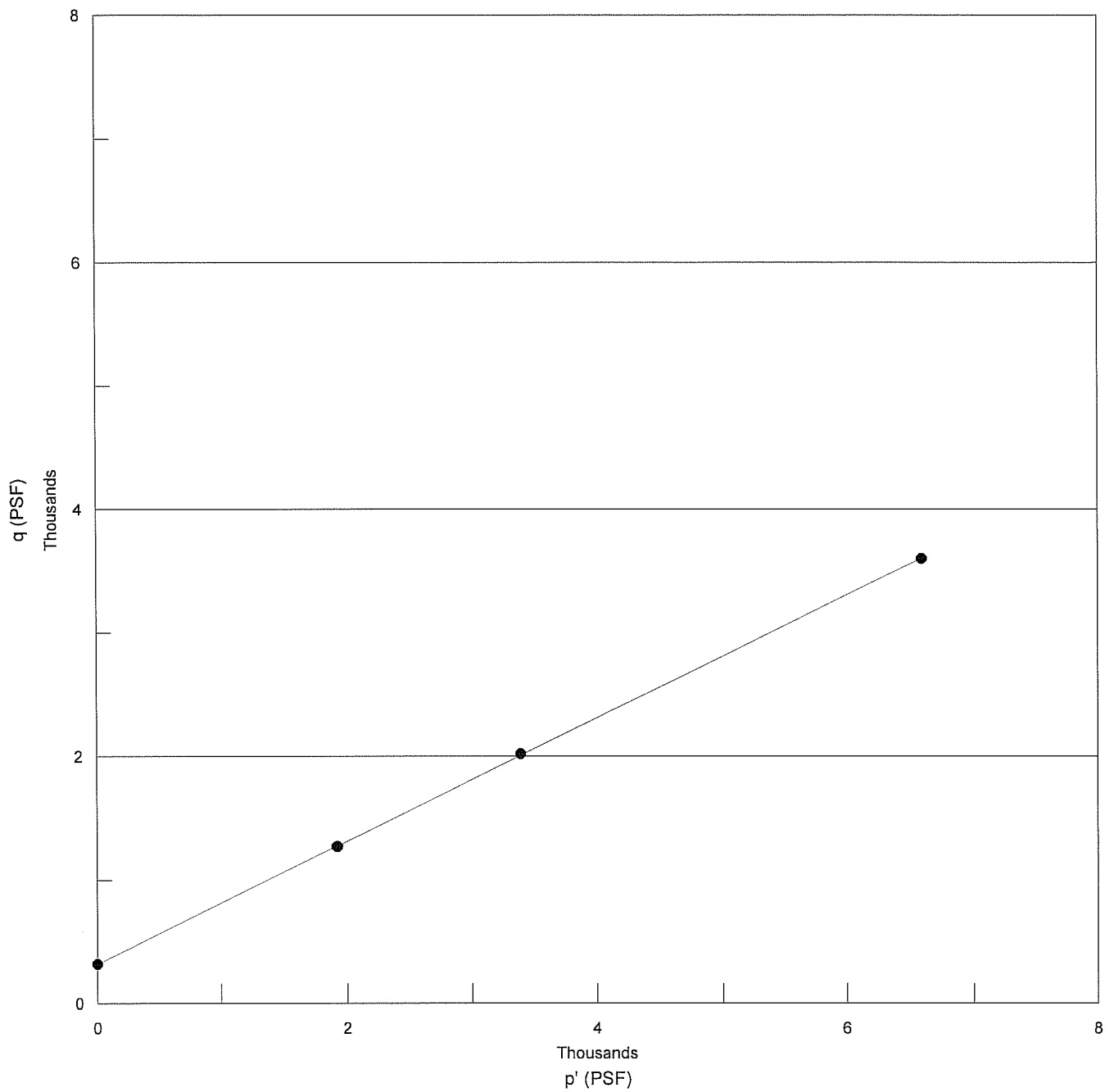
Tt-7, 10.0', Stage 3 of 3, A



Client Tetra Tech M
Job No. 2592-04
Boring No. TR-7
Depth 10'
Sample No. A
Project Rocky Fls OLF
Sampled 4/8/08 by JLR
Prepped 4/18/08 by CRK
Project No. 114-181750
STAGED TR/CUPP
1500, 3000, 6000 pcf

Effective Stress Path Analysis - p' q Regression Plot

Tetra Tech MM (Fort Collins), Tt-5, 34.0', Stage 1 of 3, A, Stage 2 of 3, A, Stage 3 of 3, A



● Shear Data

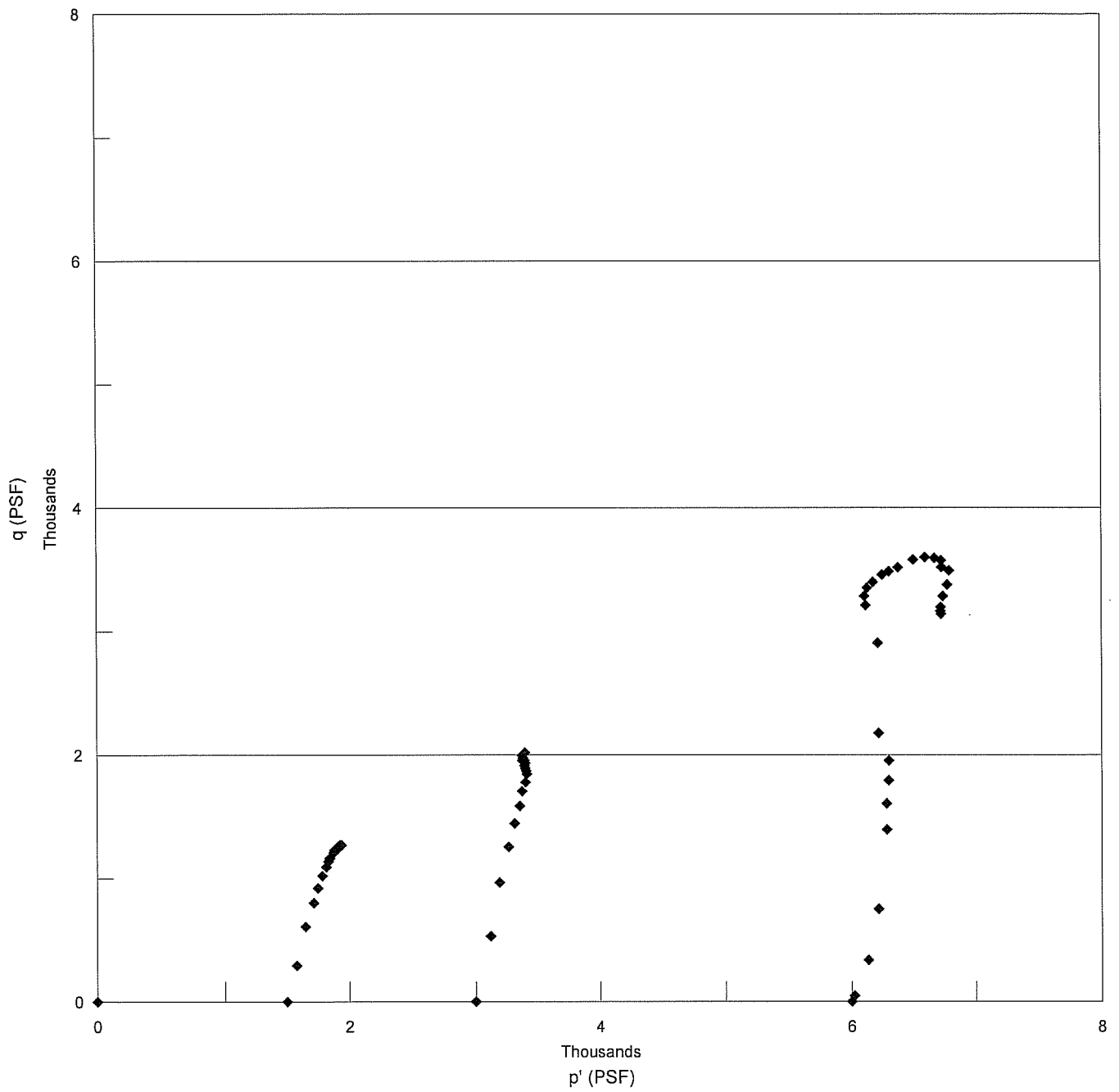
- Best Fit Line

Tau = 26.5 degrees

a = 319.6 PSF

Effective Stress Path Analysis - p' q Plots

Tetra Tech MM (Fort Collins), Tt-5, 34.0', Stage 1 of 3, A, Stage 2 of 3, A, Stage 3 of 3, A



◆ Stress Paths of Stages 1, 2, & 3, A

EFFECTIVE STRESS PATH ANALYSIS TEST DATA
ASTM D4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stages 1, 2 & 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF

SAMPLED 03-28-08 JLR
SATURATED TEST Yes
TEST TYPE TX/CUpp

Peak Points

										Peak Points	
										p'	q
										PSF	PSF
CONF. PRES. PSF	STAGE 1, A	1500		STAGE 1, A	1921	1271					
	STAGE 2, A	3000		STAGE 2, A	3391	2018					
	STAGE 3, A	6000		STAGE 3, A	6592	3601					

STAGE 1, A				STAGE 2, A				STAGE 3, A			
σ 3'	σ 1'	p'	q	σ 3'	σ 1'	p'	q	σ 3'	σ 1'	p'	q
PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF	PSF
1500	1500	1500	0	3000	3000	3000	0	6000	6000	6000	0
1284	1869	1576	292	2582	3646	3114	532	5971	6067	6019	48
1039	2256	1648	609	2222	4155	3188	966	5798	6471	6135	336
910	2515	1712	803	2006	4515	3261	1255	5467	6964	6216	749
823	2670	1746	923	1862	4754	3308	1446	4891	7675	6283	1392
766	2804	1785	1019	1762	4939	3350	1589	4675	7888	6282	1606
722	2905	1814	1091	1661	5076	3368	1707	4502	8092	6297	1795
694	2971	1832	1138	1618	5173	3395	1778	4344	8255	6300	1956
679	3002	1841	1162	1560	5254	3407	1847	4042	8396	6219	2177
665	3082	1874	1209	1531	5271	3401	1870	3307	9121	6214	2907
665	3128	1896	1232	1502	5286	3394	1892	2904	9326	6115	3211
650	3111	1881	1230	1474	5301	3387	1914	2818	9390	6104	3286
650	3157	1904	1253	1459	5330	3395	1935	2774	9482	6128	3354
650	3154	1902	1252	1430	5345	3388	1957	2774	9575	6175	3400
650	3152	1901	1251	1416	5326	3371	1955	2789	9706	6247	3458
650	3149	1900	1249	1402	5355	3378	1977	2818	9788	6303	3485
650	3147	1899	1248	1402	5351	3376	1975	2861	9891	6376	3515
650	3192	1921	1271	1373	5365	3369	1996	2918	10078	6498	3580
665	3204	1934	1270	1373	5408	3391	2018	2990	10193	6592	3601
665	3201	1933	1268	1373	5404	3388	2016	3077	10263	6670	3593
665	3199	1932	1267					3149	10296	6723	3574
								3206	10246	6726	3520
								3293	10277	6785	3492
								3394	10150	6772	3378
								3451	10020	6735	3284
								3523	9914	6719	3195
								3552	9882	6717	3165
								3581	9864	6722	3142

Data entry by: SR
Data checked by: ce
FileName: TTT0TT5

Date: 05/08/2008
Date: 5/09/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 1 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 1500

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	368.5	384.4
Wt. Wet Soil & Pan (g)	375.3	391.2
Wt. Dry Soil & Pan (g)	325.7	325.7
Wt. Lost Moisture (g)	49.6	65.5
Wt. of Pan Only (g)	6.8	6.8
Wt. of Dry Soil (g)	318.9	318.9
Moisture Content %	15.6	20.5
Wet Density PCF	124.9	129.7
Dry Density PCF	108.1	107.6
Init. Diameter (in)	1.934	
Init. Area (sq in)	2.938	
Init. Height (in)	3.826	
Vol. Bef. Consol. (cu ft)	0.00650	
Vol. After Consol. (cu ft)	0.00653	

Notes & Comments:

Data entry by: SR
Data checked by: cel
FileName: TTT0TT5

Date: 05/08/2008
Date: 5/09/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 1 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 1500

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)	Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open	
40.0	38.0	1.8	7.5			
50.0	48.0	6.2	7.1	38.1	46.0	7.9
60.0	58.0	7.2	8.1	48.4	56.8	8.4
70.0	68.0	8.0	8.9	58.2	67.0	8.8
80.0	78.0	9.0	9.9	68.2	77.3	9.1
90.0	88.0	10.0	10.9	78.3	87.5	9.2
100.0	98.0	11.4	12.1	88.1	97.5	9.4
110.0		12.1	12.2	98.2	107.7	9.5

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	12.2	0.00
0.25	0.5	13.9	-1.70
0.50	0.7	14.2	-2.00
1	1.0	14.4	-2.20
2	1.4	14.5	-2.30
4	2.0	14.6	-2.40
9	3.0	14.7	-2.50
16	4.0	14.8	-2.55
30	5.5	14.8	-2.60
60	7.7	14.9	-2.70
120	11.0	14.9	-2.70
240	15.5	14.9	-2.70
360	19.0	14.9	-2.70

Initial Height (in)	3.826	Init. Vol. (CC)	184.22
Height Change (in)	0.001	Vol. Change (CC)	13.40
Ht. After Cons. (in)	3.825	Cell Exp. (CC)	14.22
Initial Area (sq in)	2.938	Net Change (CC)	-0.82
Area After Cons. (sq in)	2.952	Cons. Vol. (CC)	185.04

Data entry by: SR

Date: 05/08/2008

Data checked by: al

Date: 5/09/08

FileName: TTT0TT5



TRIAXIAL COMPRESSION TEST DATA

CLIENT	Tetra Tech MM (Fort Collins)	JOB NO.	2592-04
BORING NO.	Tt-5	SAMPLED	03-28-08 JLR
DEPTH	34.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 1 of 3, A	TEST FINISHED	05-07-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	17S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	1500

Init. Ht. (in)	3.826	Init. Area (sq in)	2.938
Consol. Ht. (in)	3.825	Consol. Area (sq in)	2.952
Back Pres. PSI	98.8	Strain Rate (in/min)	0.005

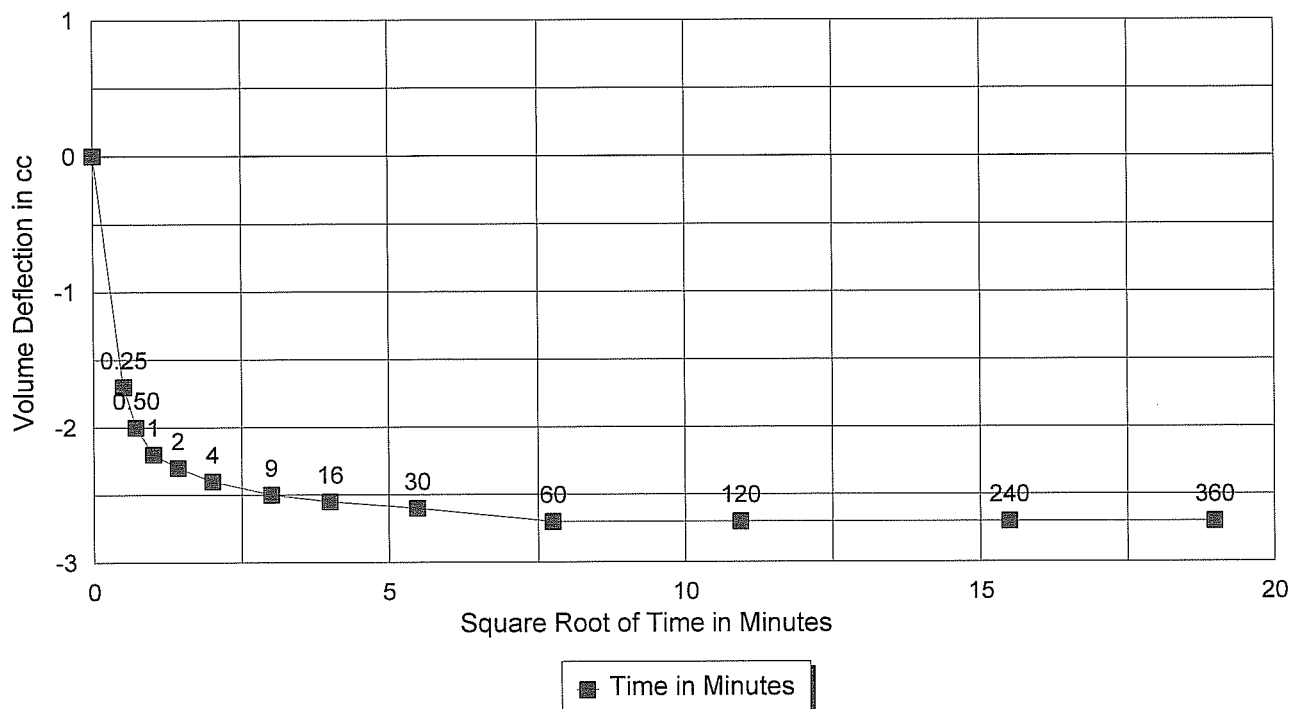
Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	2.952	0	98.8	0	1500	1500	1.00
12.0	585	0.004	0.10	2.954	585	100.3	216	1284	1869	1.46
25.0	1220	0.008	0.20	2.957	1217	102.0	461	1039	2256	2.17
33.0	1610	0.012	0.30	2.960	1605	102.9	590	910	2515	2.76
38.0	1854	0.015	0.40	2.963	1847	103.5	677	823	2670	3.24
42.0	2049	0.019	0.50	2.966	2039	103.9	734	766	2804	3.66
45.0	2195	0.023	0.60	2.969	2182	104.2	778	722	2905	4.02
47.0	2293	0.027	0.70	2.972	2277	104.4	806	694	2971	4.28
48.0	2342	0.031	0.80	2.975	2323	104.5	821	679	3002	4.42
50.0	2439	0.034	0.90	2.978	2417	104.6	835	665	3082	4.64
51.0	2488	0.038	1.00	2.981	2463	104.6	835	665	3128	4.71
51.0	2488	0.042	1.10	2.984	2461	104.7	850	650	3111	4.78
52.0	2537	0.046	1.20	2.987	2507	104.7	850	650	3157	4.85
52.0	2537	0.050	1.30	2.990	2504	104.7	850	650	3154	4.85
52.0	2537	0.054	1.40	2.993	2501	104.7	850	650	3152	4.85
52.0	2537	0.057	1.50	2.997	2499	104.7	850	650	3149	4.84
52.0	2537	0.061	1.60	3.000	2496	104.7	850	650	3147	4.84
53.0	2586	0.065	1.70	3.003	2542	104.7	850	650	3192	4.91
53.0	2586	0.069	1.80	3.006	2539	104.6	835	665	3204	4.82
53.0	2586	0.073	1.90	3.009	2537	104.6	835	665	3201	4.82
53.0	2586	0.077	2.00	3.012	2534	104.6	835	665	3199	4.81

Data entry by: SR Date: 05/08/2008
 Data checked by: cal Date: 5/09/08
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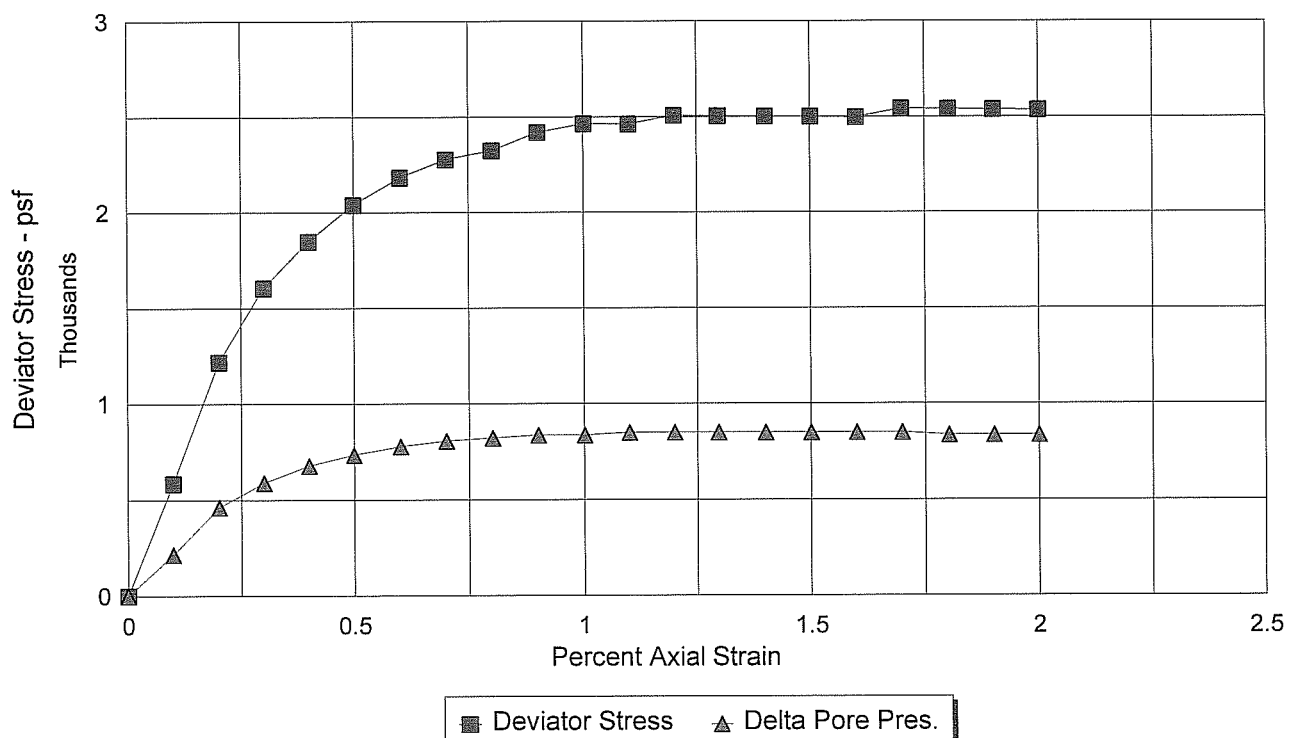
CONSOLIDATION DATA

Tt-5, 34.0', Stage 1 of 3, A



TRIAXIAL TEST - TX/CUpp

Tt-5, 34.0', Stage 1 of 3, A



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 2 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 3000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	368.5	384.4
Wt. Wet Soil & Pan (g)	375.3	391.2
Wt. Dry Soil & Pan (g)	325.7	325.7
Wt. Lost Moisture (g)	49.6	65.5
Wt. of Pan Only (g)	6.8	6.8
Wt. of Dry Soil (g)	318.9	318.9
Moisture Content %	15.6	20.5
Wet Density PCF	124.3	131.4
Dry Density PCF	107.6	109.0

Init. Diameter (in)	1.958
Init. Area (sq in)	3.012
Init. Height (in)	3.749
Vol. Bef. Consol. (cu ft)	0.00653
Vol. After Consol. (cu ft)	0.00645

Notes & Comments:

Data entry by: SR
Data checked by: cel
FileName: TTT0TT5

Date: 05/08/2008
Date: 5/09/08



TRIAxIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO.	Tt-5	SAMPLED	03-28-08 JLR
DEPTH	34.0'	TEST STARTED	04-18-08 CAL
SAMPLE NO.	Stage 2 of 3, A	TEST FINISHED	05-07-08 CAL
SOIL DESCR.	#114-181750	CELL NUMBER	17S
LOCATION	Rocky Flats OLF	SATURATED TEST	Yes
TEST TYPE	TX/CUpp	CONF. PRES. PSF	3000

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	16.2	0.00
0.25	0.5	17.5	-1.30
0.5	0.7	17.8	-1.55
1	1.0	18.0	-1.80
2	1.4	18.3	-2.05
4	2.0	18.5	-2.30
9	3.0	18.7	-2.50
16	4.0	18.8	-2.60
30	5.5	18.9	-2.70
60	7.7	19.0	-2.80
120	11.0	19.0	-2.80
240	15.5	19.0	-2.80
360	19.0	19.0	-2.80

Initial Height (in)	3.749	Init. Vol. (CC)	185.04
Height Change (in)	0.002	Vol. Change (CC)	3.30
Ht. After Cons. (in)	3.747	Cell Exp. (CC)	0.93
Initial Area (sq in)	3.012	Net Change (CC)	2.37
Area After Cons. (sq in)	2.975	Cons. Vol. (CC)	182.67

Data entry by: SR

Date: 05/08/2008

Data checked by: cel

Date: 5/09/08

FileName: TTT0TT5



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO.

2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 2 of 3, A
SOIL DESCR. #114-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 3000

Init. Ht. (in)	3.749	Init. Area (sq in)	3.012
Consol. Ht. (in)	3.747	Consol. Area (sq in)	2.975
Back Pres. PSI	98.8	Strain Rate (in/min)	0.007

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	2.975	0	98.8	0	3000	3000	1.00
22.0	1065	0.004	0.11	2.978	1064	101.7	418	2582	3646	1.41
40.0	1936	0.008	0.21	2.981	1932	104.2	778	2222	4155	1.87
52.0	2517	0.012	0.32	2.984	2509	105.7	994	2006	4515	2.25
60.0	2904	0.016	0.43	2.988	2892	106.7	1138	1862	4754	2.55
66.0	3195	0.020	0.53	2.991	3178	107.4	1238	1762	4939	2.80
71.0	3437	0.024	0.64	2.994	3415	108.1	1339	1661	5076	3.06
74.0	3582	0.028	0.75	2.997	3555	108.4	1382	1618	5173	3.20
77.0	3727	0.033	0.88	3.001	3694	108.8	1440	1560	5254	3.37
78.0	3776	0.036	0.96	3.004	3739	109.0	1469	1531	5271	3.44
79.0	3824	0.040	1.07	3.007	3783	109.2	1498	1502	5286	3.52
80.0	3873	0.044	1.17	3.010	3827	109.4	1526	1474	5301	3.60
81.0	3921	0.048	1.28	3.013	3871	109.5	1541	1459	5330	3.65
82.0	3969	0.052	1.39	3.017	3914	109.7	1570	1430	5345	3.74
82.0	3969	0.056	1.49	3.020	3910	109.8	1584	1416	5326	3.76
83.0	4018	0.060	1.60	3.023	3953	109.9	1598	1402	5355	3.82
83.0	4018	0.064	1.71	3.027	3949	109.9	1598	1402	5351	3.82
84.0	4066	0.068	1.82	3.030	3992	110.1	1627	1373	5365	3.91
85.0	4115	0.072	1.92	3.033	4035	110.1	1627	1373	5408	3.94
85.0	4115	0.076	2.03	3.036	4031	110.1	1627	1373	5404	3.94

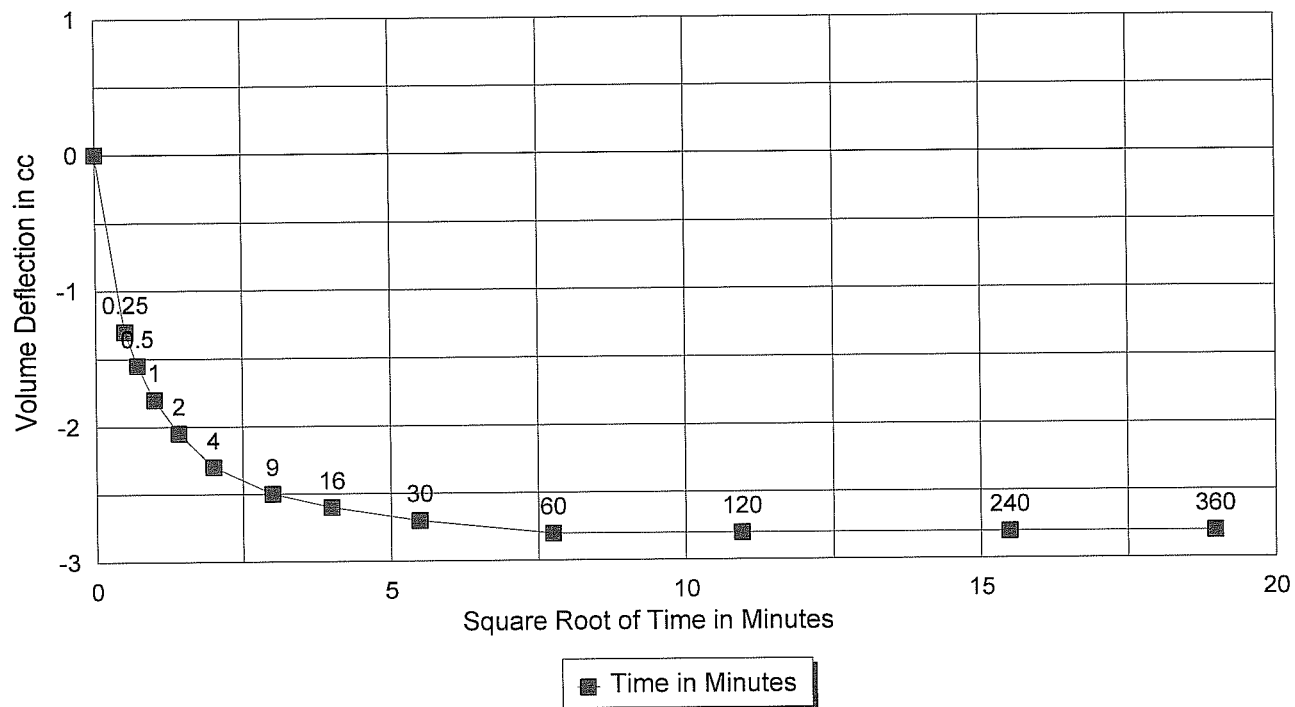
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Data checked by: cal
FileName: TTT0TT5

Date: 05/08/2008
Date: 5/09/08



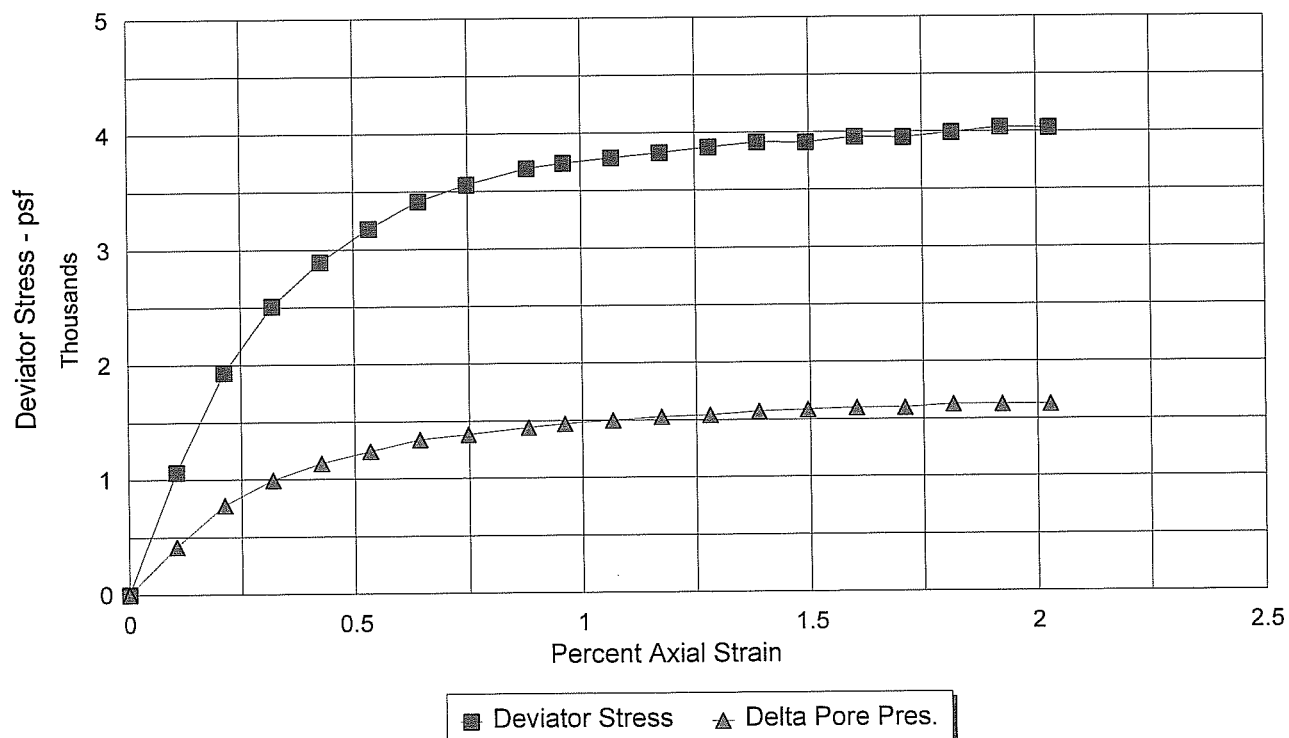
CONSOLIDATION DATA

Tt-5, 34.0', Stage 2 of 3, A



TRIAXIAL TEST - TX/CUpp

Tt-5, 34.0', Stage 2 of 3, A



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 3 of 3, A
SOIL DESCR. #141-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 6000

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER CONSOL
Wt. Soil + Moisture (g)	368.5	384.4
Wt. Wet Soil & Pan (g)	375.3	391.2
Wt. Dry Soil & Pan (g)	325.7	325.7
Wt. Lost Moisture (g)	49.6	65.5
Wt. of Pan Only (g)	6.8	6.8
Wt. of Dry Soil (g)	318.9	318.9
Moisture Content %	15.6	20.5
Wet Density PCF	126.0	133.3
Dry Density PCF	109.0	110.6
Init. Diameter (in)	1.966	
Init. Area (sq in)	3.036	
Init. Height (in)	3.671	
Vol. Bef. Consol. (cu ft)	0.00645	
Vol. After Consol. (cu ft)	0.00636	

Notes & Comments:

Data entry by: SR
Data checked by: ae
FileName: TTT0TT5

Date: 05/08/2008
Date: 5/09/08



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO. 2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 3 of 3, A
SOIL DESCR. #141-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 6000

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT TIME (Min)	Burette Reading (CC)	Vol. Defl. (CC)
0.00	0.0	20.70	0.00
0.25	0.5	22.30	-1.60
0.5	0.7	22.50	-1.80
1	1.0	22.70	-2.00
2	1.4	23.00	-2.30
4	2.0	23.40	-2.70
9	3.0	23.95	-3.25
16	4.0	24.20	-3.50
30	5.5	24.40	-3.70
60	7.7	24.60	-3.90
120	11.0	24.70	-4.00
240	15.5	24.80	-4.10
360	19.0	24.90	-4.20

Initial Height (in)	3.671	Init. Vol. (CC)	182.67
Height Change (in)	-0.001	Vol. Change (CC)	4.50
Ht. After Cons. (in)	3.672	Cell Exp. (CC)	1.87
Initial Area (sq in)	3.036	Net Change (CC)	2.63
Area After Cons. (sq in)	2.992	Cons. Vol. (CC)	180.04

Data entry by: SR

Date: 05/08/2008

Data checked by: cel

Date: 5/09/08

FileName: TTT0TT5



TRIAXIAL COMPRESSION TEST DATA
ASTM D 4767

CLIENT Tetra Tech MM (Fort Collins)

JOB NO.

2592-04

BORING NO. Tt-5
DEPTH 34.0'
SAMPLE NO. Stage 3 of 3, A
SOIL DESCR. #141-181750
LOCATION Rocky Flats OLF
TEST TYPE TX/CUpp

SAMPLED 03-28-08 JLR
TEST STARTED 04-18-08 CAL
TEST FINISHED 05-07-08 CAL
CELL NUMBER 17S
SATURATED TEST Yes
CONF. PRES. PSF 6000

Init. Ht. (in) 3.671
Consol. Ht. (in) 3.672
Back Pres. PSI 98.2

Init. Area (sq in) 3.036
Consol. Area (sq in) 2.992
Strain Rate (in/min) 0.002

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	σ 3' PSF	σ 1' PSF	Prin. Stress Ratio
0.0	0	0.00	0.00	2.992	0	98.2	0	6000	6000	1.00
2.0	96	0.005	0.14	2.996	96	98.4	29	5971	6067	1.02
14.0	674	0.008	0.22	2.998	672	99.6	202	5798	6471	1.12
31.2	1502	0.011	0.30	3.001	1497	101.9	533	5467	6964	1.27
58.1	2796	0.016	0.44	3.005	2784	105.9	1109	4891	7675	1.57
67.1	3230	0.019	0.52	3.007	3213	107.4	1325	4675	7888	1.69
75.0	3610	0.021	0.57	3.009	3589	108.6	1498	4502	8092	1.80
81.8	3937	0.024	0.65	3.012	3911	109.7	1656	4344	8255	1.90
91.2	4389	0.029	0.79	3.016	4355	111.8	1958	4042	8396	2.08
122.5	5896	0.051	1.39	3.034	5814	116.9	2693	3307	9121	2.76
136.7	6579	0.088	2.40	3.065	6422	119.7	3096	2904	9326	3.21
141.0	6786	0.116	3.16	3.089	6572	120.3	3182	2818	9390	3.33
144.8	6969	0.138	3.76	3.109	6707	120.6	3226	2774	9482	3.42
147.9	7118	0.164	4.47	3.132	6801	120.6	3226	2774	9575	3.45
151.6	7297	0.191	5.20	3.156	6917	120.5	3211	2789	9706	3.48
154.0	7412	0.219	5.96	3.182	6970	120.3	3182	2818	9788	3.47
156.6	7537	0.247	6.73	3.208	7030	120.0	3139	2861	9891	3.46
160.8	7739	0.275	7.49	3.234	7160	119.6	3082	2918	10078	3.45
163.1	7850	0.303	8.25	3.261	7202	119.1	3010	2990	10193	3.41
164.1	7898	0.331	9.02	3.288	7186	118.5	2923	3077	10263	3.34
164.6	7922	0.359	9.78	3.316	7148	118.0	2851	3149	10296	3.27
163.2	7855	0.381	10.38	3.338	7040	117.6	2794	3206	10246	3.20
163.3	7860	0.409	11.14	3.367	6984	117.0	2707	3293	10277	3.12
159.6	7682	0.442	12.04	3.401	6757	116.3	2606	3394	10150	2.99
156.9	7552	0.478	13.02	3.440	6568	115.9	2549	3451	10020	2.90
154.4	7431	0.514	14.00	3.479	6391	115.4	2477	3523	9914	2.81
153.9	7407	0.534	14.54	3.501	6330	115.2	2448	3552	9882	2.78
153.2	7374	0.543	14.79	3.511	6283	115.0	2419	3581	9864	2.75

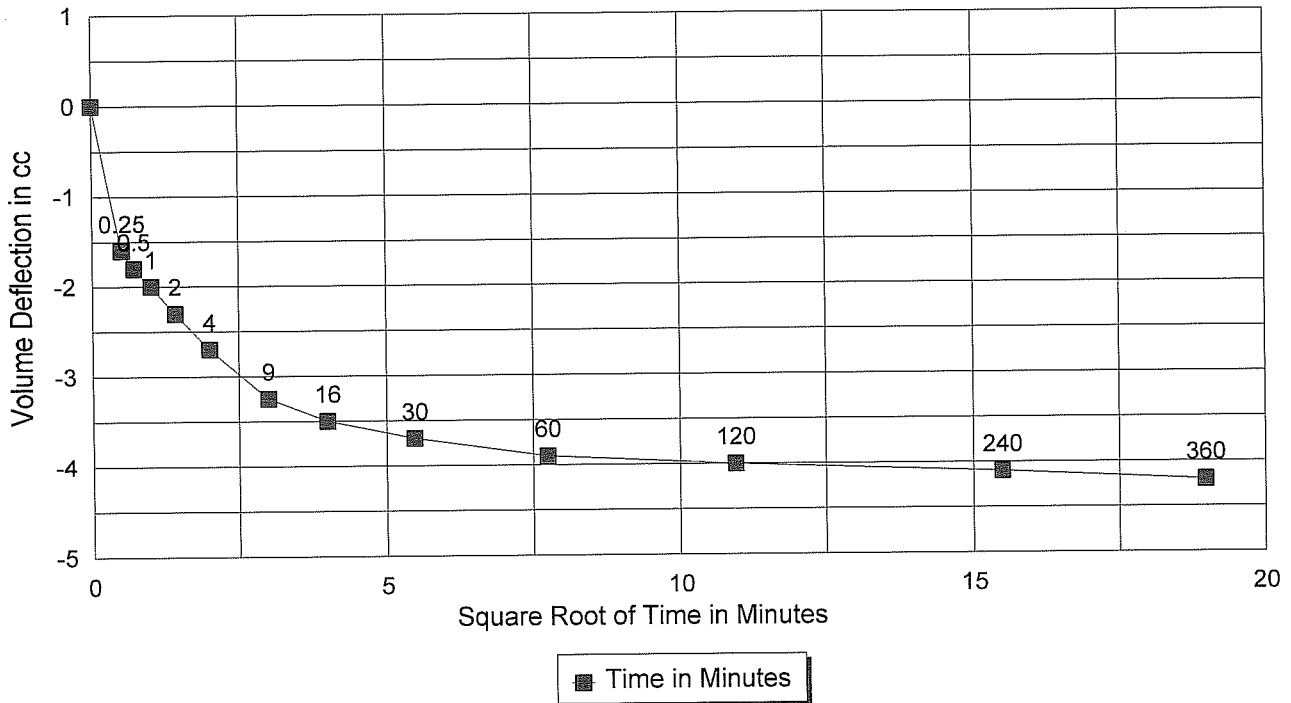
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Date: 05/08/2008
Date: 5/09/08



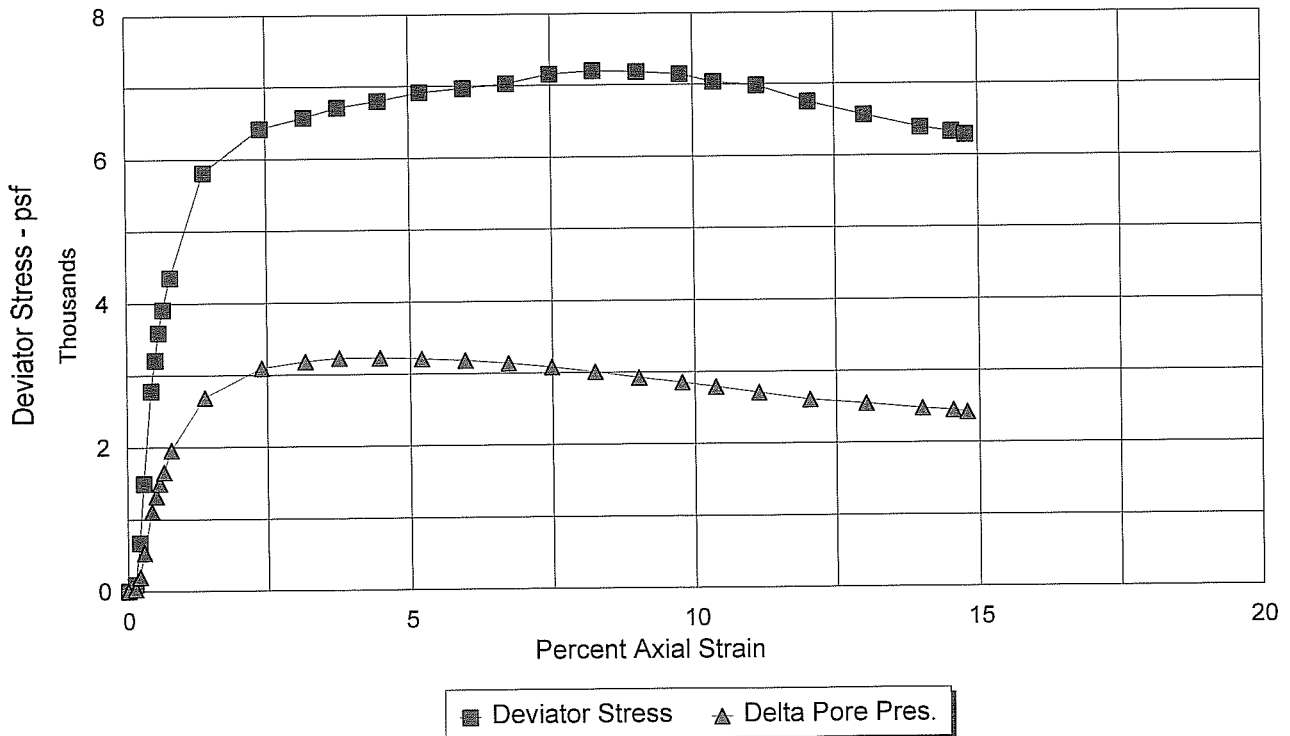
CONSOLIDATION DATA

Tt-5, 34.0', Stage 3 of 3, A



TRIAXIAL TEST - TX/CUpp

Tt-5, 34.0', Stage 3 of 3, A



Client Ted. Tech. M.M.
Job No. 2592-04
Boring No. TC-5
Depth 34'
Sample No. A
Project Rocky Flats OLF
Sampled 3/28/08 by JLR
Prepped 4/18/08 by CM
Project No. 114-181750
3 STAGE TX/cup 0₃ 1500-3000-6000 p.s.

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05-08-08